APPENDIX 3 DISCUSSION ON ECOSYSTEM APPROACH AND GOOD MANAGEMENT PLAN

3.1 A strategy of integration adapted to biodiversity: ecosystem approach

The traditional methods called "sectoral" of the natural resources management - water, forests, wetlands, fauna and flora - are far from a "durable" use of these resources. They show incapacity to apprehend the complexity of the operation of the ecological systems[1]. Their limits caused an important movement of scientific research in order to work out a global, "holistic" solution, natural stock management, based on the concept of "ecosystem" in all its components - physics, biological and human. [2]

The ecosystem approach differs from the "traditional" approaches of the integrated planning of the resources management because of several specificities. It takes scientific postulates: the functional and open character ecosystems, the recognition of the inevitability of the change, the multiplicity of the space and temporal scales, the recognition of the place of the man like integral component of the ecosystem[3]. It specifically aims at guaranteeing the ecosystem integrity, vague concept including at the very least safeguarding of the services rendered by the ecosystems and biological diversity[4], while ensuring a durable and equitable use of its elements.

1. Ecosystem approach in the Convention on biological diversity

The ecosystem approach is not directly devoted by the CBD itself. No express provision invites the Parts to adopt it systematically in the management of their territory and their living resources.

The dedication and the development of the contents of the ecosystem approach are the result of the work of the Conference of the Parts with the CBD which chose as of its second meeting in 1995 the ecosystem approach as framework for the analysis and implementation of the objectives of the CBD[5]. These principles do not have any constraining value however - as any the "ordinary" decisions of the COP.

The ecosystem approach recommended by the COP with the CBD is based largely on work of the scientists in this field. It defines it as "a strategy of integrated management of the grounds, water and resources alive, which supports the conservation and the durable use in an equitable way"[6]. Such as it is described by the COP[7], it overall consists in, promoting an integrated management ("holistic") of the

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[1] SLOCOMBE, 1998, p. 31.

[2] For a synthesis, see for ex. GRUMBINE, 1994 ; BRUSSARD et al., 1998 ; VAN DYKE, 2003, p. 268 et s.; GROOM et al., 2006, p. 467 et s.

[3] IUCN, « The Ecosystem Approach », recommandation pour la Cinquième Réunion du SBSTTA, janvier 2000, p. 2.

[4] Ainsi, pour M. Mc NEELY, le maintien de l'intégrité de l'écosystème implique *« la protection de toute la biodiversité native à tous ses niveaux, de même que les processus et configurations qui maintiennent cette diversité* » (Mc NEELY, 1999, pp. 23-24, notre traduction). Selon KARR et DUDLEY (1981), cités par DELEO et LEVIN, 1997 (p. 4), l'intégrité de l'écosystème est définie comme « *la capacité de supporter et de maintenir une communauté d'organismes équilibrée, intégrée, adaptative, ayant une composition en espèces, une diversité et une organisation foncttionnelles comparables à celles des habitats naturels de la région* ». Pour l'IUCN, les deux objectifs de l'approche écosystémique sont, d'une part, la conservation de la biodiversité et des services rendus par les écosystèmes et, d'autre part, l'équité et le partage équitable des bénéfices tirés de la conservation (IUCN, *op.cit*., p. 2). See also goals proposed by GRUMBINE, 1994 (ci-dessous, note XXX). For a study about the concept of ecosystems integritu, see DE LEO et LEVIN, 1997.

[5] Décision II/8, § 1, de la COP. Confirmed in decision IV/1, B.

[6] Décision V/6 de la COP, annexe, section A, para. 1.

[7] Décision V/6 de la COP, annexe, section A, para. 1 à 5. See corrections in decision VII/11, annexe I, section A, para. 1 à 10. Nous complétons par certains éléments tirés des principes définis à l'annexe de la décision V/6.

physical and biological resources - grounds, forests, resources water, populations of exploited species, etc. -, founded on scientifically founded, adaptive and participative practices, with for ultimate objective preserving it and guaranteeing its durable and equitable use.

2. Tension fields and principles

One can as follows summarize the tension fields of the ecosystem approach recommended by the CBD. To manage in a ecosystem way a resource initially implies to understand how and on which scales the ecosystem is structured and functions. This implies to delimit the unit of resources management on the basis of limit of the ecosystem to which it belongs. Geographically, this one can be represented on any scale - a stock, a pond, a forest, a biome. The delimitation of the ecosystem to be taken into account actually depends on the problem to solve, in so far as it is ecologically rational[8].
The scales of time to which proceed the ecological processes which animate the ecosystems - tides, cycle of water, cycles nutrients, cycles carbon, cycles erosion, migrations, etc. - must also be taken into account. They vary from the short term (of about a day) to the very long term (of about thousand of years), scale generally ignored in the stock management. The ecosystem approach must also hold account of the perpetually changing and dynamic character of ecosystems.
To this end, she recommends the recourse to methods of management known as "adaptive" - i.e. a flexible management founded on a thorough knowledge of the structure and functioning of the ecosystems and on a harvest uninterrupted collect of data ("knowledge-based management"), which adapts and improves by holding account of the positive and negative results carried out actions (approach « learning-by-doing »). The ecosystem approach in addition recognizes the part of scientific uncertainty in our knowledge on the structure and the functioning of the ecosystems while being based on the principle of precaution. Lastly, it recognizes that the men are an integral part of a great number of ecosystems, which necessarily implies to hold of it account in the decision-making, in particular by the means of an adequate participation in the decision-making process and a definition of the objectives of management on a democratic basis.

While gathering and by summarizing these principles and orientations and with regards to the literature[9], it is possible to structure the principles which form the contents of the ecosystem approach as follows:

1. Objectives and principles having to guide the decision-making:
    - Ecological dimension :
        i. To ensure the conservation in priority of the structure and the functions of the ecosystems (principle 5) ;
        ii. To manage the ecosystems within the limits of their functioning (principle 6) ;
        iii. To define long-term objectives of management of the ecosystems (principle 8)
        iv. To integrate the idea that any change is inevitable (principle 9) ;
    - Socio-economical dimension:
        i. To manage the ecosystems in an economic context (principle 4) ;
        ii. To seek a balance between conservation and use of biodiversity (principle 10) ;

2. Methods and procedural mechanisms of integration:

    - Modes of organization and participation:
        i. To promote the intersector co-operation (point de guidance 5) ;
        ii. To apply the principle of subsidiarity (principle 2) ;
        iii. To identify and ensure the participation of all the actors concerned in the definition of the objectives (principle 1) and the implementation of the measures (principle 12) ;

[8] Thus, to preserve a river, the ecosystem to be taken into account is the river and its major bed as well as the whole of its catchment area.
[9] SHEPHERD, 2004 et MATHES et FRANKENHAUSER, 2004, p. 48.

- Methods of planning and management:
    i. To make the choice of suitable scales of management in time and space (principle 7 et point de guidance 4) ;
    ii. To promote the use of adaptive methods of management (point de guidance 3) ;
    iii. To take into account of all the relevant sources of information (principle 11) ;
    iv. To evaluate the effects of the activities on the adjacent ecosystems (principle 3), including their functioning (point de guidance 1).

3. Difficulties

In spite of its promises, the recourse to the ecosystem approach to manage the natural environment presents some limit - which are certainly often only the reverse of its qualities. It proves particularly complex to implement[10], as show some problems of the environment American administration in the vision certainly extremely disparate that it developed to manage the watery forests and resources[11].
The implementation of the ecosystem approach of the stock management indeed raises an incalculable number of questions, technical, scientific, institutional and human which make random its success and causes the controversy. The principal constraints with its implementation are[12]:

- the sectorization of the institutions, administrations and public authorities which leads to a fragmentation of the decision-making process, to the absence of co-operation and coordination and, therefore, at the risks of inconsistency in the decisions about use of the ground;
- the need for a great quantity of information on the structure and the functioning of the ecosystem, information which does not necessarily exist and requires an important logistic effort;
- competition in and between authorities and administrations;
- lack of communication between concerned actors, which can make impossible any consensual approach;
- the difficulty in solving the conflicts of interests at the local level, in spite of an agreement on the general objectives;
- the institutional and administrative cutting of the territory, without relation with ecological cutting and the relevant space-time scales in ecology;
- vision with short-term of the authorities and administrations (generally limited to a legislature), which contrasts with the need for laying down objectives at long, even very long term to take into account ecological dynamics on all its temporal scales;
- vague character and complexity of the concepts used in the ecosystemic approach;
- the weak use of existing information;
- the important cost of the implementation of the approach, in terms of human, technical and financial means.

There is thus necessary to remain realistic and to regard the ecosystemic approach as a guide to adopt integrated and ecologically rational measures of management of the natural resources, rather than as a constraining framework having definitively to replace the traditional approaches currently followed to manage the territory[13].

[10] See for ex. MORRISSEY, 1998, p. 207 et s.; SLOCOMBE, 1998, p. 33; Mc NEELY, 1999, p. 24 ; IUCN, op. cit., p. 3 et s.
[11] See MORRISSEY, 1998, p. 207 et s.; VAN DYKE, 2003, p. 269 et s.
[12] See SLOCOMBE, 1998, p. 33 ; Mc NEELY, 1999, p. 24 ; CORTNER et al., 1998, p. 161, and references.
[13] Mc NEELY, 1999, p. ; GROOM et al., 2006, p. XXXX.

3.2 Describing the concept of a good management plan

When trying to define what "a good management plan" is, one could find many ways to approach this exercise. One possibility is to regard the concept of a management plan in the scope of the so called Ecosystem Approach[14] (EA). The EA is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way (see Appendix). Application of the Ecosystem Approach will help to reach a balance of the three objectives of the Convention on Biological Diversity (i.e. the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources).

The management plan is the starting ground for the actual management on the field. As it is the case for the entire management execution, also the management plan itself is subducted to the continuous process of implementation, evaluation and adaptation. This is shown in figure 1.

Figure 1: The management plan, as part of the entire management process, is subducted to the continuous cycle of implementation, evaluation and adaptation.

A management plan can be divided into three main parts, as depicted in figure 2. First of all, the making of a management plan starts with the process of the development of the plan. The process of development for a management plan consists of several activities, actions and points of interest that have to be taken into account before the actual composition and building of the plan.
The next step is the composition of the content of the management plan. Here, special attention has to go to the description of the relevant aspects of the current and target situation. There should be a major contribution of the composers of the management plan for the description of the strategy towards its objectives. The strategy describes the possible instruments and (technical) measures that will be used in the implementation phase, but also in which sequence and combination they are to be put in.
The implementation is the last phase in the making of the management plan. It consists of a description of the actual execution of the plan. Furthermore, the financing of the measures is depicted in this part of the management plan. As defined in the management cycle, there has to be sufficient attention for the way how the instruments and actions of the plan will be implemented. Last but not least, the implementation and the plan itself have to be evaluated and if necessary, adapted to new insights and knowledge.

[14] COP 7 Decision VII/11, *Ecosystem approach*, Kuala Lumpur, 9 – 20 February 2004

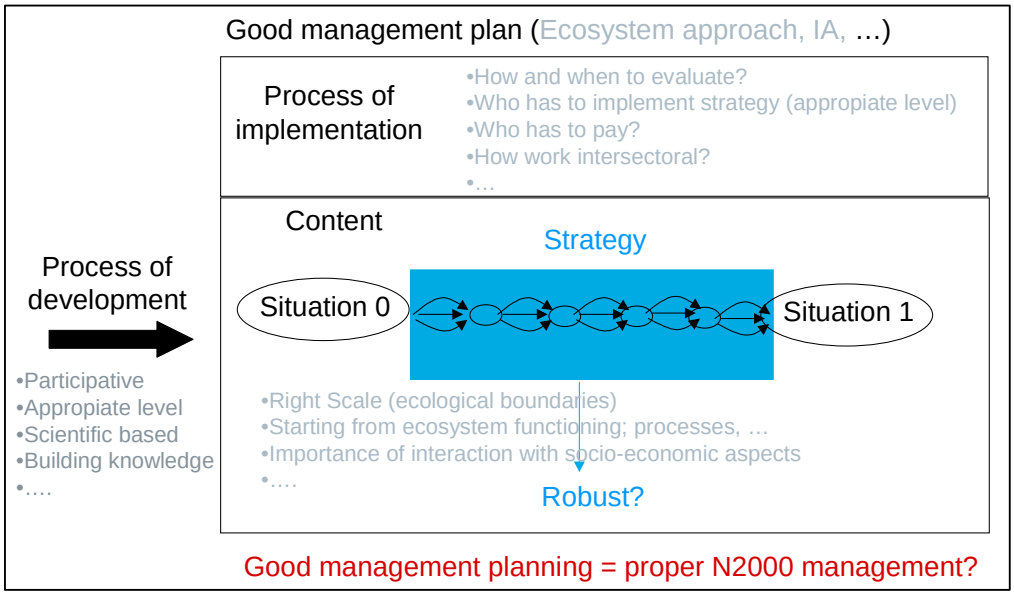

Figure 2: Schematic presentation of a good management plan

In order to assess the robustness of the management plan, the different steps of the process are confronted with the 12 principles of the Ecosystem Approach.

1. Process of development

The process of development contains important fundaments for the creation of a robust management plan.

1.1 Initiation

Starting a management plan and initiating the building of a network of cooperating administrations, officials and stakeholders begins with composing some general objectives for an area of ecological importance. These objectives can be placed in one or several scenarios, presenting the possible development. All relevant partners have to be involved in the development of these objectives in order to know what the aims and the prospects are for the site in which they are involved. They have to understand why these objectives are chosen and what the (scientific) basis is for the scenarios. Moreover, as explained later, all partners have to understand from the beginning their role in this process and why they are involved. Setting clear objectives from the beginning for the cooperation is crucial.

1.2 Inventory

The inventory phase is composed by the preliminary investigation on available indigenous, local and scientific knowledge on all sorts of socio-economic and ecological aspects. Moreover, one should gain insight in the legal framework relevant to the site and its surrounding area. As it is important to decentralize the management of nature sites to the lowest appropriate level, the understanding of the different levels of relevant administrations is another crucial aspect.
The inventory phase also consists of the preliminary research on the content aspect of the management plan. As new inventories and research takes time, one should start up collecting data early in the process when they are not available. For evaluation, managers also need a null-value, a description of the current situation. While this is part of the content aspect of a management plan, it is of major importance to start data collection and monitoring on this aspect. The success of the process of developing and implementing and recurrent evaluation of a management plan partially depends on a sound scientific basis and knowledge. As so, the start of the making of a management plan should prioritize the identification of gaps in our knowledge. Next to scientific knowledge, it is important to

have enough attention for capacity building. As some of the stakeholders will have a more limited knowledge of certain (environmental or socio-economic) aspects of a management plan, their education will increase the likelihood of a successful cooperation. While scientific insight and monitoring results will gradually increase the knowledge of the site and the impact of management measures, one has to consider in advance that nothing is certain on the longer term. Making stakeholders and the general public aware of this uncertainty in management will reduce the chance for lost involvement or cooperation in the future.

1.3 Participation

Appropriate participation refers to the necessity of an equitable involvement for all stakeholders and actors towards the building and the content of the management plan. During the definition of the spatial context of the plan, it will become clear that other actors and stakeholders will have to participate in the process of development. Here, a difficult balance arises between involving many stakeholders and building a plan for a large area or making the perimeter smaller and cooperate with less stakeholders. Therefore, the initiator of the management plan should have a clear view of all relevant sectors and stakeholders. At all times, flexibility is needed. Concerning the relevant actors, one needs to ensure that they all have the capacity to become effectively involved. By consulting them, it might become clear that extension of the perimeter is necessary, meaning that other stakeholders have to be consulted as well. Next to changes in spatial scale, the consultation might bring up the need for a change in temporal scale, i.e. phasing of the plan. The role of a stakeholder can change over time, where some will become more and others less important during the process of actual implementation. Stakeholders have to be aware of this and therefore, as part of adaptive management of the site, participation must be adaptive as well. The use for all sorts of participation, in both inventory and decision making processes, has to be in balance with the socio-economic context, existing societal mechanism or, if new mechanism are build, managers have to make sure they are compatible with existing societal conditions. This approach is most likely to create more citizen involvement and participation in the project.

2. Content

The main goal of the management plan is the conservation of ecosystem structure and functioning as such and with it maintaining the benefits from ecosystem services. The strategy to realize this goal will be set out in the content of the management plan. In that sense, the content is the most practical part of the management plan. In short, the content of a good management plan is the part which includes the actual analysis of the current situation (and its threats), the description of the favourable conservation status and the protocol for the action (on and off the terrain) to reach that status.

2.1 Current situation

A general description of the current situation must be established, providing sufficient information about the main threats and difficulties to manage the site. This description consists of a physical description on the one hand (including a description of the site limits, the local and regional climate, geology, geomorphology, soil and hydrology), and a description of the ecosystems state on the other. The analysis of the current situation of the protected area is extremely important, as the whole strategy to realize the management goals will be based on this part.
The actual state of the ecosystem is to be described by means of the appropriate indicators. In this part, the interrelationship among ecosystem composition, structure and function with respect to human interaction, needs and values (including cultural aspects), conservatory management of biodiversity, and environmental quality, integrity and vitality must become clear. Thus, besides a mere ecological description, also the socio-economic context (hunting, fishery, recreation, historical land use, …) must be taken up in this analysis. The knowledge of the responses of the ecosystem, in terms of changes in composition, structure and function, to both internally and externally induced threats (human use, disturbance, pollution, fire, alien species, disease, abnormal climatic variations such as drought and flood, …) should be assembled here. Traditional knowledge and practice should be used to enable better detection and comprehension of ecosystem change, and to develop appropriate adaptation measures. Usually, there is a need to understand and manage the ecosystem in an economic context. When valuating the ecosystem, appropriate practical economic valuation methodologies for ecosystem goods and services must be applied, and all values should be incorporated (direct, indirect and

intrinsic values). It is important that all stakeholders agree on the used methodology for the economic valuation, to avoid discussions afterwards.

2.2 State to reach

The state to reach is the counterpart of the current state described above. Here, the management objectives are laid out, and a vision of the future of the ecosystem is elaborated. Assumptions behind proposed management decisions should be based on the best available expertise, explicitly compared to scenarios of future change and including the knowledge and views of stakeholders. As the favourable conservation status is the result of the planned restoration and development of the current ecosystem, it will strongly depend on the general description of that current situation. This emphasizes the importance of a correct and profound analysis of the ecosystem in its present state.
When defining the goals for management, the appropriate balance between conservation and use of biological diversity is to be found. Sustainable use objectives are to be determined and defined and are to be used to guide policy, management, and planning, with sufficient stakeholder participation. The management of areas and landscapes has to be carried out in such a way that the delivery of ecosystem goods and services to meet human requirements, as well as conservation management and environmental quality are optimised. The final goals must be in relation with the societal choice.

2.3 Strategy

The bridge between the current and favourable status is formed by the management-strategy. Here, the protocol for the action (on and off the terrain) to reach the favourable status are worked out. Broadly speaking, the right strategy means using the right instruments and measures at the right time in the right sequence and the right combination. The strategy must therefore consist of the elimination of practices that are not sustainable and the development and application of appropriate mechanisms to improve the status of the ecosystem. These mechanisms must have the ability to be implemented over the long term, but at the same time, must provide the possibility to undergo evaluation and – if necessary - adaptation during the management process. The management of ecosystems must always be carried out within the limits of its functioning. As a lot of uncertainties arise concerning those limits, the precautionary approach should be applied. By formulating, reviewing and implementing regulatory framework, codes of good practice and other instruments, the use of ecosystems beyond their limits can be avoided.
At all time, the management has to take into account the possible effects of their actions on adjacent and downstream ecosystems. These effects are to be evaluated by all relevant stakeholders and technical experts to make sure adverse consequences are minimized. The assessment of impacts can be done through a scenario development in collaboration with relevant stakeholders. The knowledge gained by this exercise can give input to the set-up of (precedent) monitoring programs. Also Environmental Impact Assessments (EIA's) can play an important role in this aspect. Yet, natural resource managers must also recognise that natural and human-induced change and pressure are inevitable and take this into account in their management plans. When elaborating the strategy to be followed, it is important to keep in mind that management must take place at the right spatial and temporal scale. Similar to phasing in stakeholder participation, the management has to recognize the relevance of phasing of the implementation of measures and instruments. As some measures are not feasible or effective in the short term, long term approaches have to be implemented as well (see also EA principle 8, 9). As long term objectives are set, short- and mid-term objectives need attention as well. As much as the temporal scale, management should take spatial scale into account. The management of nature reserves should not stop at the boundaries of the sites and external stakeholders need involvement that is recognized by internal stakeholders and site managers. The choice for the spatial scale of the management plan is affected by the choice for management measures and their effects on adjacent sites and ecosystems. Hereby, one must realise that regional collaboration is necessary to deal with large scale changes.
The management of an ecosystem always takes place in an socio-economic context. Therefore, any ecosystem-management programme should reduce the market distortions that adversely affect biological diversity and align incentives to promote biodiversity conservation and sustainable use. Furthermore, costs and benefits in the given ecosystem must be internalised to the extent feasible with the objective of sharing costs and benefits in an equitable way. Sociological aspects, such as the respect for local traditions are not to be overlooked either.

3. Process of implementation

The last phase in the making of the management plan is the implementation phase. It consists of a description and planning of the actual execution of the plan. Here, the process-coordination is worked out. This means that all aspects concerning the distribution of tasks and responsabilities, the functions of managers and stakeholders and the finance questions are handled. Last but not least, a programme for monitoring and evaluation must be set up in order to adapt the management to new insights and knowledge.

Once strategies have been developed, the next step is to make sure they are correctly implemented and that their implementation is effective on the long term. An effective implementation cannot stand without cooperation between multidisciplinary professional and scientific expertise. From the very beginning of the implementation, it has to be clear who will be involved when and for what purposes. Working out scenario exercises with different groups of stakeholders can provide part of this necessary knowledge. It must be stressed that implementing long-term management requires stability of institutions, legal and policy frameworks, monitoring programs, and awareness-raising programs. In order to increase the responsibility, ownership, accountability and participation, management should be decentralized to the lowest appropriate level. To counteract the fragmentation of decision making and its related problems, the sharing of information and expertise and the nesting and linking of decisions are basic principles to respect. Furthermore, the relationships between all stakeholders are to be encouraged and supported. This takes time, so (financial) resources have to be secured to keep the process going. During the implementation process, possible trade-offs between short-term benefits and long-term goals must be recognised. A clear communication between the different management bodies and between the community and the overall management is indispensable. Only this way, overlap and actions taken at the wrong level can be avoided and intersectoral understanding is maximised.

The establishment and maintainance of feed-back mechanisms, in order to monitor the effects of management practices across ecosystems, forms a key-factor in the implementation process. An appropriate management plan should always be linked to the monitoring of population sizes of vulnerable and important species as well as to the detection of long-term, low frequency changes in ecosystem structure and functioning. Initial measures are evaluated and will be re-installed or replaced if it becomes clear they lack the desired results or if external effects occur outside the accepted range of impact. This can only become clear if a monitoring program is available. The detection of incapacities and external effects is crucial, as it creates the need for mitigation, alternative measures, or even compensations. The feedback of information to the appropriate persons and institutions must take place at regular intervals. In addition, it is important to incalculate the time lag between management actions and their outcomes. Landscapes can be restored on a short base but this does not mean that the whole ecosystem is restored. For example, after years of agricultural activities, soils need years to recover. Because the realisation of the final objectives can take many years, long term objectives must be accompagnied by mid-term objectives in order to be able to verify whether the management is going in the right direction.