GEM-CON-BIO

Governance and
E cosystem
M anagement for the
CON servation of
BIO diversity

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FOREWORD

The GEM-CON-BIO project has been based on the common acceptance that in Europe we face a number of serious challenges regarding the protection of our natural heritage and the sustainable use of our natural resources. These challenges are evident in our everyday life and require an urgent and effective solution. It is a widely spread phenomenon in Europe the existence of an extensive network of protected areas, though the vast majority of biodiversity is found outside them. As a result, in the last few years we have witnessed massive declines in biodiversity and equivalent declines in the ability of ecosystems to provide the necessary services for our communities. In order to restore this balance, the active participation of all stakeholders is required. It is certain that we have to become increasingly clever in how we integrate environmental concerns into all sectors of resource use. The GEM-CON-BIO project was initiated in order to contribute to that direction by identifying the different ways in which we can sustainably manage our natural resources.

GEM-CON-BIO is a FP6 funded project under Priority 7 - Citizens and Governance in a knowledge-based society. It ran for two years bringing together 9 partners from 7 European countries, plus partners from the United States, Iran, Indonesia, and Bolivia.

The project partners are:

1. Aristotle University of Thessaloniki (Coordinator, Greece)
2. The World Conservation Union (Belgium)
3. Stockholm University, Centre for Transdisciplinary Environmental Research (Sweden)
4. Institute for International and European Environmental Policy (Germany)
5. Anatrack Ltd (United Kingdom)
6. Tero Ltd (Greece)
7. University of Debrecen, Centre for Environmental Management and Policy (Hungary)
8. Danube Delta National Institute for R&D (Romania)
9. Saxon Academy of Sciences and Humanities, working group on Natural Balance and Regional Characteristics (Germany)
10. Centre for Sustainable Development and Environment (Iran)
11. Fundación Yangareko (Bolivia)
12. Centre for International Forestry Research (Indonesia)

The strategic objective of GEM-CON-BIO has been to explore the interactions between governance modes and sustainable development objectives in view of identifying what governance processes and institutions can best contribute to the conservation of biodiversity. In order to achieve this objective, GEM-CON-BIO has investigated the different types and modes of governance which are related to biodiversity conservation and sustainable development, has identified critical characteristics and threshold factors, which exist in the environment of an ecosystem management authority (environmental, social and economic factors), and has conducted research on a range of case studies on biodiversity governance. Lessons have been drawn from community and private sector experiences, from region-specific practices and conditions and from efforts to link ecosystems in order to achieve a broad management and governance level (regional, national and global). Co-management approaches, currently flourishing all over the world, have also been an important focus of discussion.

The main results of the project can be summed up as following:

a) an analytical framework for the elaboration of the case studies
b) reports on the 29 case studies conducted on the basis of this framework
c) a governance matrix linking governance structures and ecosystem management practices, and a set of corresponding policy guidelines which can act as a guidance tool on how governance can be improved

In specific, GEM-CON-BIO has conducted research on a number of case studies across Europe, US and third countries, examining different ways of management (e.g. private ownership, public

authority, community management etc) and comparing the "success" or "failure" of different biodiversity conservation approaches. The scope of the case studies' elaboration has been the development of recommendations and guidelines addressed to the policy makers for the conservation of biodiversity.

The 29 case studies elaborated by the GEM-CON-BIO researchers present a great variety in terms of spatial levels and time frames. They are distinguished in three major groups:

a) Those carried out in EU and US at ecosystem/local level;
b) Those carried out in other non-western countries adopting a slightly different analytical framework; and
c) Those focusing the analysis on one or more specific uses of natural resources and biodiversity at international/European level.

First and foremost, each case study has been analyzed on the basis of the GEMCONBIO's analytical framework. The framework groups around 70 research questions/variables into five clusters structured around a rationale. Specifically, the analytical framework identifies natural, social, economic, institutional, resources, together with external drivers, and major threats affecting a case study area, as determining factors of governance initial capacity for setting ecosystem management objectives and decision making. It is accepted in the framework that both initial capacity and ecosystem management objective influence the governance processes adopted (regulatory, economic/financial, societal instruments). The impacts on each study area are then divided in several categories (economic and financial, social and ecological, including biodiversity change) and examined separately. Evaluation of governance effectiveness is carried out in each case study by comparing the initial situation with the final one in a defined period of analysis at a specific spatial level (local, regional, national, European). The analytical framework for the conduction of the case studies provides a common research tool to identify what are the most significant governance and critical ecosystem management characteristics which may or may not explain conservation results and sustainable use of biodiversity.

At this point, it has to be noted that the GEM-CON-BIO framework is scale-free, meaning it may work for all institutional scales and explore links between institutional processes at different scales. Each cycle starts by assessing the Initial Capacity (ecological capacity including drivers and threat, socio-economic capacity, governance capacity, regulatory capacity, and general social capacity). Based on this general capacity, an assessment is made of how management objectives are determined, whether an integrated perspective (e.g. the ecosystem approach) is employed, and whether efforts to monitor are taken (which is necessary for an adaptive management). Then the framework calls for detailed analysis of the governance processes, how regulations are linked between multi-level institutions, how rules are enforced, how monetary and social incentives are provided, whether and how stakeholder groups collaborate in horizontal and vertical networks, how local ecological knowledge is embedded in management plans, the role of leadership, and so on. Since the framework focuses on governance and ECM, the impacts of these are assessed on market opportunities, on social organization (changes in stakeholder collaboration and local social capital) and ecosystem services including the threats (drivers and pressures) to ecosystem services. Hence, "impact" does not mean impact of drivers and pressures but impact of governance (which of course sometimes can be regarded as drivers, e.g. the Common Agricultural Policy or economic policies). In this respect the GEM-CON-BIO framework differs from both the MEA (Millennium Ecosystem Assessment) and the DPSIR (Driving forces - Pressures - State - Impact - Responses) frameworks.

A synthesis of the outcomes from the case studies has been made in order to:

a) Test the validity of the analytical framework as a research tool to carry out case studies and identify the most important factors of governance and ecosystem management and their relationships with biodiversity conservation.
b) Understand if the use of the analytical framework can facilitate the comparison and integration of outcomes among case studies results, thus, to enhance the capacity of

identifying existing relationships between factors of governance, ecosystem management and biodiversity conservation

The results achieved indicate that the GEM-CON-BIO analytical framework is a research tool of utmost usefulness in terms of synthesizing and comparing outcomes from case studies and drawing conclusions on the most important factors of governance impacts on biodiversity conservation. Also, the analysis of the 29 case studies has indicated many differences amongst case studies for what regards:

- ecological, social, economic, cultural, institutional, contexts,
- spatial level (e.g. ecosystem/local or national/international levels)
- temporal dimension (e.g. the time span analysed).

The most important outcome of the GEM-CON-BIO project is the formulation of its results into a set of policy guidelines. These guidelines provide explanatory and supporting material in accessible form while highlighting the relevance of guidelines at different levels of government and in a variety of biodiversity contexts. The applicability of the guidelines with European policy makers at all levels of governance (local, regional, national, international) had been discussed with the GEM-CON-BIO consortium and evaluated in a policy conference which took place in Brussels. Thus, and that is the most important contribution of the project to the conservation of biodiversity across Europe, the guidelines may be applied or work as a guidance tool for the design and the implementation of new policies in the field of biodiversity conservation.

The Project Public Report is divided in eight chapters providing all the information on the project's history, performance and outcomes. In Chapter 1, the main research questions and the project's objectives are described and critical concepts, such as the ecosystem management approach and the term of governance, are clarified while the linkages between these two concepts are introduced. In Chapter 2 the GEM-CON-BIO analysis framework is analysed in comparison with other well known frameworks. Chapter 3 refers to the critical issue of the methodology developed for the analysis of the GEM-CON-BIO case studies, followed by the project's experience in Chapter 4 and the case studies presentation in Chapter 5. The main results of the GEM-CON-BIO project and the synthesis of these results are provided in Chapter 6. Chapter 7 consists of the policy guidelines for improving governance for biodiversity conservation in Europe as well as for EU development policy affecting governance of biodiversity in non-western third countries and the third countries. Last but not least, Chapter 8 refers to the project's dissemination activities and provides critical concluding remarks on the future of biodiversity conservation in Europe.

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CHAPTER 1. OVERVIEW

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1.1 Background

1.1.1 Origins of the Project / FP6 Topic Addressed

GEMCONBIO was submitted on the last call of the 6th Framework Programme FP6-2004-CITIZENS-5 of the Priority 7 ***"Citizens and Governance in a knowledge based society"*** in the Research Area 4 ***"The implications of European integration and enlargement for governance and the citizen"*** under the Research Topic 7.4.2.2 ***"Governance for sustainable development"***. The call was open to STREP and Coordination Actions covering 17 different topics. In the specific topic, 26 proposals were submitted, 7 passed the evaluation threshold, while 3 were finally received financing for a total of approximately €3.5 million. GEMCONBIO had the highest mark in this topic and the second highest for all topics.
The objective of the Research Area 4 "***The implications of European integration and enlargement for governance and the citizen"*** is to clarify the key interactions between European integration and enlargement, and issues of democracy, institutional arrangements and citizens' well-being.
The topic 7.4.2.2 **"Governance for sustainable development"** was one of the two topics under this research area relevant to Specific Targeted Research Projects and Co-ordination Actions. The topic highlighted the EU's commitment both to improve its governance and to foster sustainable development. While 'good governance' and 'sustainable development' are broad concepts with broad political and public support they also involve possible tensions and conflicts. **The topic's objective was to explore the interactions between governance modes and sustainable development objectives in view of identifying what governance processes and institutions can best foster sustainable development within a European knowledge based society.**
STREPs and/or CAs were expected to examine the relations between local, national, European (including implications of EU enlargement), and global governance in the management of environmental resources and in implementing sustainability; environmental security and options to deal with vulnerability of social groups and economic sectors to global environmental change. Research was also expected to analyse how current policy 'sectoralisation' provides obstacles to, or can accommodate, an integrated approach to sustainable development (that is the pursuit of environmental, economic and social sustainability); the relations between different cycles –e.g. political, administrative and investment cycles- of short/medium term and the long-term perspective required by sustainable development approaches. Sustainable development also raises specific research issues in relation to democracy and the knowledge based society, e.g. citizens participation in setting sustainable development objectives and related policies, the role of knowledge in fostering sustainable development, corporate social responsibility, the tackling of distributive aspects across generations and social groups as well as between wealthy and poor countries (e.g. governance implications of concepts of inter- and intra-generational justice, and international fairness).
GEM-CON-BIO answered directly to the objective of this topic by focusing its research on the conservation of biodiversity, as one of the main elements of sustainable development. Specifically GEM-CON-BIO had

the strategic objective to explore the interactions between governance modes and sustainable development objectives in view of identifying what governance processes and institutions can best contribute to the conservation of biodiversity. By doing so, GEM-CON-BIO assists the EU in improving its governance modes and in fostering sustainable development.

1.1.2 Initial Consortium / Description and Tasks

The initial consortium of GEMCONBIO was constituted by 9 partners from Greece, Belgium, Sweden, Germany, UK, Hungary and Romania (see table 1).

Table 1. List of initial participants

Part. No.	Participant name	Part. short name	Country	Major function
1	Aristotle University of Thessaloniki	AUTH	Greece	Project management, case studies, dissemination, assessment and evaluation
2	IUCN	IUCN	Belgium	Analysis of ecosystem management characteristics, case studies, development of policy guidelines, dissemination, assessment and evaluation
3	Stockholm University	CTM	Sweden	Analysis of governance types, case studies, dissemination, assessment and evaluation
4	Ecologic	Ecologic	Germany	Case studies, awareness and dissemination, assessment and evaluation
5	Anatrack Ltd	Anatrack	UK	Case studies, dissemination
6	Tero Ltd	Tero	Greece	Case studies, dissemination
7	University of Debrecen	UD	Hungary	Case studies, synthesis of results, dissemination, assessment and evaluation
8	Danube Delta National Institute for R&D	DDN	Romania	Case studies, dissemination
9	Saxon Academy of Sciences	SAS	Germany	Case studies, dissemination

Aristotle University of Thessaloniki (www.auth.gr/agro): The School of Agriculture of the Aristotle University of Thessaloniki was established in 1928 and is currently a branch of the Faculty of Geotechnical Sciences of Aristotle University of Thessaloniki. Over the 70 years of its history the School of Agriculture offered about 8.200 BSc Degrees, 350 MSc degrees and 170 PhDs. The School of Agriculture is housed into the Building of the School of Agriculture and Forestry in the University Campus, lying in a central location of Thessaloniki. It occupies 5 floors. Some laboratories and other facilities are situated off campus at the University Farm School (10 Km away from the University), where certain facilities like greenhouses, meteorological stations, livestock building etc. are available providing an area of about 2,000 acres for students' practical training and agricultural research. The Department of Agricultural Economics has participated in many European and national projects.
The World Conservation Union (www.iucneurope.org): IUCN was founded in 1948 and brings together 79 states, 112 government agencies, 760 NGOs, 37 affiliates, and some 10,000 scientists and experts from 181 countries in a unique worldwide partnership. Its mission is to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable. Within the framework of global conventions IUCN has helped over 75 countries to prepare and implement national conservation and biodiversity strategies. IUCN has approximately 1000 staff, most of whom are located in its 42 regional and country offices while 100

work at its Headquarters in Gland, Switzerland. IUCN is represented in Europe with its IUCN Regional Office for Europe (ROfE) whose mission is to contribute to a sustainable Europe by influencing policy development and implementation for biodiversity and landscapes conservation, restoration and sustainable use inside and outside Europe. ROfE is coordinated through its office in Brussels, but it also has Programme Offices in Warsaw, Moscow and Belgrade. ROfE works with over 366 member organizations across its Programme region.

Centre for Transdisciplinary Environmental Research, Stockholm University (www.ctm.su.se): The Centre for Transdisciplinary Environmental Research (CTM) aims to catalyze environmental research and promote environmental education across the faculties of Stockholm University. CTM has extensive international research collaboration within The Resilience Alliance (www.resalliance.org) and The Millennium Ecosystem Assessment (http://www.maweb.org see Sub-Global). CTM has, together with these international organizations, carried out comparative analysis of ecosystem management which will be very useful experiences for this research.

Institute for International and European Environmental Policy (www.ecologic.de): Ecologic – Institute for International and European Environmental Policy is a private not-for-profit think-tank for applied environmental research, policy analysis and consultancy. Ecologic is dedicated to bringing fresh ideas to environmental policies and to promoting sustainable development. Ecologic's work covers the entire spectrum of environmental issues and includes the integration of environmental concerns into other policy fields. Ecologic's work programme has a particular focus on international environmental governance, feeding political, legal and economic expertise into the debate. Ecologic has participated in many European and national governance related projects.

Anatrack Ltd (www.anatrack.com): Anatrack Ltd is a spin-out from the United Kingdom Natural Environment Research Council's Centre for Ecology and Hydrology (CEH). Founded in 2000, its primary purpose is to develop and market ecological software designed in CEH, with a particular interest in specialist GIS software for recording spatial data of individually-marked animals and modelling animal populations in relation to changing land-use. All 3 full-time staff of Anatrack have doctorates in Environmental Sciences, with some 60 years of research experience over a wide range of topics. Based at Oxford University and in Dorset, they are deeply committed to science-based conservation that uses new technologies to integrate local-level results for decision making at all levels from policy-making to field applications.

Tero Ltd (www.tero.gr): Tero is a privately held company offering consulting services to private enterprises and public organisations. Tero focuses on technologies that have a positive impact on the environment and on social welfare. Tero believes that every investment in technology is always a choice between more or less sustainability. Tero works on strategic environmental management, natural resources management, environmental remediation, waste management, economic analysis of environmental parameters, and sustainable development. Tero is also providing project management services for research & development, such as establishing project implementation procedures and policies, conflict resolution, risk management, quality assurance, management of dissemination activities, management of intellectual property rights, exploitation and business planning.

University of Debrecen, Centre for Environmental Management and Policy (www.envm.unideb.hu): Debrecen ranks as the second largest of Hungary's cities, hosting the University of Debrecen since 1912. The newly integrated University of Debrecen is made up of eight faculties, several institutes, research centers, and a Conservatory as well. The new structure, educating over 20.000 students, has strong scientific and professional links with the Hungarian Academy of Sciences (HAS), with several members of HAS serving as academic staff. The Centre for Environmental Management and Policy was established in 1997. Educational, research, expertise and advisory activities mean its main profile on the fields of Environmental Management, Environmental Policy and Regional Development at local, regional, national and international level.

Danube Delta National Institute for R&D (www.indd.tim.ro): The Danube Delta National Institute for Research & Development (DDNI) provides scientific support for the management on the Danube Delta Biosphere Reserve (DDBR) and other wetland zones of national and international interest for biological diversity conservation and sustainable development. DDNI has strengthened considerably in the last years attracting international donor funds, which provide equipment and facilities of high standard (Conservation of Biodiversity in Danube delta - GEF project funded by World Bank). The DDNI has selected in 2000 as Centre of Excellence for Deltas and Wetlands, in Accompanying measures, FP5 project (DELWET). DDNI

has consolidated its presence in ERA by its partnership in three RTD funded projects in FP6. Research being carried out on habitat and ecosystem restoration is already of direct relevance to the EU, being used to inform planners for the restoration of polders in the Netherlands. Work being carried out on the conservation and restoration of sturgeon species in the Delta is being used to inform the programme for the restoration of sturgeons in the Rhine. DDNI is main scientific contractor of Ministry of Environment and Water Mamagement (MEWM) for implementation of "Natura 2000" network and Water Framework Directive in Romania. The main research domain are: biodiversity assessment, environmental factors and human pressures; sustainable use of the natural biological resources (fish, vegetation, hunt, landscape); wetland restoration; protection of endangered species (fish fauna- sturgeon- and ornithofauna); developing GIS and remote sensing techniques; and harmonizing the socio-economic interests with the biological diversity conservation.

Saxon Academy of Sciences and Humanities (www.ag-naturhaushalt.de): The working group "Natural Balance and Regional Characteristics" of the Saxon Academy of Sciences and Humanities in Leipzig is settled in Dresden. The working group's main focus is on the long-term investigation of landscape changes. The group is active in the development and testing of discovery and evaluation methods for report and forecast of status, functionality and carrying capacity of landscape in different scales. The goal of its research is to analyse and evaluate the effects of human influences on structure and functions of landscape. Main targets are determination of ecosystem health and landscape performance indicators, landscape functions and nature potentials, conservation of landscape and biodiversity. A long-term monitoring helps to reveal regularities and its special features of landscape changes as well as to prognosticate development trends of different landscape types. From this, fundamental contributions can be derived to the protection and use of natural resources and potentials in the sense of a sustainable development.

1.1.3 Project Extension / New Project Partners and Tasks

On May 2006, GEMCONBIO consortium decided to participate in a specific call intended to promote the participation of partners from Targeted Third Countries in ongoing or under-negotiation projects in priority thematic areas of research. The aim of the call was to support and develop more efficient means of cooperation between EU Member States, Associated Countries, Associated Candidate Countries and these countries. The proposal was accepted and 3 new partners from Targeted Third Countries were included in the consortium.

The EU is the world's largest trading block and, together with its Member States, is by far the largest provider of development aid. Furthermore behind the United States, the EU-25 has one of the largest Ecological Footprints of any region. Through its overseas regions and the overseas territories of some of its Member States, the EU also has huge responsibilities for the conservation of biodiversity worldwide. As we moved through the process of industrialisation and towards the present day, Europeans have had an increasingly reduced connection to their natural resources. Production is so efficient that it is carried out by a tiny minority of the workforce in all European countries. This situation can be clearly contrasted with that found in developing countries around the world. Although this is a generalisation, it is true that these countries have far larger rural communities and these communities are far more reliant on the direct use of natural resources. Furthermore these countries generally have extremely important stores of biodiversity or ecosystems. This presents a classic conflict between communities who need and use natural resources, the development objectives of regional and national authorities and the need to protect these stores of biodiversity.

It is the interaction between the rights and responsibilities of the three main stakeholder groups: national authorities, civil society and local communities that is at the heart of GEM-CON-BIO and is also the focus of its extension. Governance is a fairly new topic on the international agenda; it is a fairly broad term that looks at institutions, structures, processes and behaviours, and then all the interactions between them. Numerous studies have shown that it is not only what structures and processes are in place that is important, but also how the different stakeholder groups interact within these.

This project aims to take the study of community and co-management of resources a step further by applying the analytical framework developed in Europe to analytically identify what are the key elements within community management that ensures success or promote failure. As GEMCONBIO is a case study based project, the new partners assisted to the testing of the theoretical concepts currently being constructed

in Europe by carrying out a series of international case studies. This approach provides the project with a strong basis from which to make conclusions and recommendations on the interactions between governance processes and the management of natural resources. The project will address the relationship between the different forms of community management and the state of biodiversity in the regions and will try to identify which governance processes are most successful for biodiversity and sustainable development.
Through connection with the project results generated in Europe, analysis will try to draw parallels between the management of natural resources in Third Countries and those in Europe to identify the similarities and differences, and possible recommendations for management in Europe.

Table 2. List of new participants following project extension

Part. No.	Participant name	Part. short name	Country	Major function
10	Centre for Sustainable Development and Environment	CENESTA	Iran	Third Country case study coordinator, case studies, awareness and dissemination
11	Fundación Yangareko	YAN	Bolivia	Case studies, awareness and dissemination
12	Centre for International Forestry Research	CIFOR	Indonesia	Case studies, awareness and dissemination

Centre for Sustainable Development & Environment, Iran (www.cenesta.org): *CENESTA* is an Iranian non-governmental, non-profit organisation dedicated to promoting sustainable community- and culture-based development. While their main areas of work are Iran and Southwest Asia, *CENESTA* experts have also engaged in extensive activities in Africa, Latin America, Asia, and in the international arena in general. *CENESTA* is a member of IUCN—the World Conservation Union and is affiliated with the University of the North (Iran). CENESTA works with a variety of partners, from local communities in Iran and other countries to local and national governmental agencies, from universities and research organizations to national and international NGOs. The UN bodies with which CENESTA and its experts entertain on-going collaboration include UNDP, FAO, UNICEF, UNSO, IFAD, UNCCD and the UN Secretariat. CENESTA has a small core of staff and a large network of associates, ranging from community-based groups to women's associations and technical experts who act on the basis of common concerns and specific capacities. CENESTA staff and associates work in the context of project contracts and/or on a voluntary basis, contributing time as well as financial and material resources for the goals of the organization.
Fundación Yangareko, Bolivia (www.yangareko.org): Fundación Yangareko is a Bolivian NGO whose mission is to contribute to the conservation of the environment and improve the quality of life of the people living in high biodiversity areas. The activities of Yangareko have included: conserving protected areas, indigenous territories and associated watersheds in the trinational ecoregion Gran Chaco, where biodiversity and livelihoods are threatened by inappropriate land use; participatory diagnosis and capacity building for local communities and government; promotion of local government and national agency collaboration with local communities; participatory land use mapping and planning to improve land and forest management; monitoring of environmental impacts; biodiversity inventories; promotion of exchanges of experiences with other organizations at national and international levels, and outreach videos documenting new and traditional knowledge of biodiversity and collaborative development of ecologically-sustainable agriculture and forestry practices that support local enterprises.
Fundación Yangareko Centre for International Forestry Research, Indonesia (www.cifor.cgiar.org/): CIFOR is an international research and global knowledge institution committed to conserving forests and improving the livelihoods of people in the tropics. CIFOR employs over 150 staff at its headquarters in Bogor, Indonesia and at its regional offices in Brazil, Cameroon and Zimbabwe. CIFOR's high impact research helps local communities and small farmers gain their rightful share of forest resources, while increasing the production and value of forest products. CIFOR has developed and implemented a research program called Adaptive Collaborative Management (ACM), to address the problems and simultaneously contribute to our scientific understanding of the processes involved in 30 study sites in 11 countries around the world. The ACM approach aims to improve the adaptiveness and collaborativeness of stakeholders in managing their natural resources. Communication, cooperation, negotiation and conflict management are the collaborative

elements of ACM, while social learning across stakeholder groups, and within each group required for management to be responsive represent the adaptive element of ACM.

References

Annex I "Description of work", European FP6 Project 028827 'Governance and Ecosystems Management for the Conservation of Biodiversity', 2006

1.2 Research Questions

1.2.1 Introduction

In Europe, possibly more than anywhere else, human societies have altered the landscapes and species that occupy them to such an extent that many of our biodiversity-rich areas are reliant on some form of human management. In recent times our ability to extract natural resources or modify our ecosystems has increased exponentially and is having strongly deleterious effects on biodiversity and our future wellbeing (Schröter et al 2005). In fact these two aspects of our living world – biodiversity and human wellbeing -have become so closely intertwined that it is difficult to separate them. With few exceptions, the landscapes we protect for their value in sustaining biodiversity require some form of management and are surrounded by intensively used areas. Coupled with this is the fact that we now protect more of the European continent than ever before, some 18% of the European Union is protected under Natura 2000 alone, and yet we still witness strong rates of species decline. Political targets have been established to put in place the policies that will address this decline. Much of their focus is not on nature protection legislation or activities, but rather it is focused on those sectors of natural resource use and economic development which have greatest impact. It is against this background that the GEM-CON-BIO project was developed with the view that only through the equitable and sustainable management of natural resources will it be possible to maintain levels of biodiversity in Europe. We share the prevailing view of the global community that we must focus on the ecosystem level and then identify the services that ecosystems provide. Only through the realistic valuation (in all senses of the term) of ecosystems will be able to achieve some form of sustainable development. We take the view that biodiversity underpins much of the ability of ecosystems to provide functions and as such is a key component that warrants special attention. Thus throughout this project we study the interaction between the institutions and processes used to govern our ecosystems and their resulting impacts on biodiversity. Can we truly manage our ecosystems in an equitable way to enhance our wellbeing and sustain biodiversity? It is a fundamental question that this project will undertake to study.

1.2.2 Aims and Objectives of GEM-CON-BIO

GEM-CON-BIO aims to improve the scientific and conceptual understanding of governance of biodiversity and natural resources. It did so by dealing with the following particular issues:

- Examining the ownership structure of particular areas with importance in the conservation of biodiversity.
- Examining the governance and management structures of such areas.
- Identifying and studying governance structures and examples at local, national, regional, European, or global level.
- Assessing the impact that different governance structures have in the conservation of biodiversity and sustainable development.
- Assessing the socio-economic factors that are involved in the management of the identified lands in different governance levels and EU countries.
- Recognizing and studying the needs and influence of social groups and economic sectors in the management of these lands.
- Reviewing the positive and perverse incentives on local actions within current environmental laws and other instruments of the EU and individual nations.

In order to meet the above outlined objective, GEM-CON-BIO has the following specific and operational objectives:

1. Identify existing **governance types** and their modes and processes in relation to conservation of biodiversity, as well **critical ecosystem management characteristics**; discuss its findings in a workshop with renowned experts in the field.
2. Develop and finalise a **governance matrix** linking governance types and critical ecosystem management characteristics.
3. Identify and conduct research on a set of **case studies** to show how different governance approaches can be exercised in different ecosystems, using the governance matrix suggested above.
4. Compare the **"success" and "failure"** of different approaches in Europe as to whether good governance practices lead to better outcomes.
5. Draw lessons from the **US experience**, especially in the context of market-based instruments for conservation.
6. Develop **best practice guidelines** that could be transferred to a wider context.
7. Codify its recommendations in a **policy guidance document** aimed at policy makers and officials at all levels (local, national, regional, European); present and discuss these guidelines in a policy conference taking place in Brussels in the end of the project.
8. Develop the tools to **disseminate** the acquired knowledge at all levels, i.e. from governments and policy makers through to local people.

GEM-CON-BIO is particularly concerned with some research issues that are in the interface between governance, ecosystem management, and changes in biodiversity.

- How do different governance models impact biodiversity conservation?
- For different scales and institutional settings, which governance structures (institutions) and processes (collaboration, transparency, benefit-sharing etc.) are most effective for biodiversity conservation?
- What governance features seem to be correlated to adaptability in ECM?
- Does the level of authority and accountability match the scale of management?
- How important is interaction between governance at different levels for biodiversity conservation?
- Can poor government initiatives be compensated by strong local action, or is local action fruitless in the wrong institutional context?
- Have changes in governance patterns led to more flexible and effective local initiatives or has the "hollowing-out" of the state led to poor local action?
- How important is the governability of social-ecological systems to the effectiveness of government initiatives to protect biodiversity?
- Which property rights structures seem to lead to the most effective collaboration patterns and hence local action?

These issues are further elaborated in the rest of this report and in Annex 1: The Research Questions

1.3 The Management and Governance of ECOSYSTEMS

Ecosystem management (ECM) "integrates scientific knowledge of ecological relationships within a complex socio-political and values framework toward the general goal of protecting native ecosystem integrity over the long term" (Grumbine 1994). To analyze the *management* of ecosystems, GEM-CON-BIO addresses several issues including property rights (ownership and management regimes), management objectives, type of knowledge used in management, and type of collaboration among actors. To analyze *governance*, we address general governance capacity at national level, institutional arrangements that enable multi-level governance, and societal attributes including social capital and policy networks. Indeed, management and governance are intertwined and most of the issues mentioned above have both a management component (how to manage ecosystems) and a governance component (the institutional framework and network of actors governing management activities). For instance, advocating an adaptive ecosystem approach, Boyle et al. (2001) suggest a triad of activities, where *governance* is the process of resolving tradeoffs and providing a vision and direction for sustainability, *management* is the operationalization of this vision, and *monitoring* provides feedback and synthesizes the observations to a narrative of how the situation has emerged and might unfold in the future.

In this section we discuss these issues and how they are inter-connected and linked to conservation of biodiversity.

1.3.1 The Ecosystem Approach and Sustainable Use

At the global scale, the ecosystem approach to management brought many important advantages including a reliance on science-based knowledge for policy development and planning (Lamont 2006, Kessler & Thomas 2006). Building on ecosystem functioning, the ecosystem approach (or Ecosystem Management), provides a framework for the integrated management of aquatic and terrestrial resources. At the basis there is the goal of maintaining the long term ecological integrity of an area. Management objectives and decision-making processes then build on the scientific understanding of this integrity to combine both ecological and societal requirements (i.e. the needs of stakeholders).
The ecosystem approach and the guiding principles were endorsed by the Fifth Conference of Parties to the CBD in 2000 and have become the primary framework of activities implemented within the Convention. Since its ratification, the CBD has gone a long way to solidifying and adopting many of the concepts that were being developed in the last three decades. The 2004 Seventh Conference of Parties saw the adoption of the Ecosystem Approach (CBD VII.11) and also the adoption of the Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity (CBD VII.12).

1.3.2 Efforts at the European Level

There are several important pieces of legislation passed by the EU for the environment, especially those that relate to the use of Environmental Impact Assessments, which is a requirement for all major development projects. The Birds and Habitats Directives provide the core of the EU's nature conservation legislation. The Directives required Member States to identify areas within the countries that would protect the species and to protect them under national law. This network of protected areas became Natura 2000.
As of June 2006, the Natura 2000 network comprises 20,582 sites under the Habitats Directive, including 1,250 marine sites (12% of the area of the European Union), and 4,317 sites under the Birds Directive, including 459 marine sites (9% of the area of the European Union). The process of implementing the Nature Directives gives valuable insight into the process of governing natural resources and biodiversity conservation. The implementation in the former EU-15 Member States was extremely difficult with considerable resistance met at all levels, particularly from landowners and users. Invariably these problems stemmed from the lack of due communication between Member States and the stakeholders, with landowners often being unaware of them becoming a Natura 2000 site! Furthermore a lack of understanding of the activities possible within Natura 2000 led to losses of land value and more resistance. When 10 new countries joined the EU in 2004, the process was started again. Some lessons were learned from the EU-15, but many mistakes were repeated. Currently there is considerable difference between countries in their implementation of the Directives.
The Common Agricultural Policy (CAP) is the single largest common policy in the EU accounting for almost 50% of the total budget. Its principle tool was the provision of payments to support agricultural production in Europe and to protect European producers on the global market. The impacts on biodiversity of paying farmers to produce or latterly to not produce are well documented. Increasingly the rural development component of the CAP (2nd Pillar) has been used for agri-environmental schemes that support direct actions for the environmental on agricultural lands. These schemes have to date met with mixed success and there is generally a paucity of data concerning the ability of agri-environmental schemes to support biodiversity (Kleijn & Sutherland 2003).

1.3.3 Ecosystem management regimes

Based on the standard theory on property rights regimes (e.g. Bromley 1991), GEM-CON-BIO recognizes four major ecosystem management regimes:

A. **Government management:** Authority and accountability for management is with a government agency which may consult with other stakeholders prior to making decisions. The responsible order of government may be at the national or provincial (in a federal state) level, or at the local or municipal level. Management may be *delegated* by government to a designated organization (e.g. a local government body, indigenous peoples organization, private corporation, environmental NGO or a multi-stakeholder group) which makes certain decisions within mandated directions. Legally protected areas under government management are no guarantee against biodiversity loss. Hence, an important challenge for government management is to set aside bureaucratic planning and instead allow experimentation based on monitoring and local ecological knowledge (Folke et al. 2005). This probably requires organizational change and leadership within governmental agencies (Danter et al 2000).

B. **Multi-stakeholder management:** Authority and accountability for management is shared in various ways among a number of parties, e.g. government agencies, local communities, NGO's, private landowners, industry representatives. In *collaborative management (co-management),* formal authority for decisions rests with one party (often a governmental agency) but the agency is required to collaborate with other stakeholders. In *joint management*, accountability for management rests jointly with various actors who sit on a management body with decision-making authority (e.g. this has been suggested as an approach for high seas marine areas beyond the jurisdiction of any one country). An important challenge for multi-stakeholder management is coordinate multiple actors with multiple objectives in social networks across sectors (horizontal collaboration) and organizational levels (vertical collaboration). Leadership that emphasizes trust-building is important here (Hahn et al. 2006).

C. **Local community management:** Authority and accountability for management is with local communities, who collectively own or claim rights to the lands based on traditional use and occupancy. The term local community is used to mean a socially and geographically networked group of people, not necessarily homogeneous, who live close to or care for the natural/cultural resources in a protected area. Local communities may include individuals or groups with tenurial and customary rights of use or ownership in an area, and those who have a direct dependency on the area. Members of local communities who do not have tenurial rights may also be active contributors to areas governance along with the relevant landowner(s). Management is through a locally agreed form of governance, which may have roots in traditional, customary or ethnic practices. Negotiations with government may result in recognition of specific rights, definition of broader accountabilities to society and possibly a joint management arrangement. Challenges for local community management include empowerment, clarifying legal issues and establishing vertical links for institutional and financial support.

D. **Private management:** Authority and accountability for management is with the private (non-government) owner or owners of the lands. In some cases, the owner would be an individual or a group of individuals. In other cases, the owner might be a private for-profit corporation or a not-for-profit organization. Much of the benefits of biodiversity accrue to society at large whereas the costs (smaller harvests of cash crops) fall upon the private landowner. Challenges include the provision of effective economic incentives and information so that private landowners can afford becoming the good stewards for biodiversity that most of them want. Government agencies also need to adopt new approaches and attitudes (give social incentives) to learning and collaboration by identifying win-win opportunities for biodiversity conservation (Pretty 2003).

Open access is also a *de facto* regime but typically a result of failure to implement any of the four *de jure* regimes above. Some resources in abundance, e.g. some berries and mushroom, are governed by an explicit open access regime in countries like Sweden and Finland. However, it is difficult to implement management objectives under an open access regime and hence it falls outside our framework.

There are several factors influencing the effectiveness of various ecosystem management regimes (see our Deliverable D2.2 for more details):

- the level of understanding ecological feedbacks and adapting management to this;
- the generation and sharing of knowledge among stakeholders (social learning);
- collaboration of different stakeholders including identification of common interests and conflict resolution
- leadership and organizational change.

When analyzing governance processes in dynamic social networks we should be careful with how we perceive stakeholder collaboration: are there groups (agencies, companies, organizations) collaborating or

individuals who somehow represent these groups but without contracts and formal agreements? Are the multilevel networks formalized or have they emerged and self-organized, maybe in response to rigid governmental structures? The latter has been referred to as *new governance* by Lee (2003) who defines it as a polycentric form of social coordination in which actions are coordinated voluntarily by individuals and organizations with self-organizing and self-enforcing capabilities.

1.3.4 Why is Governance Important?

Both the destruction and protection of biodiversity seems to be tightly interconnected with governance issues. It is often argued that countries facing the most serious challenges in biodiversity conservation often are nations with meagre state capacity and poor governance (Laurance 2004, Smith et. al. 2003). Economic globalization combined with government policy priorities, the presence of corruption (Transparency International 2005:235ff, Welsch 2004), weak public environmental administrations, and inadequate legislative regimes all seem to contribute to a continued destruction of biodiversity around the world (Brechin et. al. 2002). High governance capacity on the other hand, as manifested by most European countries, is no guarantee that government will take environmentally positive measures, or implement effective management of ecosystems (Katzner 2005). Under the pressure of strong political lobbyists, governments may be reluctant to implement scientifically grounded and cost-effective environmental policies.
In addition, even with the best intentions, policy can be adopted based on inadequate theoretical foundations. Policy initiatives can be seen as a simultaneous experiment with all resources and their management. If this initiative is based on erroneous data about one key structural variable, one false assumption about how actors or ecological systems will respond, or create implementation that is unable to adapt to changing social and ecological environment, the result can be a collapse in the whole system. Central policy-makers without a coherent and effective theory of how the dynamic social-ecological systems work, may easily be misled, and create policy that is to more harm than good (Ostrom 1999, Anderies et. al. 2004, Dietz et. al. 2003, Ostrom et. al. 1994:18f).
Hence the linkage between "governance" and biodiversity is far from simple. At the same time, any attempt to understand the drivers of change in biodiversity, or to concretely cope with the destruction of vital ecosystem services, requires a deep understanding of these poorly understood linkages. As we argue in the following sections, this can only be done by unfolding the characteristics of biodiversity governance, and by trying to assess their linkages to the state of biodiversity.
Gem-Con-Bio refers to "governance" *as the way society as a whole manages the full array of its political, economic, and social affairs.* We refer to "biodiversity governance" *as the way society at all scales manages its social, economic, and social affairs with the aim to protect ecosystem function and biodiversity.* This latter definition includes not only central policy-initiatives and legislation, but also attempts by actors at other political scales to introduce or modify current ecosystem management. A fundamental assumption in this definition is that biodiversity governance radically shapes the incentives political actors, individuals and communities face in their daily activities and interactions, hence either facilitating or hindering biodiversity conservation.
We would like to stress the importance of making a distinction between uses of the term "governance" as 1) a normative conception (i.e. the demands of "good governance" as discussed by e.g. the UNDP), and 2) using the term as an analytical concept. In the former case, "good governance" is used as a blueprint to which existing and malfunctioning governance is contrasted (Grindle 2004). The second approach uses the term as a way to unpack, and systematically assess the characteristics of biodiversity governance that seem to lead to diverse outcomes (i.e. state of ecosystems and biodiversity (e.g. Smith et. al. 2003, Sampford 2002). This report follows the latter perspective as we believe that it addresses the most interesting, and pressing research needs.

1.3.5 What are the Linkages between Governance and Ecosystem Management?

There are important linkages between the different components of biodiversity governance. To be precise, the characteristic of governance as defined by governance capacity, and the realization of policy initiatives,

provide the institutional, economic and socio-political setting for ecosystem management. These initiatives determine the incentives local stakeholders face, define their capacity to deal with emerging threats to ecosystems, and define the degrees of freedom for local initiatives, and affect local actors' ability to innovate. The question is how to sustain or develop a desired social-ecological trajectory (Carpenter et al., 2001) in the face of change and uncertainty (Folke et al., 2003). This has lately been referred to as adaptive governance of ecosystems or social-ecological systems (Dietz et al. 2003); Eckerberg and Joas, 2004; (Ostrom 2005), Folke et al., 2005).

Folke et al. (2005) and Hahn et. al. (2006) analyse the features of successful adaptive approaches for ecosystem management under uncertainty. As illustrated in Figure 1, these features involve a diversity of interacting social, economic, institutional and ecological factors.

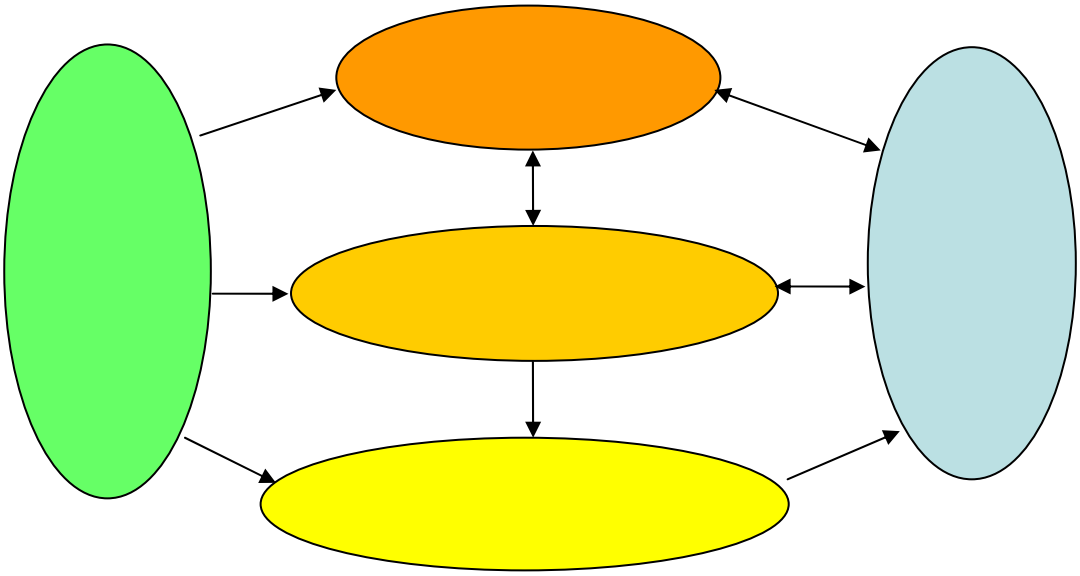

Figure 1 A conceptual model of the dynamics facing a linked social-ecological system (SES). A SES consists of an ecosystem, the management of this ecosystem by actors and organizations, and the formal (rules) and informal (social norms and conventions) institutions underlying this management. The resilience of a SES depends on ecological dynamics as well as the organizational and institutional capacity to adapt to ecosystem dynamics. This requires a learning environment and links between key persons across organizational levels. To be resilient, the social-ecological system also needs capacity for dealing with external change. (Modified from Hahn et al. 2006)

Figure 1 provides a framework for integrating governance and management issues. It may also be a helpful framework to explore some of the questions for which there are no blueprint answers:

- Which forms of governance seems to be most effective from the perspective of biodiversity?
- How do we strike a balance between top-down initiatives and local innovations?
- When does biodiversity legislation make a difference?
- And which kind of collaboration forms and ownership structures seem to be most effective in promoting adaptive approaches to ecosystems?

Despite the pressing need to provide policy-makers and societal actors in general with clear answer to these questions, our understanding is limited, fragmented and at worst shallow. Case studies are needed to enhance our understanding of these integrated issues.

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1.4 Biodiversity and Ecosystems in Europe and in the World: Ecosystem Management Characteristics

1.4.1 Considering ecosystems and their goods and services

Ecosystems are a relatively recent concept for ecological study, gaining prominence within the last fifty years. Here we use the CBD (article 2) definition of an ecosystem as a "dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit". It is the dynamic interactions, sometimes termed ecosystem processes, between the components of an ecosystem that define its boundaries and these are irrespective of scale or location. Ecosystem processes occur at a multitude of scales and finding the actual boundaries between ecosystems can be difficult. Generally ecologists take a pragmatic approach that looks for assemblages of strong links between components within an ecosystem compared to weak interactions with components outside them. As biological diversity relates to the sum of the variability within species (e.g. genetic), between species and between ecosystems, it can be seen as a key structural feature of ecosystems (MA 2005).
When discussing the different components of an ecosystem and then how they relate to human wellbeing, there is a wide range of different terminologies used, and sometimes in a contradictory sense (De Groot et al 2002). Generally the starting point for studying an ecosystem comes from its structure, the organisation and composition of an ecosystem's components, and the processes which are the interactions between these components (Naeem et al 2002, De Groot et al 2002). As expected the structure and composition of an ecosystem are extremely important for its function. There is considerable variation between the roles of species and functional units (e.g. groups of species performing similar functions) within an ecosystem, which can also change between habitats and ecosystems. Much of the complexity of an ecosystem (its structure and processes) can be reduced to contain a number of ecosystem functions; each of which represents the sum total of the processes within one particular system. A definition of an ecosystem function is "the capacity of natural processes and components to provide goods and services that satisfy human needs, directly or indirectly" (De Groot 1992, De Groot et al 2002). It is important to remember that the functions themselves do not need to convey direct or even indirect benefits or value to humans. Sustained ecosystem processes and functions are necessary for the production of ecosystem services whether or not we value, or even understand, these processes and functions. Based on this definition, De Groot et al (2002) broadly grouped these functions into four categories: 1) Regulation, 2) Habitat, 3) Production and 4) Information. Out of this group of ecosystem functions, we can identify a set which have observable benefits to human society and these are termed *ecosystem goods and services*. In this case the definition of what is a good or a service is anthropocentric and based on their value to humans (De Groot et al 2002). The Millennium Ecosystem Assessment (MA 2005) developed a list of what it defined as Ecosystem Services which include the functions identified by De Groot et al (2002), but focuses on their anthropogenic role. Within this project we concentrate on the role ecosystem goods and services, as being those elements that are most easily valued within a system of use of natural resources. It should also be remembered that different components of an ecosystem will perform different functions, especially when we consider biodiversity which underpins the delivery of most ecosystem services. Finally, when considering ecosystem goods and services, a distinction is often made between those that provide direct benefits such as the production of a raw material and those that provide indirect benefits (MA Glossary, MA 2005). This distinction, whereas may serve in some cases to allow the better differentiation of services in economic and valuation models, is otherwise difficult to make with most services.

1.4.2 The role of biodiversity within ecosystems

Biodiversity represents the sum of variation in genes, species and ecosystems (MA 2005). This includes the variation found within species and also the interactions between different species and assemblages. As such biodiversity underpins the provision of all ecosystem services (see Figure 1). Although most measures of biodiversity assess species richness, understanding the role of biodiversity requires data on trophic relations between species, functional traits, abundance, distribution etc. Much of this information is lacking and as yet, there have been few studies into the relationship between biodiversity, ecosystem services and human wellbeing (MA 2005b). The case of invasive species illustrates the importance of understanding the

different components of biodiversity within an ecosystem. Currently invasive alien species are identified as one of the leading causes of biodiversity loss (MA 2005b). These are species that can exist at normal densities within their native ranges, but on introduction into a novel ecosystem can spread at fast rates usually out-competing local species. Alien species may exist at low densities in particular habitats before becoming invasive and subtle changes in the ecosystem dynamics suddenly supply the necessary conditions for the species to spread (e.g. Stockwell et al 2003). Thus the key feature of biodiversity is the functional relationships between species within an ecosystem. Although we have a good understanding of the role species play within an ecosystem, for example the role of photosynthesis for primary production, we have only a very limited understanding of the functional significance of biodiversity, for example the role of grass diversity in supporting ecosystem productivity (Naeem et al 2002). In nature conservation terms we assume that biodiversity should be maximized to ensure that ecosystems can function, but there are numerous theories concerning the form this relationship takes (Naeem et al 2002). Conversely when looking at extinctions, considerable attention is placed on halting global extinction, however local extinction and functional extinction (the reduction of a species population to a point that it can no longer play a functional role) receive far less attention, but are equally damaging to the provision of ecosystem services (MA 2005b). Hence, if we are interested in how biodiversity and ecosystem services sustain human wellbeing we need to broaden our interest in "hot spot" biodiversity areas and also assess ecosystem processes in "cold spots", i.e. in areas with relatively small number of species of which few are endemic but which are crucial to human well-being (Ceballos et al. 2005).

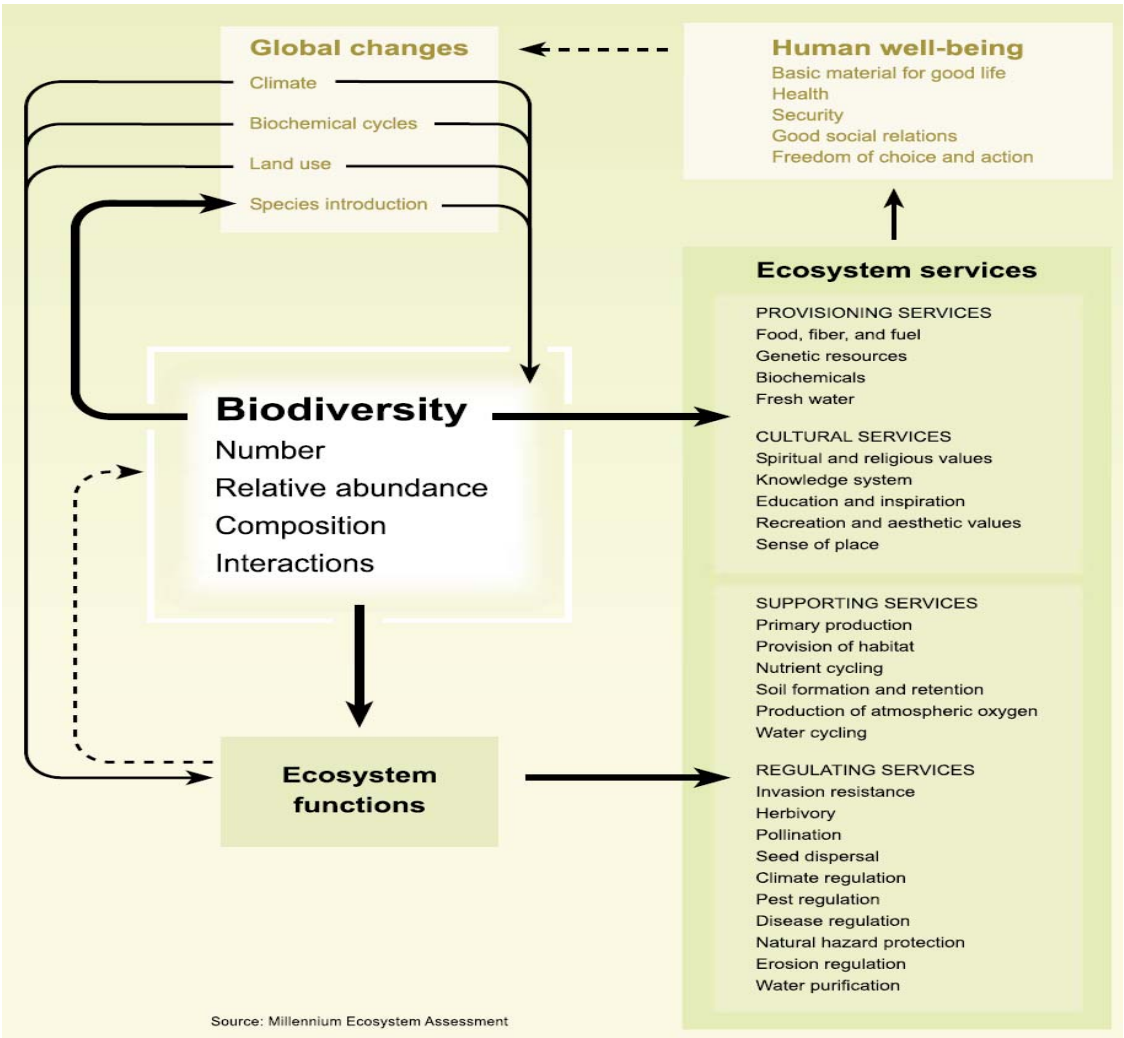

Figure 2: The role of biodiversity within an ecosystem (MA 2005)

An important area of study of ecosystem management is functional redundancy. Within an ecosystem there maybe several species, or assemblages, that perform similar functions, such as nitrogen fixation. The loss of one of these species may be deemed as acceptable as other species can perform the same function and

therefore there is redundancy in the system. Conversely there will be some species that have a key function within the ecosystem and their loss will have highly deleterious effects. With greater redundancy there is a greater 'insurance' that an ecosystem can function in the face of change. This brings us to the concept of ecosystem resilience. Resilience in this context is defined as the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks (Walker et al 2004). As with many of the terms used within ecosystem studies, resilience has a broad definition. But it is one that is closely linked to our assessment of the role of biodiversity within ecosystems and the ability of ecosystems to cope with Human induced impacts (e.g. habitat destruction and fragmentation). It is important to note that within an ecosystem, the capacity to buffer negative effects is not enough. The ecosystem must be able to reorganize after disturbance, adapt to the new situation, and sustain important ecosystem services. A non-resilient ecosystem facing disturbance will degrade or even flip into less desirable states (Holling 2001). The importance of resilience needs to be further borne in mind when considering the value of biodiversity. Biodiversity is often valued for its components but in the true sense of its definition, the *variety* of all life, it is valuable its ability to support ecosystem resilience (MA 2005b).
As discussed above biodiversity plays a critical role in the ability of ecosystems to provide goods and services to humans. Measuring the state of biodiversity is extremely complex and as such there are no real measures of biodiversity currently in use. Instead we use a number of indicators of elements of biodiversity that highlight changes to biodiversity over time. As we increasingly focus on the goods and services that ecosystems provide, and consequently the ability of biodiversity to sustain them we must be careful in the choice of proxy indicators (e.g. hot spot areas and red listed species versus ecosystem processes in cold spot areas). When assessing biodiversity we can focus on three major levels: genetic, species and ecosystem. Monitoring programmes almost completely focus on the species level, primarily using species richness (i.e. the number of different species in an area) and then abundance (the number of each species in an area). This approach only allows us to see one aspect of biodiversity which are the elements that make up ecosystems. There are also several issues associated with the use of species, primarily that it is a fairly arbitrary concept that is used rigidly by conservation biologists and fairly liberally by taxonomists (Isaac et al 2004). Species richness, although it correlates with ecosystem health, does not yield information on genetic diversity, trophic relationships or functional traits (MA 2005b). In Europe, there is a relatively rich source of biodiversity monitoring data with all countries managing species monitoring schemes. Furthermore through the adoption of indicators at the global level through the CBD and then at the pan-European and EU level, greater effort and resources are being placed in the developed of a series of state and trend indicators for elements of biodiversity (the Streamlining European 2010 Biodiversity Indicators (SEBI2010) process). The best known data is undoubtedly from the long term monitoring of bird species (e.g. Gregory et al 2002, Birdlife International 2004). Some countries also have good monitoring data for vascular plants, mammals and commercially exploited fish species (The Royal Society 2003), but in general we lack sufficient data to monitor the long term trends in the state of species.

1.4.3 Biodiversity in Europe

Europe contains a wide range of biomes and habitat types within its 11 distinct biogeographic regions. In general these terrestrial habitats are estimated to contain 1,000 vertebrate species, 10,000 plants and over 100,000 different invertebrates (EEA 2005). Species richness varies across Europe, generally increasing in the South, with areas of low richness in Northern Europe. The most biodiversity rich areas are to be found in the mountainous regions and the Mediterranean basin; these areas (the Caucasus and the Mediterranean) provide Europe's two biodiversity hotspots[1].
Europe is the second most densely populated continent in world (32 people/km2), and produces 27% of the worlds GDP (UN 2001). Population density decreases across Europe - ranging from 166 people/km2 in Western Europe to 16 people/km2 in Eastern Europe. As a result, the state of biodiversity in Europe is characterised by the degree of association between people and nature. Generally, moving from Western to Eastern Europe and the Commonwealth of Independent States (CIS), Europe's habitats have received less

[1] Defined as an area supporting over 1500 endemic plant species, 0.5% of global total. Also it must have lost over 70% of its primary vegetation (Myers 1988).

modification or conversion. Habitats in Western Europe are largely framed within a network of farmed and urbanised landscapes, however the CIS contains vast areas of wilderness (EEA 2003).
Europe contains around 8.5% of all the globally threatened vertebrate species (37% of which are mammals, 15% birds, 4% amphibians, 10% reptiles and 34% freshwater fish). It is more difficult to accurately gauge the level of threat faced by plant taxa, but Europe contains approximately 2.5% of all globally threatened species (excluding the Caucasus, EEA 2003).

1.4.4 Major ecosystems in Europe

With the introduction of the ecosystem level focus and the increased attention put on connectivity, our focus has shifted from habitats to landscapes. Using the term 'landscape' is already an anthropomorphism as the notion includes not only the biological functions of the ecosystem, but also the services it provides to humans (EEA 2005). A view of Europe's landscapes can be seen in Figure 3. Here it is possible to see that the vast majority of Europe's landscapes have been modified by humans for some sort of resource production; less than one fifth is free from some form of management (EEA 2005). These changes to the landscape have created many of Europe's habitats and the opening of forested areas also presented opportunities for species to expand and colonise new areas. Now much of the continent's biodiversity is found on semi-natural grasslands, which require continuous extensive management to sustain populations. Many of the most important semi-natural areas are found in South Eastern Europe, including areas such as puszta and steppe grasslands and alpine meadows (EEA 2005).

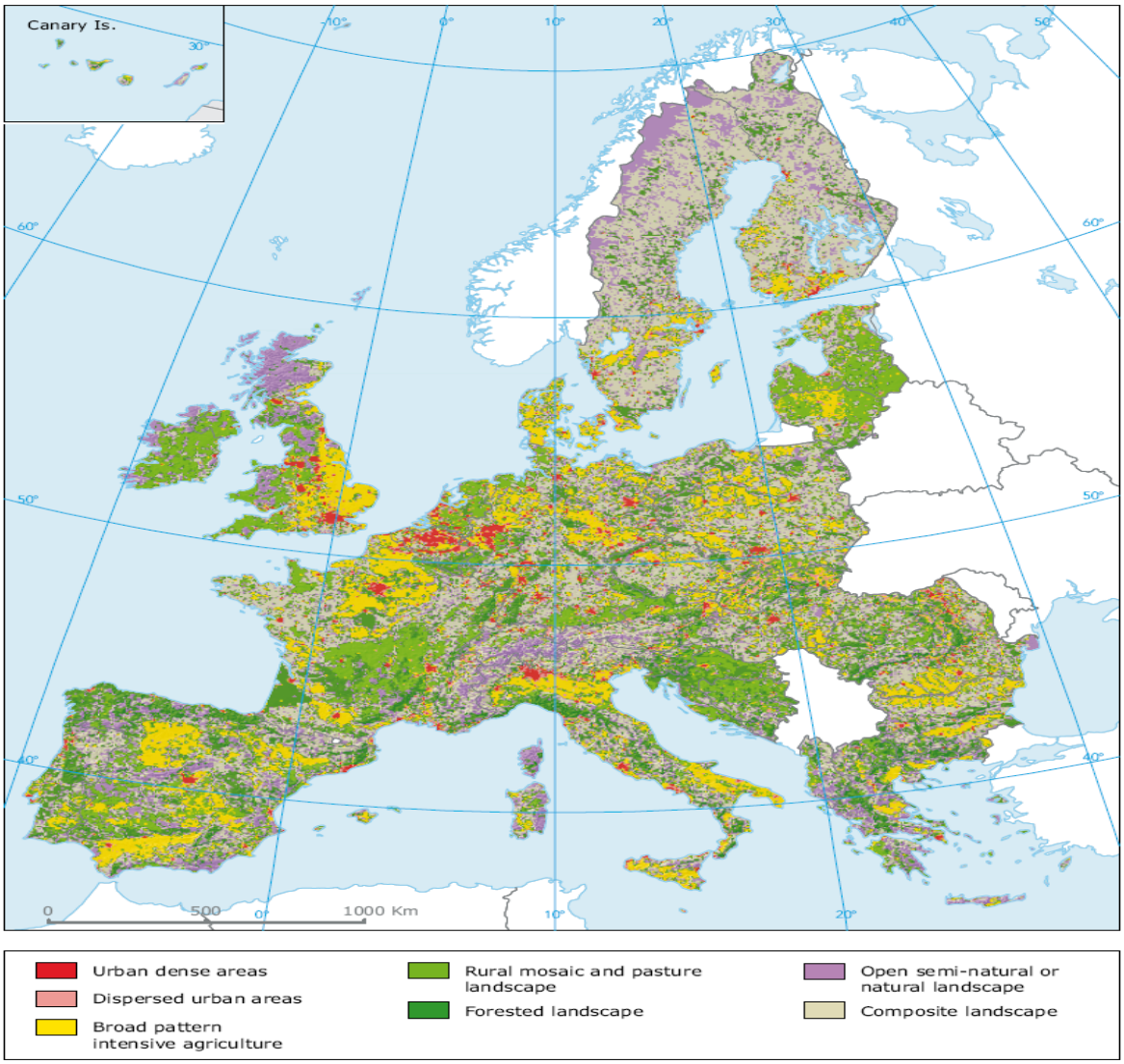

Figure 3: The dominant landscape types in Europe, based on Corine 2000 land cover data (EEA 2005)

The landscape perspective offers an important concept for GEM-CON-BIO. It is broader than the ecosystem, with some definitions of the landscape as containing two or more ecosystems (Sanderson & Harris 2000). It also contains a mixture of social and ecological perspectives as the structure, form and ability of a landscape is shaped by the underlying ecological conditions and the decisions of policy-makers and land users. Protecting these landscapes was until recently predominantly achieved through protected areas legislation (at different organisational levels). However as the area of land under protection increases, and biodiversity loss continues, we have become aware that species require a range of habitats that are connected. Protected areas can act as the core zones of much larger networks of ecosystems allowing migration and dispersal. In this section we provide a summary review of some of Europe's dominant land use types (farmland, forestry and freshwater ecosystems).

1.4.5 Drivers of Ecosystem change

It is clear that Europe's ecosystems and the species they contain are under considerable pressure. Ecosystems have been converted or modified for human use more now than at any time in Human history (MA 2005b). In its analysis, the MA considers indirect and direct drivers of change, which at the European level (or within the DPSIR framework) would be considered drivers and pressures. The principle anthropocentric drivers in Europe are economic growth and development. Given the pervasive nature of its impacts, climate change can be considered as a key driver, although the anthropogenic role in exacerbating climate change is due to economic development. Understanding the relationship between drivers and pressures is extremely complex as there is rarely a simple linear relationship with the resulting impacts on ecosystem services. Although there are key drivers that act at all levels, the impacts and magnitude of these drivers comes from their interaction with local conditions. Furthermore these drivers have impacts that are expressed over different time periods and at different organisational levels.

The rapid development in the use of natural resources in Europe has led to substantial gains in well-being and economic development (EEA 2005b). Globally increasing population, economic growth and patterns of development broadly cause ever increasing demands on natural resources (the MA also includes cultural and religious factors, and scientific and technological change as key drivers (MA 2005b)). In Europe, populations are stabilising or have declined in some countries, and therefore may not directly place a pressure on natural resources. However as economic wealth increases, people seek increased living conditions and the people per household decrease. Furthermore as life expectancy increases in Europe so does the relative demand on resources. This pressure of increased development continues to exert an ever increasing pressure on natural resources both through extraction and habitat modification (EEA 2005b). Currently within the European Union, the Lisbon Strategy is focussed on the creation of jobs and economic growth at the expense of its other objective of sustainability. Global economic development has seen the gap between developed and developing countries become broader, even as the pace of economic development in developing countries is faster than that of the industrialised countries. Considerable work remains to be done on the connections between ecosystem services and continuing economic development. Part of this needs to include more inclusive valuation methods to better integrate ecosystems into national or regional economic planning. For example the MA showed that a broader valuation of the ecosystem services provided by particular habitats meant that they had a greater economic value than being converted to production alone (MA 2005). The supposition from this is that economic growth may be rapid and immediate with the conversion of habitats to production or infrastructure, but longer term total economic value will suffer.

European countries have become increasing efficient in their extraction and use of natural resources, primarily through technological development. This has in some cases reduced the pressure on resources, but in others it has been offset by an increased demand for the resources. As a greater proportion of the economy shifts from direct resource use industries (e.g. extraction) to both manufacturing and services, the pressure on resources can be further reduced. European economies have witnessed a relative decoupling of development and resource use in the past 20 years (EEA 2005b). Since the 1980, the European (EU) economy has grown by 50%, however natural resource extraction has remained largely constant. However it should be remembered that the absolute use of resources remains and therefore this decoupling may not have led to an absolute reduction in environmental impacts (EEA 2005b). A further caveat to this view of economic development in Europe is that there is considerable variation among EU countries generally

moving from West to East in the intensity of resource use. The MA identified five key drivers resulting in the decline in the provision of key ecosystem services: habitat change, climate change, invasive species, over-exploitation and pollution. In Europe we view this slightly differently. For the purpose of this project we view climate change as a main driver of change and do not group it with the more proximate pressures, this is primarily an issue of scale and the appropriate level of response. We also look at habitat change in more detail, expressing the distinction between habitat destruction, fragmentation and conversion.

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CHAPTER 2. THE GEM-CON-BIO ANALYSIS FRAMEWORK

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2.1 Introduction

Understanding the linkages between the social, economic, political and ecological drivers and biodiversity is far from a simple task. Not only are the number of drivers of change that directly and indirectly affect biodiversity very high, ranging from demographic and cultural change, to changes in land use, species introduction and climatic change. The number of scales raging from local to the global, the interactions, and the time span comprised in these drivers are also difficult to grasp scientifically (e.g. Millennium Ecosystem Assessment 2005:vii), and difficult to govern (Cumming et. al. 2006). As an example, as many as 35 factors have been identified being critical to the organization, adaptability and sustainability of natural resource regimes – ranging from resource system characteristics to socio-political circumstances (Agrawal 2001). Indeed, we lack explicit theory that is able to assess the degree of correlation among these and other variables, and identify causal chains or propose plausible causal mechanisms (Stern et. al. 2002).

2.2 What should be addressed in a Framework?

A framework for analysing governance and management for the conservation of biodiversity needs to include insights from, and explore links between, several disciplines, e g. political science, economics, organisational studies, ecosystem management, and ecology. We argue that the following three issues are to be addressed in such a framework:

a) An integration of "governance theory" (e.g. Pierre and Peters 2005). Governmental institutions and policy processes can be evaluated in terms of how they are capable of i) providing an institutional framework that enable ecosystem management and ii) stimulating collaboration with, or within civil society, and iii) the capacity of multilevel ´biodiversity governance to respond to environmental change

b) An integration of insights from collective action theory in natural resource management (Ostrom 1990, 2005; Pretty and Smith 2003) and collaboration research (Wondolleck Yaffee 2002), with special focus on how collective action in policy networks emerge and self-organise.

c) An integration of insights from research of social-ecological resilience (Gunderson and Holling 2002, Berkes et. al. 2003, Folke 2006). Knowing how to adapt, without creating higher costs for the future, requires an understanding of ecosystem dynamics and thresholds, distinguishing "natural" variation from regime shifts and abrupt unwanted changes. Knowledge about ecosystem functions and processes underlying the production of ecosystem goods and services, and the vulnerability of these processes, is essential.

These three issues provide the basis for the GEM-CON-BIO framework. Before elaborating on these issues we provide a very short review of four existing frameworks that we have used as bench-marking.

2.3 Review of recent Frameworks in the Literature

There are a number of similar analytical frameworks for the study of natural resource management. In the following section, we review four of the most widely used research frameworks in the field of governance and natural resources, to elaborate the advantages and transdisciplinary focus of the suggested framework.

2.3.1 The Institutional Analysis and Development Framework.

In her seminal work Elinor Ostrom (1990) identifies a number of factors behind institutional choice in natural resource management (Ostrom 1990:194f). Various situational variables such as the number of decision makers, heterogeneity of interests, past strategies of leaders affect, whether the appropriators live near the CPR and other variables have all proven to be important (Ostrom 1990:205f). Refined and extended versions of the framework called the Institutional Analysis and Development (IAD) framework has been applied to several and widely differing settings around the world such as the evolution of coffee cooperatives in Cameroon to the regulation of the phone industry in the U.S.(Ostrom 2005), indicating its significance and wide spread use.
Though the framework has helped to clarify the important role self-organized institutions plays in natural resource management, it suffers from an important drawback that can be circumvented in part by the suggested framework. As Agrawal argues, studies based on this highly institution-focused framework are "negligent in examining how aspects of the resource system, some aspects of user membership and the external social, physical and institutional environment affect institutional durability and long-term management at the local level" (Agrawal 2001:1650-1). A related shortcoming is the fact that the IAD-framework lacks an explicit strategy to elaborate to what extent changes in "outcome" (in our case biodiversity) are the results of the institutions created by local natural resource users, or the result of natural fluctuations or other external non-institutional changes linked to the state of biodiversity, such as changes in general government policy. The latter is important in discussing how governance affects biodiversity as degradation often results from government initiatives at higher institutional levels than self-organized natural resource management institutions (c.f. York et. al. 2003, Agrawal 2001, Baland and Platteu 1998).

2.3.2 The Millennium Ecosystem Assessment (MEA) Framework

The complex interactions and poorly understood linkages between ecosystem services and human wellbeing have been the rational of the widely acknowledged Millennium Ecosystem Assessment. The ambitions of the MEA framework are very similar to those of GEM-CON-BIO but the MEA framework does not assess governance in any detail. As discussed earlier, the capacity and quality of government, and the governability of the system, (i.e. the existence of social networks, public support for biodiversity, the level of trust etc.) all have fundamental impacts on changes in biodiversity. The MEA framework however, does not include nor elaborate these factors in the presented framework (MEA 2005:vii) despite their importance. In addition, this implies that the MEA was "unable to answer a number of important policy questions related to ecosystem services and human welfare" (MEA 2005:101).
These policy questions were to some extent addressed by the sub-global assessments (MEA 2006) which did not belong to the original plan for the MEA but were appended after criticism at one early science meeting. The sub-global assessments were approved after application to the MEA Board and although they promised to follow the overall MEA Framework, the assessment was carried out by researchers focussing on quite different issues. Hence, the process of synthesizing the findings from the 34 sub-global assessments proved to be very difficult since the data were not really compatible (see e.g. (Malayang et al. 2006).

2.3.3 The Resilience in Social-Ecological Systems Framework (RSES)

The RSES is not a framework in the same strict sense as those described above, but could instead be characterized as joint research agenda with an explicit focus on interlinked social and ecological systems

across scales, the structure and feature of ecosystem management, and the system's ability to buffer, recover or reorganize from crises, stress or change (Gunderson and Holling 2002, Berkes et. al. 2003). Research within this framework also has an explicit ambition to analyze non-linear behaviour in social-ecological systems, including both path dependence and abrupt change (ecological surprises and social responses to such crises).
It is important to highlight that the RSES "framework" also lacks an explicit agenda for the study of the impacts of governance capacity and governability on ecosystems and biodiversity. An exception here is Folke et. al. 2005, yet the framework suggested for GEM-CON-BIO includes more detailed governance issues. Related to this is the fact that the RSES framework has not yet been applied systematically in large cross-national studies (c.f. Berkes and Seixas 2005) although attempts are underway (Olsson et al. 2006, Walker and Salt 2006).

2.3.4 The PSR / DPSIR approach

The application of indicators to describe the causal relationships between society, economy and environment is a frequently utilized approach. These interactions can be described and visualized by a common approach developed by the OECD. The PSR approach (pressures – state - responses) and its extension, the DPSIR approach (driving forces - pressures - state - impact - responses) was developed to both, monitor, and clarify the linkages between human society and the consequences for environment and ecosystems, but also to point out the needs for action. Because of the complexity of the interactions between human societies and environment, the limited capacity of the original model was well known (OECD 1994). Therefore, the model was extended to the Driving Forces-Pressures-State-Impact-Responses-Model. Now the focus also involves the reasons (driving forces) for environmental pollution and the consequences (impacts) for environmental state changes. To be more precise, the framework assesses the following (Pirrone et al. 2005):

- Driving forces are processes and anthropogenic activities (production, consumption, recreation etc.) able to cause pressures;
- Pressures are the direct stresses, deriving from the anthropogenic system, and affecting the natural environment, i.e. pollutant release;
- State reflects the environmental conditions of natural systems (air, soil and water quality);
- The Impact means the measure of the effects due to changes in the state of environmental system;
- The Responses are the evaluations of actions oriented to solve environmental problems in terms of management strategies.

The simplicity of the model is often raised as strength of the PSR/DPSIR approach. Not only does it make the framework easy to understand, and therefore easy to apply on other cases, furthermore the approach is flexible enough to adjust on more detailed questions (OECD 2003:21).
The similarities between the work assumed by users of the PSR/DPSIR approach, and the ambitions of GEMCONBIO are obvious: Both describe the interactions and causalities between human decisions and activities and their consequences for the environment. At the DPSIR framework the societal responses related to biodiversity governance are not as detailed compared to the suggested GEMCONBIO framework. While the first approach merely includes indicators of societal responses such as legislation, taxes and subsidies, waste recycling rates etc. (OECD 2003:21, Pirrone et al. 2005), the latter elaborates the importance of, and the interactions between governance factors such as co-management, social networks and others (Dhakal and Imura 2003). In this way, the suggested GEMCONBIO framework can be considered as a detailed elaboration of governance responses in the field of biodiversity protection. Figure X (see below) elaborates the linkages between the suggested GEMCONBIO framework and the PSR/DPSIR approach.

2.4 The GEM-CON-BIO Framework

This framework is developed in the rest of this report, especially in section 5.2 and Annex 1: The Research Questions. Important ingredients have been mentioned above in 4.1 "What should be addressed in a

Table 2.1. Alternative Frameworks Linking Governance, Ecosystem Management and Biodiversity.

Framework	Potential strengths	Potential shortcomings
Institutional Analysis and Development Framework (IAD)	Detailed and systematic understanding of the importance and emergence of self-organized natural resource management institutions.	Lacks an explicit strategy to analyze important external non-institutional drivers. Lacks an explicit research approach to understand the dynamics of ecosystems.
Millennium Ecosystem Assessment (MEA) Framework	Transdisciplinary and broad understanding of the direct and indirect drivers of change in biodiversity and ecosystem services. Clear link between ecosystem management types and processes and changes in ecosystems and biodiversity. Global scale assessment and scenarios including a detailed discussion of the health and dynamics of ecosystems.	Lacks a detailed discussion and analysis on how key governance aspects (such as state and government capacity, governability) affect biodiversity. Framework not applied systematically across sub-global cases, which leads to limited possibilities to draw general conclusions.
Resilience Framework	Transdisciplinary and broad understanding of the direct and indirect drivers of change in biodiversity and ecosystem services. Detailed and state-of-the-art focus on the dynamics of linked social-ecological systems.	Lacks a detailed discussion and analysis on how key governance aspects (such as state and government capacity, governability) affect resilience and ecosystem services. Framework never applied systematically on large N samples
The PSR/DPSIR approach	Simply understood approach that assesses the linkages between human society and the consequences for environment and ecosystems. Points out the needs for action in a diverse set of societal responses. Applied systematically across countries and ecosystems/natural resources by both scholars and policy-researchers such as the OECD.	Use of indicators implies that governance responses and characteristics are not elaborated in detail. Linkages between key governance aspects not stated nor studied explicitly.
GEM-CON-BIO Framework	Transdisciplinary and broad understanding of how different types of multi-level governance arrangements are linked to ECM. Assesses stakeholder collaboration and adaptability to changing conditions. Identifies and analyzes how key governance aspects (such as government capacity, governability) affect resilience and ecosystem services. Includes focus on the dynamics of linked social-ecological systems.	The framework is not prescriptive in the sense that drivers and pressures on ecosystems are studied in detail with the aim to derive policy prescriptions. Instead, the starting point of analysis is existing governance systems. Assessment is not made on global scale, and does not include scenarios.

framework?" In short, the GEM-CON-BIO Framework draws on the insights and experiences from the other three frameworks described here. We expand the issues of governance without neglecting ecosystem dynamics and adapt the framework to the European ecological and policy context.

The GEM-CON-BIO framework is scale-free, i.e. works for all institutional scales and explores links between institutional processes at different scales (Figure 2.1). Each cycle starts by assessing the Initial Capacity (ecological capacity including drivers and threat, socio-economic capacity, governance capacity, regulatory capacity, and general social capacity). Based on this general capacity, we assess how management objectives are determined, whether an integrated perspective (e.g. the ecosystem approach) is employed, and whether efforts to monitor are taken (which is necessary for an adaptive management).
Then our framework calls for detailed analysis of the governance processes, how regulations are linked between multi-level institutions, how rules are enforced, how monetary and social incentives are provided, whether and how stakeholder groups collaborate in horizontal and vertical networks, how local ecological knowledge is embedded in management plans, the role of leadership, and so on. Since our framework focuses on governance and ECM, we assess the impacts of these on market opportunities, on social organization (changes in stakeholder collaboration and local social capital) and ecosystem services including the threats (drivers and pressures) to ecosystem services. Hence, by "impact" we don't mean impact of drivers and pressures but impact of governance (which of course sometimes can be regarded as drivers, e.g. the Common Agricultural Policy or economic policies). In this respect the GEM-CON-BIO framework differs from both the MEA and the DPSIR frameworks.
The GEM-CON-BIO framework focuses on the Change in the State of Biodiversity resulting from the impacts of all governance processes. This is followed by the important evaluation: did the biodiversity governance actions meet the management objectives and/or the requirements of broader commitments (e.g. the CBD)? Were major drivers and pressures identified, targeted, and influenced? If this was not the case, or if governance actions were based on inadequate understanding of ecosystem dynamics, the actions are bound to be ineffective, no matter how democratic the governance processes have been and how much "good governance" we have experienced. A response at a local scale may appear effective and successful at the local scale but unless drivers and trends at larger scales have been influenced the effectiveness can be questioned. This was the case for some of the Sub-Global Assessments within the MEA (Malayang et al. 2006).
Table 2.1 provides an overview of the differences between GEM-CON-BIO and the other presented frameworks and Figure 2.1 is a stylized representation of the relationship between the GEM-CON-BIO analytical framework and the DPSIR framework and relate it to the policy development cycle.

2.5 Key Methodological Issues

When a large number of causal variables potentially affect outcomes, the absence of careful research design makes it almost impossible to be sure that the observed differences in outcomes are the result of claimed causes (Scharpf 1997). This is most clear in case studies or small N studies where the causal model is not carefully or explicitly specified. The drawbacks here have the potential to produce an emphasis on causal factors that may not be relevant, ignoring other factors that may be relevant, and the generation of spurious correlations (Agrawal 2001:1661, King et. al. 1994, Scharpf 1997).

This is not to say that large-N multivariate studies are free from research bias and problems in assessing causal relationships. Limitations here are the range and quality of measures available for all cases in the data sets. Sometimes, variables of theoretical importance are not measured at all, or can be measured only by using rough proxies. Hence even though large-N studies can be very fruitful in formulating and testing hypothesis, they can also fail in properly elaborating the causal paths, or assume false correlations (Hedström and Swedberg 1998, Stern et. al. 2002:451f.
These challenges are obviously common to all research activities. The important question at this point is how to overcome them. One often suggested strategy to approach these methodological problems is to deploy a careful research design by assuming 1) theoretically motivated comparative case analyses to identify the most important causal mechanisms, and narrow the range of relevant theoretical variables, and 2) conduct large-N studies to identify the strength of causal relations (Agrawal 2001:1662-5, Stern et. al. 2002:468f). The benefits of the suggested approach should not be underestimated. Theoretically guided comparative case studies, combined with multivariate analysis can contribute to empirically supported

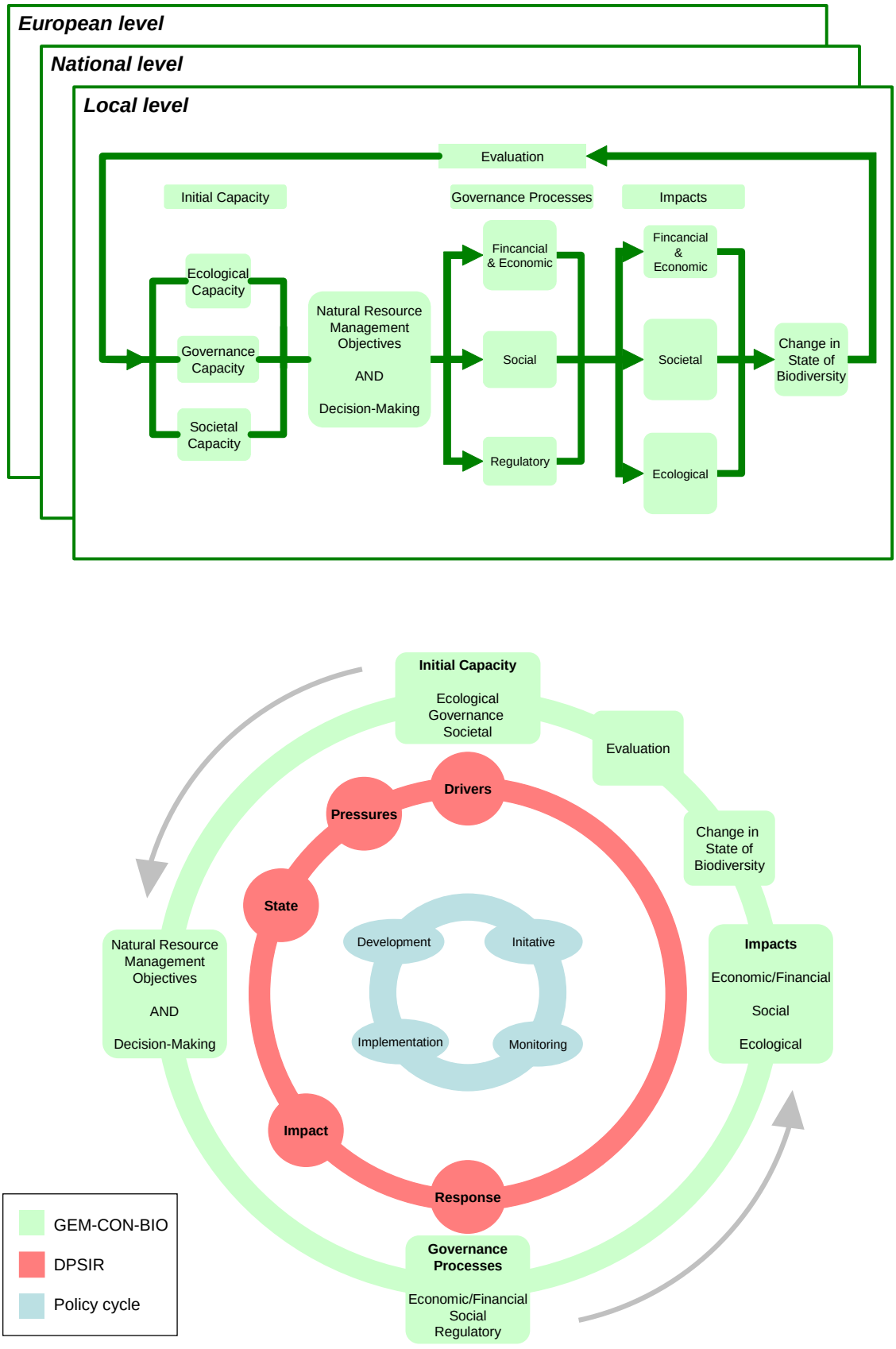

Figure 2.1: A stylized representation of the relationship between the GEM-CON-BIO analytical framework and the DPSIR framework and also the policy development cycle.

causal hypothesis, particularly in dealing with transdisciplinary challenges (Stern et. al. 2002:467f, Coppedge 1999, Agrawal 2001).
It is of great importance that as many variables of the suggested framework are measured in each case study. There are two main reasons for this. First, a systematic use of the framework allows the research programme to expand it explanatory potential, compared to a scenario where the framework is applied unsystematically and *ad hoc* (King et. al. 1994:43ff, George and Bennett 2006). As a case in point, the IAD-framework and its systematic use over a large number of natural resources, has been widely acknowledged as solid knowledge base of great importance for our increased understanding of how natural resource users overcome the "Tragedy of the Commons" (Drama of the Commons, Ostrom 2005).
Second, a systematic use of the framework across the case studies allows the research program to elaborate the linkages between different biodiversity governance factors, and changes in biodiversity. As one example, whether the use of market-based instruments is effective across differing institutional contexts (e.g. national and international legislation, degree of compliance etc), can only be answered in a convincing way if these dimensions are captured in all case studies.
We recommend that the program avoids a situation where the included case studies differ considerably in the data collected (e.g. some cases are rich in ecological data, and poor in social data, or vice versa), or the framework is applied in a disjointed manner. Hence we recommend that the project management makes sure that the balance between social, institutional, economic and ecological is taken in serious consideration in the choice of case studies.
One often raised point of criticism to large N studies is the lack of dynamics in the studied phenomena (Agrawal 2001). In the case of GEMCONBIO, the linkages between the independent variables (i.e. biodiversity governance), and the outcome of interest (biodiversity conservation) risks to be studied measuring non-changing variables as a way to keep the analysis simple. The cost of this simplified approach on the other hand, is that the project overlooks how the factors change and interact over time. To be precise, a static analysis within GEMCONBIO might lead to highly limited possibilities of understanding how shifts in biodiversity governance affect changes in the state of biodiversity, or vice versa. The importance of assessing these dynamics is of high scientific and policy value.
Hence we recommend that the case studies include an analysis of ex ante, and ex post of both ecosystem state and biodiversity governance. Since most case studies in GEMCONBIO were chosen because of an interesting governance experience, the assessment team had to select a starting point in time before the particular governance intervention started, and compare this state of biodiversity with the present state of biodiversity. Thus the argument follows, in *x* set of starting conditions, *y* governance model was implemented with *z* outcomes for biodiversity.

2.6 Governance types

Within the proposal for the project, one of the end products was a *governance matrix* that would link "governance types and critical ecosystem management characteristics." Critical ecosystem characteristics as a term was never defined within the proposal, but the work programme alluded to the elaboration of "the main types of instruments used to manage natural resources in order to achieve biodiversity conservation" and that this would involve "identifying the different policy instruments which are used to manage natural resources in both protected areas and socio-economic sectors in order to conserve biodiversity."
Based on this premise, the lead partners in WP2 and 3 proposed a series of governance types based on a number of characteristic features. In the report we characterised these as "ideal types", which were intended to be seen as model situations that should be open to assessment within the case studies. The idea behind this process is not to fit each case study to one of the governance types. But it is a tool to frame questions within the case studies and to identify whether certain predictions hold true. In this context these models were free from value judgement, i.e. one model was not necessarily seen as better for biodiversity than another.

	State controlled	State controlled	State controlled	State controlled	Community based	Policy Network based	Market Based
	National/Federal	**Decentralised**	**Delegated**	**Corporatist**			
Description	Strong centralised control over management through State agencies	Management delegated to most appropriate administrative level	Management delegated to a non-governmental body, e.g. Academic, NGO, private sector. Remains within govt policy objectives	Management employed through negotiated agreement between state agents and organised interested.	Objectives and main processes of ESM are defined by self-organized communities depending on ecosystems for their livelihood.	Objectives and policies are negotiated and implemented among local stakeholders, government agencies and NGOs	Objectives oriented towards economic returns
Main Management objectives	Regulatory compliance and economic development	Regulatory compliance and economic development	Regulatory compliance and economic development	Regulatory compliance and economic development	Ecosystem resilience, economic development	Regulatory compliance, Ecosystem resilience, economic development	Economic development
Key policy instrument	Legislation and policy guidance	Legislation and policy guidance	Legislation and policy guidance	Legislation and policy guidance	Decentralized formal and informal institutions	Mixture	Economic incentives
Main Ownership structure	State	State/mix	State/mix	State/mix	Community/mix	State/mix	private
Level of vertical integration	High (with state agencies)	High (with state agencies)	High (with state agencies)	Medium	Variable	Variable	Low
Level of horizontal integration	Low	Medium	Medium	Low	High	High	Variable
generation of knowledge	Low	Medium	Medium	Low	Variable	Variable	Low
Local community participation	Low	Variable	Variable	Low	High	Variable	Variable
Adaptive management	Low	Medium	Medium	Low	Variable	High	Variable
Multi-level governance	Limited	Possible	Possible	Possible	Important	Important	Unimportant
Leadership	Limited	Possible	Possible	Possible	Strong	Important	Unimportant
Market/Financial tools	medium	medium	medium	high	medium	medium	high
Regulatory Tools	high	medium	low	medium	medium	medium	low
Societal Tools	low	low	medium	low	high	medium	low
Sustainability of resource use **Maintenance of ecosystem services** **State of Biodiversity**							

Table 2.2: Governance types identified within GEM-CON-BIO and their defining characteristics

We proposed that each of these types would display a number of characteristics that could be tested and elaborated using the research questions. For example state dominated management is hypothesised to show low leadership and social integration. These models are not necessarily mutually exclusive and we recognise that not all situations will closely match a model, there are certainly examples were state dominated approaches have implemented innovative approaches and increasingly stakeholder engagement is actively pursued. As a result from the literature review and the Stockholm Workshop, we finally decided to divide the "State controlled" governance type into four categories (Galaz, Hahn and Terry, 2006; Terry, 2007):

1) State Controlled
    a. National/Federal
    b. Decentralised
    c. Delegated
    d. Corporatist
2) Community based
3) Policy Network Group
4) Market based

Table 2.2 provides a summary of characteristics for each one of these seven governance types. After the inclusion of non-western case studies a parallel classification were made, reflecting the different nature of vertical collaboration in these countries (Borrini-Feyerabend and Lassen 2007):

1) Government-based
2) Shared governance
3) Community governance
4) Private governance
5) Open Access

A fuller description of these governance types and how they fit to the case studies are discussed in Chapter 6.

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CHAPTER 3. METHODOLOGY FOR THE ANALYSIS OF THE PROJECT'S CASE STUDIES

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3.1 Introduction

The GEM-CON-BIO project has studied the complex relationship between governance processes and the management of natural resources for the conservation of biodiversity. Within this are the fundamental questions of how do different governance models impact biodiversity conservation and what is the importance of the interactions at different levels of organisation.
Within efforts to conserve biodiversity little attention is paid to the role of governance processes in enabling or hindering management actions. Also although there is quite a background of work on the governance processes used in the management of natural resources, this is primarily from a sociological perspective and does not continue to consider the state of biodiversity underlying the delivery of these resources. Therefore the analytical framework developed within GEM-CON-BIO is one of the few attempts to link these fields (see next page Figure 1).
As part of the initial conditions that the framework analyses, attention was paid to the role of driving forces. These are defined as factors that influence the policies and management decisions, but are outside of the governance capacity of the region being studied. These are in effect external drivers that there is little possibility of changing within the scope of the analysis, but that have an important impact on decision-making and implementation. To some extent climate change can be treated as a driving force. Changing the course of climate change, is obviously beyond the actions assessed within the project, however it has a major impact on the decisions taken. It is possible for management decisions to either support the ability of species to adapt to climate change (i.e. implementation of habitat connectivity measures) or to even try to mitigate the impacts (e.g. management to improve sequestration function of forests). Another example comes from the EU's Common Agricultural Policy (CAP) which still acts as an important external driving force for most of the case studies with regard to the management of agro-ecosystems at the local level. These external drivers were identified within the initial conditions of the model at the local to the European level.
As part of the development of the analytical framework, we also developed a series of research questions that would guide the research carried our in each of the case studies. These questions were separated into those that were very important to the study and those that may be more difficult to collect data on or may provide supporting data. It was the aim of the guidance manual for case studies to take the research questions in turn and to explain the reasons for asking the questions and the type of information to be collected. Where there are lists of categories to be identified, we have tried to provide the starting lists. For example with the range of habitat threats and ecosystem functions.

3.2 Methodology

This study is based on the detailed assessment of case studies at different levels of organisation from the local site level to the European Union level. The analytical framework that has been developed presents a model that can be applied in a similar fashion at each level, therefore aiming to ensure coherence between results generated within the different case studies. Below we discuss some of the methodological issues associated with the use of the analytical framework within the case studies.

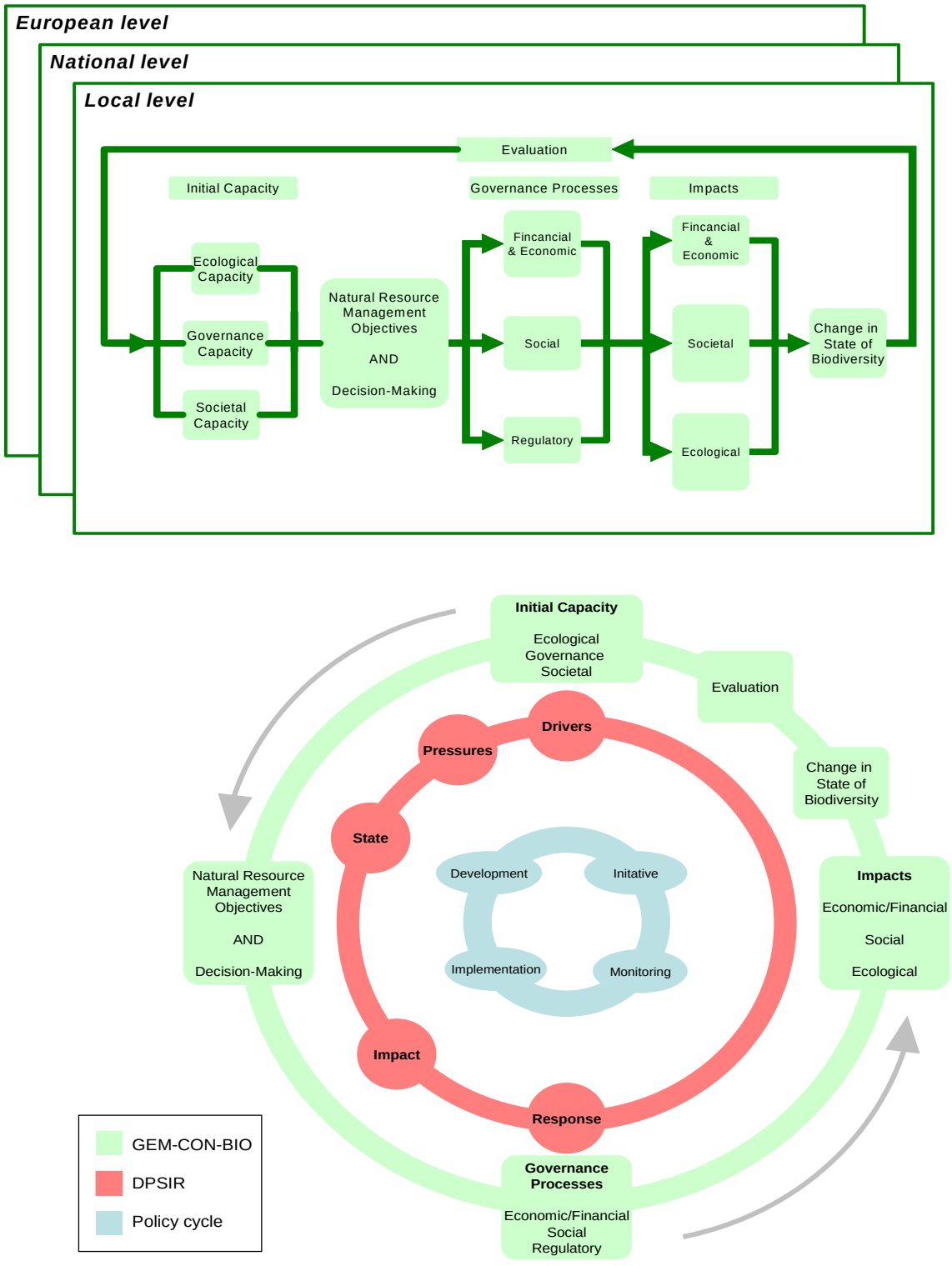

Figure 1: A stylized representation of the relationship between the GEM-CON-BIO analytical framework and the DPSIR framework and also the policy development cycle.

3.3 Time Frame

It is recognised that critical to the analytical framework integrated approach is a consideration of the spatial and temporal scale within which the processes being studied are enacted and have measurable responses. There is obviously a time lag between the implementation of a policy or plan and the resulting change on

the ground. This time lag and also the confounding factors of dis-entangling the various influences that result in changes, have hindered the development of policy response measures for the state of biodiversity to date. Furthermore the actions and results can occur at different organisational levels. For example the development and modification of policy generally occurs at the national or super-national level (e.g. EU), but the implementation of measures and the management of sites occurs at the local level. Again identifying the most suitable points to influence the management of biodiversity is an important component of the analysis framework and this is reflected within project (See Figure 2).

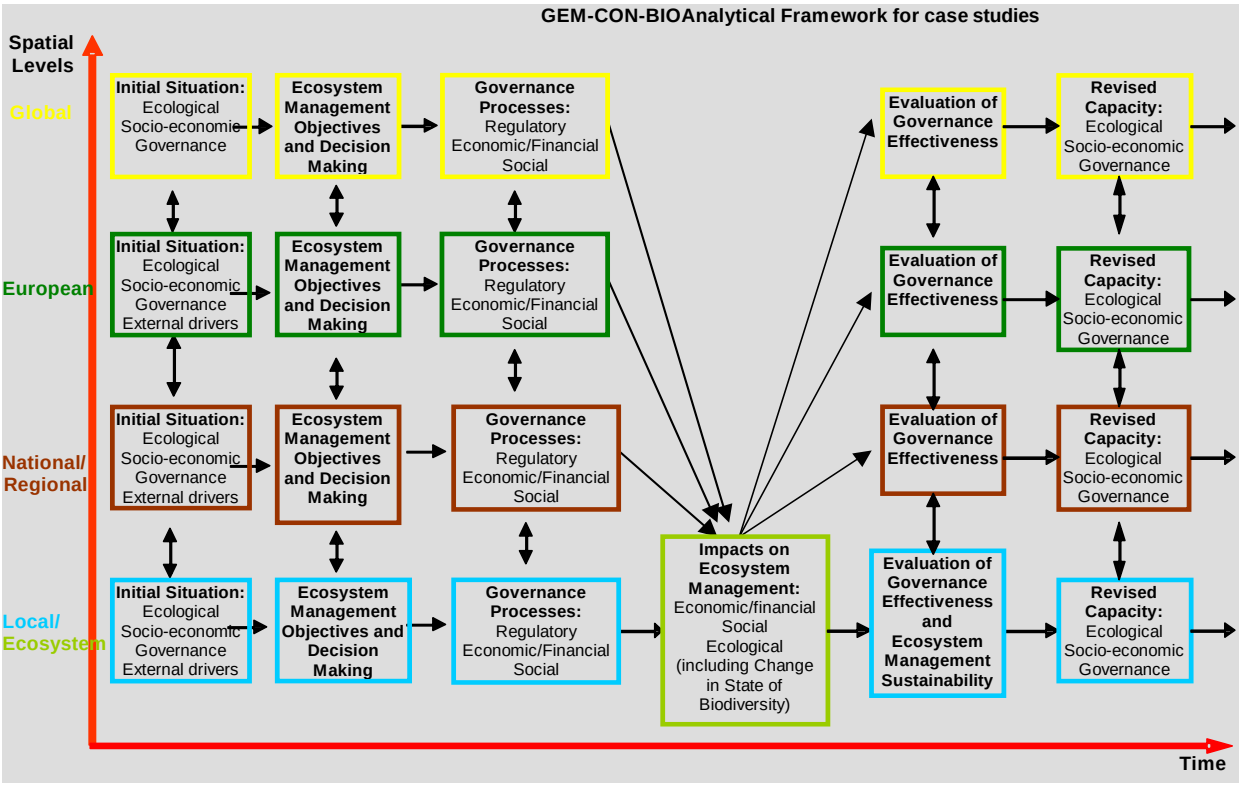

Figure 2. Governance and ecosystem management: different spatial levels and time dimensions

To understand the impacts of governance processes on natural resource management, the case studies needed to identify a starting point for their study with the range of initial conditions (*time t*). Then by working through the model it was possible to identify the actions that were taken as a result, what the impacts were and therefore what changes were made to arrive at a new set of starting conditions (time *t+1*). We proposed that the date of implementation of the policy or management process being studied is used as time *t* and time *t+1* should be identified as either the present day or some suitable period after implementation to witness results. Case study leaders therefore needed to consider whether the time period they were studying was sufficiently long to show an impact from implementation. An absolute limit for time *t* was set at 1957, or the Treaty of Rome. This established the EU and the mechanisms that have shaped so much of the continent since then. It also provides a 50 year time window for the project. However analysis did not need to start with the implementation of the CAP. It was up to the case study leaders to identify which time frame made most sense to the issues under direct study. For example for some protected or managed areas such as Biosphere Reserves, it may have made sense to start the analysis at the time when the area was gazetted or when Management Plans were implemented.

3.4 Spatial Scales

This project aimed to make assessments at different spatial scales from the local to the European. Most of the case studies focused on the local site level, while some focused at the regional level (collection of local administrative units) and currently two case studies focused at the national-European level. However many of the governance processes and impacts that have being studied were closely connected between the different levels. Rural development policy for example is developed at the European level, and implemented

at the national and/or at regional level through national/regional agencies' rural development plans for individual stakeholders or projects operating at a local level. Many of the processes that affect a site, therefore, are implemented regionally. In order to take into account the objectives set at different governance level but insisting on local level definition of goals and management of ecosystem, triggered governance processes, and corresponding impacts and effectiveness, it was recommended to carry out the analysis for the above issues by starting from the higher hierarchical level (i.e. European) to the lower (i.e. local).

3.5 Categories

Within this study we requested that quantified data was collected where possible. However we recognise that in many cases it was not possible to collect direct field or desk data for the questions being asked. Therefore for questions where data was lacking we asked that case study authors would use a combination of the Categories that express best professional judgement (BPJ) and text justifications or the identification of the source of the classification (see tab.1). Categories have the advantage in that they can be used to identify quantified variables from largely qualitative data. In the scope of this study their major disadvantage is that they will be assigned by usually by one person and so be prone to error or bias. For this reason we asked for a text justification and/source after each use of categories.

Table 1 Examples of ranking categories

	-2	**-1**	**0**	**+1**	**+2**
Impact	Very low	Moderately low	Medium	Moderately high	Very high
% change	>50% decrease	10-50% decrease	No change	10-50% increase	>50% increase
Rate of change	Strong negative	Moderately negative	No change	Moderately positive	Strongly positive

3.6 Text Descriptions

In designing the research questions to be asked during the case studies we have tried to identify ways of quantifying responses. This is the reason for the use of categories identified above, when explicit data may be lacking. Although the use of quantified variable allows a certain level of statistical comparison and graphical representation of data and comparison between case studies, there is also an important need for text descriptions to support these variables. The use of text descriptions allowed the user to describe in more detail the situation faced on the ground and the connections between the different components of the study. This is important information, especially when it comes to the development of a synthesis conclusion and recommendations. Without an extremely detailed study many of these connections would be lost. Therefore wherever possible we asked case study leaders to provide text explanations for the data provided. Beside text explanations, each of the case study reports prepared for GEM-CON-BIO should contain an introductory summary which presents the area under study and some key features which are not covered in later sections. This summary should also provide an overview of the results presented by the report and establish a narrative linking the governance of the area to its biodiversity.

3.7 Assigning a Governance Type

An important ambition of GEMCONBIO was to assess the linkages between different governance types, and their outcome for biodiversity conservation. As part of the background report, we developed a series of governance models to be identified during the project. We suggested that the wide variety of biodiversity governance objectives and characteristics can be reduced analytically to seven general models. The governance ideal types analysed for EU and US case studies, as identified by the GEM-CON-BIO research team (Galaz, Hahn and Terry, 2006; Terry, 2007), are the following: *State Controlled (National/Federal; Decentralised; Delegated; Corporatist); Community based; Policy Network Group; Market based.* These governance models are described in Chapter 6 of this report (Governance matrix summary) together with those used for non-western case studies proposed by Borrini-Feyerabend and Lassen, (2007): *Government-*

based; Shared governance; Community governance; Private governance, Open Access. The models try to describe different situations found in the management of natural resources. These models are not focused on protected areas and therefore do not take the site management objectives as their starting point. However there is considerable overlap between the PA governance types identified by Borrini-Feyerabend et al (2004) and the GEM-CON-BIO governance models. It is possible to have different governance models applied within different PA governance types. As an example, Natura 2000 sites, which may be managed at a local level or at a state agency level, can be managed with economic interests included and can also be managed through adaptive management. Similarly Biosphere Reserves with a zone management system will conform to different models within one Protected Area governance type. Users should therefore identify the GEM-CON-BIO governance models for their sites and if applicable (i.e. if within a PA), the protected area governance type. It will be important to use the models to identify which governance types can support biodiversity conservation in different settings.

3.8 Aims of the clusters of research questions

The project aimed to assess the role of different governance approaches on the management of ecosystems and protection of biodiversity. The analysis was carried out by around 70 research questions clustered together to assess the following:

Natural Capacity: this section provides the background information concerning the natural state of the area under study. It identifies the key habitat types and ecosystem services that will be assessed throughout the case study.

Socio-economic Capacity: In describing the starting conditions for the study, an important component is the initial socio-economic conditions. In many cases these will provide an important pressure on the way in which ecosystems are used and managed. For example in some cases a high per capita income may support more measures for biodiversity conservation. Conversely in rural areas with a low population density and low per capita income fewer pressures may be put on the environment. This section attempts to identify some key socio-economic indicators.

Governance Capacity: There are a number of indicators that identify the governance context within which activities can take place. These almost wholly relate to data from the national level and refer to the rule of law and level of corruption present in each country. These statistics may have less relevance for studies at the local level, but they establish the context within which national to local authorities are acting.

Regulatory Capacity: Part of understanding the context within which ecosystems can be governed and options be made to protect biodiversity, is the strength of the regulatory framework. This does not mean having legislation that is heavily in favour of biodiversity, but instead a well implemented and strongly enforced framework that integrates biodiversity concerns. The questions therefore ask about the coherence of the legislative framework both within and outside environmental legislation. They ask whether laws and policies are enforced and funded properly and importantly whether they support multiple models of implementation.

General social capacity: This section aims to uncover some of the background social capital within the country of study that will be assessed in more detail within the site level case studies. The first two optional questions ask at the national level how different stakeholders are integrated into the use and management of biodiversity and what are the levels of trust. The second two questions look in more detail at what the public perception of the value (in broad terms) of biodiversity is, i.e. in beneficial and non-beneficial terms.

Natural Resource Management: There are a number of different strategic plans that impact the use and management of natural resources. This section requests case studies to identify which of these plans are the most important (e.g. Rural Development Plans, Protected Area Management Plan etc) and then what their impacts are for the study sites. The term Management Plan is defined here in its broadest sense to identify a plan that impacts the management of natural resources. Plans are the instruments through which the use and preservation objectives of an area are met. They provide the tools for integrating actions with local stakeholders and land users and steer all the activities that take place within a site, from tourism to development. As a result they are primarily focused at the local site level, and not the regional or national level. However it is possible to adapt the questions to suite a national perspective.

Governance processes: The series of questions that relate to governance processes, identify that the tools used to management biodiversity and natural resources can be broadly divided into three categories:

regulatory, financial and economic, societal. This project is interested in the balance between the three sets of processes.

Regulatory: Regulatory mechanisms are those prescribed by legislative or policy documents usually established at the national level. These tools are then implemented regionally and locally. These questions try to identify the extent to which regulatory mechanisms are implemented within each case study.

Economic and financial: This section considers the Financial and economic tools that can be implemented for the sustainable use and conservation of biodiversity.

Societal: These questions provide the main integrative component of the study which looks at the societal mechanisms involved in the management of natural resources. This tries to understand the different stakeholder groups involved in use and management and how they interact. It will try to explain why in some settings management and sustainable use mechanisms are more successful than others.

Impacts In the previous questions we asked about the different instruments that are used to manage natural resources, ranging from financial tools to policy groups. As mentioned each study area sees a combination of these tool employed. In this section we are interested in what impacts those processes have. We recognise that impacts fall into three general groups;

Financial and economic impacts on the local community and its stakeholders and their economic activities,

Social impacts are those that affect the social interactions among stakeholder groups. These questions view the social impacts of the implementation of the governance processes or their attitudes towards biodiversity

Ecological impacts are the ecological impacts of the processes on the surrounding ecosystem in the study area. Finally we asked for the net results of all the impacts on the state of biodiversity in the region. It is recognised that aligning policy action and changes to the state of biodiversity is extremely difficult as many different influences will have an impact on biodiversity. Also there is the issue of how to monitor biodiversity in a way that will identify these impacts.

Evaluation: The evaluation component of the model provides the opportunity to measure whether the outcomes of management decisions meet their local objectives and then whether they support commitments made nationally and to the global processes such as the CBD. This section then provides the feedback required to modify the management objectives in the next iteration. The final question asks at what level the modification would be best made. This is a very important question. In many management scenarios, it may be most effective to makes changes at the local level, empowering people who have the most knowledge concerning the system. However there will be some changes that will require institutional or policy change and has to happen centrally. This final question will try to identify where the most appropriate level of change is for different governance models so that recommendations can be made for the governance of the management of biodiversity.

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CHAPTER 4. THE PROJECT EXPERIENCE

4.1 The Stockholm Workshop on Governance and Ecosystem Management

Royal Academy of Sciences, Stockholm, Sweden 14th – 15th September 2006

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Introduction

As the conclusion of Work Packages 2 and 3 of GEM-CON-BIO, CTM and IUCN organised a two-day workshop at the Royal Academy of Sciences in Stockholm to discuss the findings of the report on ecosystem management and governance in Europe and the development of the analytical framework that will steer the case studies in 2007.
This combined workshop (D2.1 and D3.1) provided the first opportunity to bring together all the partners of the project with key external experts to discuss the emerging analytical approach being developed within the project. The workshop was arranged over two days, addressing governance and ecosystem management in an integrated fashion, followed by one day of internal meeting for project partners.
The analytical concepts developed within the project so far follow an approach that is being increasingly used within European and global natural resource management and biodiversity conservation. Most comprehensively studied in the Millennium Ecosystem Assessment (2005), the ecosystem approach takes a holistic and scientifically based view of an ecosystem as a single entity containing the many processes that keep that ecosystem functioning. Many of the processes are essential for human survival (ecosystem goods and services), but short of a few easily identified examples (e.g. provisioning services), most are poorly accounted for in political, regulatory, financial and social settings. The main view is that this is why relatively little importance is placed on the conservation and sustainable use of ecosystems by societies; we are unaware and therefore ignore the central importance of ecosystems for our survival. More and more the likely results of this societal approach are being expressed in the media especially in relation to the impending impacts of factors such as climate change.
The GEM-CON-BIO project focuses on the responses of societies to these pressures and how European and national agencies implement the different opportunities to manage natural resources for biodiversity conservation. This is, in essence, an issue of governance because in Europe most countries have relatively strong legislation, especially within the European Union framework. We define *biodiversity governance* as the way society at all scales manages its social, economic, and regulatory affairs with the aim to protect ecosystem function and biodiversity. The success of any legislation is in its implementation, monitoring and enforcement. The critical questions arise around *how* institutional structures and governance processes come together to form effective responses to decline in ecosystem services in general and biodiversity in particular. For this purpose we need to understand how regulatory, financial and social processes contribute to failure of success.
Through this workshop we aimed to discuss some of the key elements driving ecosystem management in Europe and the governance that enables an integrated management. Key external experts were invited to provide their insights into this subject and their feedback on our proposed approach.

Assessment

The workshop was attended by all project partners and sub-contractors, as well as invited external experts. The intimate nature of the workshop allowed a greater openness for discussion and the sharing of opinions. The participants were able to receive input from ecological aspects of ecosystem science such as ecosystem resilience (Thomas Elmqvist), evolution of the sustainable use debate from its early beginnings to the present situation within the Convention on Biological Diversity (Steve Edwards) and the current state of

ecosystems in Europe (Andrew Terry). This mixture of research and advocacy is very important in ensuring the effective use of scientific knowledge in the formation of biodiversity related policy. These approaches were also compared with experience from the USA where there is a longer history of monetary evaluation (Richard Carson) and implementing the ecosystem approach in innovative collaborative ways (Michael Donlan and Ken Elowe).
When we switched to looking at the governance of natural resources, we asked critical questions of whether it really mattered and what were the links between good governance and sustainable resource use. This was tackled at a global level with data from the World Bank (Andreas Duit) and also within the social networks of stakeholders working at the local level (Thomas Hahn and Yvonne Rydin). Drawing on this firm base, the workshop moved to discussing how GEM-CON-BIO has proposed to address its research questions. Victor Galaz, Thomas Hahn and Andrew Terry presented the analytical framework developed during the project and this was compared with existing approaches such as the DPSIR approach.
But this workshop was not intended to be about one-way communication through presentations. The most important element of the workshop was to allow detailed discussion of the analytical framework. Therefore participants including the external experts were divided into two groups and each went through the entire framework deciding whether questions made sense, were feasible and would answer the research questions. This was a lengthy and involved approach that led to discussions extending into the evening. On the final day, rapporteurs from each group presented their main findings and submitted a set of specific responses. The first group focussed on which questions should be prioritised and what data sources could be used to answer them, the second group focussed on the clarity of each question in the framework and also prioritised questions. This was a very successful approach that resulted in a much more refined set of questions within the analytical framework.

External Speakers

Ecosystem Resilience and Its Implications for Biodiversity Governance (Thomas Elmqvist)
Thomas Elmqvist from the Department of Systems Ecology at Stockholm University outlined the ecosystem resilience theory with a special focus on thresholds. Thresholds are non-linear relationships between dose and response. A system may absorb disturbance until a certain degree but after that "flip" into a new stability domain, which is difficult to reverse. We don not know what systems are characterized by thresholds and Elmqvist suggested that all systems should be treated as near a threshold unless there are good reasons to believe otherwise. Elmqvist also suggested some rules of thumb to detect systems with thresholds without long time series. For instance, if most shallow lakes are dominated by either top or bottom vegetation, but very few are mixed, then this suggests two stability domains.

Global Strategies for Sustainable Use (Steve Edwards)
Steve Edwards is a senior advisor for the World Conservation Union (IUCN) and has been working on sustainable use issues for many years. He started the sustainable use work within IUCN, which then led to the development and adoption 2004 of the Addis Ababa principles within the CBD. Edwards emphasized that the famous "sustainable use" concept is resource focused, asking if the biological resource can sustain its processes. It is not an economic term focusing on sustaining human wellbeing.

On the use of Contingent Valuation (Richard Carson)
Richard Carson from the University of California (San Diego) came to Stockholm to discuss different models that can be used to value ecosystem services. Currently there is considerable global debate concerning how to properly incorporate the value of all the services provided by ecosystems within economic models. Difficulty arises when attempts are made to put values on provisions, regulating or cultural services. How exactly does one put a value on all the services that a wetland performs? The contingent valuation approach is to ask people in a survey, what they would be willing to pay for the continued delivery of the service. This approach has been used quite a lot in the US and Richard described examples where Californians indicated that on average they would be willing to pay $61 to avoid oil spills and $83 to avoid water shortages. It is unsurprising that this approach has its proponents and detractors and engenders a strong debate. Typically responses are highly dependent on the questions asked and the options

provided within them (i.e. the 'contingent' component of the valuation). But it does provide a useful tool in an increasing 'toolbox' for the valuing economics of ecosystems.

Does Governance matter? (Andreas Duit)

Andreas Duit of the Department of Political Science at Stockholm University asked this provocative question to present some of his work using the World Bank's database on governance indicators and what they can tell us about the quality of natural resource management. The main question he asked was *What explains differences in environmental performance between nations?* He proposed the hypothesis that good institutions provide the necessary basis for good environmental performance. This is a difficult issue to study because of the many confounding factors involved. For example countries with high economic development tend to have strong institutions, but which of these factors has the leading impact on environmental performance. Invariably indicators of environmental performance increase with those of institutional quality. But at the same time countries with a strong institutional quality are also more able to exploit natural resources. A study by Mikusinski & Angelstam (1998) found a negative relationship between woodpecker density in European countries and institutional quality. It seems that although institutional quality is essential strong policy is also required. The implementation and enforcement of that policy although enhanced by good institutions is not necessarily a product of institutional quality. It is this stage that the GEM-CON-BIO project will look at the relation between institutions, policy implementation and biodiversity to identify these relationships.

Networks and Fragmented Institutions in Natural Resource Management (Yvonne Rydin)

Yvonne Rydin from the Bartlett School of Management at University College London studies the relationships between institutions in urban planning, sustainability and the implementation of environmental policy. Her presentation to the workshop focussed on the interaction between different components of a region's institutional structure in the management of natural resources. In the management of common pool resources (those that are sufficiently large that it is very difficult to exclude users), Yvonne maintains that collective action is required to ensure sustainability. This collective action requires a strong and coherent institutional structure which establishes the 'ground rules' of use. What we experience in reality is that most institutions are fragmented with gaps in management, overlap in regulatory frameworks and inconsistency in policy. To combat this fragmentation, the development of strong networks is required that are characterised by mutual dependencies between actors. The idea of social capital defines the types of connections that can exist between actors within a network. Social capital can take the form of norms, reciprocity and trust. There are two forms of social capital; bonding (strong links between members) and bridging (links heterogeneous actors together). Yvonne suggested a third form called bracing which aims to establish limits to the amount of bonding and bridging that is required for an effective network. In a series of case studies, she studied the different elements of social capital showing that selective bonding and bridging (i.e. bracing) led to the most effective networks. Interestingly she found that certain key individuals were always present in the successful networks. Many of the ideas Yvonne presented are now being incorporated into the GEM-CON-BIO model.

Pro-biodiversity enterprises (Liz Hopkins)

Liz Hopkins who works with Flora and Fauna International discussed another 6th Framework project that she is involved in called "ProBioPrise", which aims to identify specific business opportunities and constraints for the sustainable use of terrestrial, freshwater and marine biodiversity by SMEs especially in ecologically sensitive areas. Currently there are some 23 million SMEs in the EU, providing around 75 million jobs and accounting for 99% of all enterprises. But we know little about the pro-biodiversity sector in terms of its size, and the difficulties and opportunities faced by companies. The project is using workshops and case studies of businesses associated with biodiversity to develop some clear typologies and a platform for businesses. This project contributes to GEM-CON-BIO because it is studying the governance among the private sector and identifying the options that will allow small to medium sized enterprises to engage more with biodiversity conservation.

4.2 Third Country Workshop

Kastamonu, Turkey, 1st-5th October 2007

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As part of work package 4 of the GEMCONBIO project, Cenesta organized a Third Country Workshop to present the results of each of the third country case studies, jointly analyze their results and draw recommendations. The workshop took place in the Kure Mountains of Turkey (country host of one of the Third Country Case studies) in the first week of October 2007. The workshop focused on the crucial topic of community governance of biodiversity and associated ecosystem functions and cultural values, spanning co-managed protected areas, co-managed landscapes and Community Conserved Areas (CCAs). It brought together the Cenesta project coordinators, the researchers of the five Cenesta case studies, and two representatives of CIFOR. A number of external experts on community governance of biodiversity were also present, some of which offered results from another research project on Community Conserved Areas coordinated by Cenesta and TGER/TILCEPA. Additionally to the nine GEMCONBIO Third Country case studies, results were thus presented from four regional CCA reviews (Northern Mesoamerica, the circumpolar Arctic, East/Central Africa, South-West China) and several national studies (Tajikistan, Iran, Zimbabwe, Peru, India). All in all, thirty conservation and development professionals came together and reviewed the results of the research, identified challenges facing community governance of natural resources, drew lessons learned and developed policy recommendations at several levels, including for EU Development Policy.
The basis for reflection on the concept of Community Conserved Area (CCA) was the definition and key characteristics agreed upon at the 2003 World Parks Congress, subsequently expanded in the IUCN Best Practice in Protected Area Series no. 11 (2004):

CCAs are "…natural and modified ecosystems, including significant biodiversity, ecological services and cultural values, voluntarily conserved by indigenous and local communities through customary laws or other effective means…".

All CCAs have three key characteristics in common, as follows:

- *"Some indigenous peoples and local and mobile communities are "concerned" about the relevant ecosystems - usually being related to them culturally and/or because of livelihoods.*

- *Such indigenous and local communities are the major players (hold power) in decision making and implementation of decisions on the management of the ecosystems at stake, implying that some form of community authority exists and is capable of enforcing regulations.*

- *The voluntary management decisions and efforts of such communities lead towards the conservation of habitats, species, ecological services and associated cultural values, although the protection status may have been set up to meet a variety of objectives, not necessarily related to the conservation of biodiversity."*

The key discussion points during the workshop included:

- Threats to CCAs
- CCAs and rights
- CCA evaluation
- Institutions for effective governance and management of CCAs
- Formal recognition of CCAs; and
- Appropriate forms of support to CCAs

The results of these discussions were later incorporated into the synthesis of results of the Third Country studies (see chapter 6 for further details). The **main recommendations for governance of natural resources in Third Countries for the sake of biodiversity conservation** include:

- Recognise and respect customary institutions for natural resource management
- Help such institutions to fend off and/or discipline destructive "development"
- Build alliances between governmental agencies in charge of conservation and indigenous/ community institutions
- Adopt a landscape approach to natural resource management and conservation
- Support participatory action research, community-based analyses and learning by doing
- Promote fairness in sharing the costs and benefits of conservation
- Ensure both sound local governance and a supportive policy environment, including the respect of basic rights

The workshop identified concrete strategic mechanisms and steps to promote community governance of biodiversity, in particular CCAs and their associated biodiversity conservation and livelihood benefits. It examined the role of important players such as international institutions, national and sub-national governments, NGOs, researchers, the private sector, and donors such as the EU. The last point was discussed in further detail, and concrete policy guidelines were developed for EU development policy (see chapter 7).

Crucially, the workshop stressed **the need to build a broad, worldwide alliance in support of Community Conserved Areas**, outlined the first steps in this process, and managed to identify a small constituency willing to embrace the tasks at hand. Throughout 2008, intense networking and fundraising will take place and dedicated meetings will be held at various international and regional fora, including the second gathering of the CBD Working Group on Protected Areas (Rome, Feb 2008) and 9th Conference of the Parties of the Convention on Biological Diversity (Bonn, May 2008). This first phase will lead towards a dedicated event at the Fourth World Conservation Congress (Barcelona, Oct 2008), where what is now an ad-hoc network of committed experts and organizations could be more formally launched as a broadly-based alliance, including community-based and indigenous peoples' organizations, NGOs, concerned professionals, civil society networks and research institutions. The purpose of the alliance would be to meet some of the most important needs identified in the workshop, namely to increase the visibility of CCAs and to promote their formal recognition and support in careful and context-tailored ways.

The Third Country workshop achieved results beyond expectation! On the one hand, it managed to bring together the results of the in-depth GEM-CON-BIO and other studies and to develop recommendations for policy and practice. On the other, it played a seminal role in building momentum around the concept of **Community Conserved Areas for the effective and equitable governance of biodiversity** and to develop concrete action for the future. For a full report of the workshop, the workshop presentations, a synthesis of research conclusions, regional studies, individual case studies of CCAs and much more please visit: http://www.iucn.org/themes/ceesp/CCA/Kastamonu.html

4.3 Policy Conference

Brussels, 07 April 2008

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Introduction

As part of Work Package 6 (development of Policy Guidelines) a Policy Conference was organized in Brussels on April 7th, 2008 to present the GEM-CON-BIO project and its results to EU policymakers and other interested parties.
The day was divided into two events: in the morning, a technical workshop presented the GEM-CON-BIO framework, its methodology and results to counterparts at EU DG Research and other interested parties; in the afternoon, the Policy Conference itself served to present the project to a wider audience of policy makers and to discuss the results and policy guidelines emerging from the project.

Technical Workshop

After welcoming remarks from Prof. Basil Manos (Aristotle University of Thessaloniki), Mr. Pierre Valette (EU DG Research – Social Science and Humanities Programme) acknowledged the contribution of the GEM-CON-BIO project to scientific knowledge and addressed in particular the economic value of biodiversity, as well as the importance to pay attention to biodiversity in the context of climate change, which is a main priority for the EU during the French presidency.
After an introduction outlining the work packages, deliverables and process of the project (presented by Dr. Jason Papathanasiou, Aristotle University of Thessaloniki), Dr. Thomas Hahn (Stockholm University) presented the analytical framework of GEM-CON-BIO, including the research questions, definitions and development of governance types. He presented how what was initially designed as more qualitative research with guiding questions did evolve in some points into a more rigid questionnaire to generate more quantitative data, and how the quantitative results should be viewed as indicative, not prescriptive, considering the diversity and relatively small number of case studies.
Hinting towards the results, Dr Hahn stressed the importance of adaptive management, indicating that collaboration among actors at different levels (local, national, international) is a key element of "success" for governance. He also pointed out the need for a framework to understand how governance adapts to various conditions, and to identify opportunities within governance structures to improve biodiversity management.
GEM-CON-BIO make the first steps towards this goal, through the analysis of a diverse set of case studies from around the globe. A sample of cases studies were presented form EU countries, the US and Third Countries, as well as the pan-European UNWIRE study:

- Biosphere Reserve Schorfheide, Germany (Sandra Naumann, Ecologic) and Danube Delta, Romania (Dr. Ion Năvodaru, Danube Delta National Institute for R&D) presented relatively complex well-structured mainly top-down approaches
- Maine, USA (Michael Donlan, Industrial Economics) presented the Habitat Programme where towns have to develop credible habitat management plans before they receive public funds for other needs, in an collaboration with stakeholders through a "negotiating" process
- Danau Sentarum National Park, Indonesia (Linda Yuliani, CIFOR) and Gobi Saikhan National Park, Mongolia (Barbara Lassen, Cenesta) where traditional institutions and community management seem to regain credibility as effective biodiversity management and conservation practices, demonstrating the importance of a bottom up, collaborative, learning-based approach where local knowledge can be highly beneficial for the state of biodiversity

UNWIRE (Prof. Robert Kenward, Anatrack) presented results showing that regulations and top-down approaches cannot guarantee conservation of biodiversity, even though they can have positive impacts. According to UNWIRE, the most successful governance patterns are based on a mix of financial incentives, regulations and voluntary engagement, and through adaptive management.
After a synthesis of the case studies integrating and comparing the available quantitative data (presented by Dr. Zoltan Karacsonyi, University of Debrecen), Riccardo Simoncini presented the Governance Matrix developed from the cases studies, linking governance types to ecosystem management characteristics.
From this Governance Matrix emerged a set of tentative policy guidelines for the EU case studies. Again, these are tentative because of the limited number of cases studies and the influence of differences in "Best Professional Judgment" used to obtain variables. However, it was noted that these tentative guidelines give a first impression and that they can be validated and expanded by further research, especially by carrying out the analysis on a greater number of cases, and by refining the ranking system to assess ecosystem management characteristics.
The Policy Guidelines form the non-western Third Country case studies (presented by Barbara Lassen, Cenesta) were obtained in a different manner: they mostly emerged from the Third Country case studies themselves (whose methodology was more qualitative) and from the Third Country workshop that brought together the local case studies researchers and outside experts in Turkey in October 2007. These Policy Guidelines were translated into concrete recommendations for EU Development Policy as it relates especially to community governance.
Recommendations for the future include strengthening of the framework through validating it to more case studies, developing robust and more precise governance indicators, achieving better understanding of scale effects (local, national, international), and linking economic variables to social processes and to ecological thresholds.
In the policy environment, the cooperation among different DGs of the European Commission needs to follow the cooperation among scientific disciplines with the goal of true integration of environmental concerns into sectoral and other EU policies.
In his concluding remarks, Marc Goffart (DG Research) mentioned the positive range of results obtained by the GEM-CON-BIO project and the promising potential for further studies. He also expressed his interest in transmitting the policy guidelines into the EU policy process.

Policy Conference

The Policy Conference itself addressed a much broader audience and focused less on the technical aspects of the GEM-CON-BIO framework but rather on the discussion of the results and policy guidelines.
The conference was opened by Dr. Basil Manos, who gave the floor to two distinguished guest speakers: Dr. Peter Schei (President of BirdLife International and Director of the Fridtjof Nansen Institute), and Prof. Nigel Leader-Williams (Durrell Institute of Conservation and Ecology, University of Kent).
Dr. Peter Schei outlined the foundations and elements of the Ecosystem Approach, and how it was developed within the Convention on Biological Diversity through the Malawi Principles. He gave some operational guidance for implementation, such as focusing on the relationships and processes within ecosystems, enhancing benefit sharing, using adaptive management practices, and adapting actions to the appropriate level. He insisted on the importance and challenges of integrating biodiversity values into the economy, and presented the Addis Ababa Guidelines for the Sustainable Use of Biodiversity. He highlighted the need to integrate sectoral policies, especially to achieve the Millennium Development Goals, and to mainstream environmental issues into all policy sectors to achieve the conservation of biodiversity which is, after all, "life's insurance of life".
Prof. Nigel Leader-Williams presented an analysis of which aspects of governance can best impact biodiversity, exploring the role of governance and corruption through case studies from Africa and Europe. He presented results of recent research showing the negative impact of corruption on large mammal populations in Africa. Further case studies focused on another aspect of governance: the role of sustainable use as an incentive for conservation behavior. One case from Britain showed for example how private landowners who were involved in field sports readily engaged in voluntary management of ecosystems on their lands. Further studies from Africa emphasized the importance of common property regimes, and the overall conclusions recommended to promote partnerships between Protected Areas and People, creative

use of PA designations, and the capacity of communities and private landowners to manage and co-manage biodiversity.
The following presentations were essentially the same as in the morning workshop, after which the participants had the occasion to ask questions to the presenters and to discuss the results and policy guidelines that emerged from the project. Issues were raised by the discussants concerning the governance aspects of the EU Common Agricultural Policy and its impacts on biodiversity and concerning the EU Fisheries Policy (especially regarding the issue of levels of trust between actors as examined by the GEM-CON-BIO project).

CHAPTER 5. CASE STUDIES PRESENTATION

5.1 Artificial lake Kerkini

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social).

The study area's ecosystem is of great importance. The spatial level analyzed is local, the extension of the area is about 800 km^2, the time period analyzed is from 1990 to 2007 and the prevalent governance type is state controlled. It is one of the 10 most important wetlands in Greece, a National Park and one of the most important wetlands for birds. Main goods and services provided are eco-tourism, forestry, agricultural activities, fishing, hunting (partly allowed) environmental education and scientific research.
There are many laws and administrative decisions for the area, but there are problems of implementation and compliance. This is the one of the major problems influencing the conservation of biodiversity in the study area.

2. Ecosystem Management Objectives and Decision Making

As already mentioned in the case study there is no management plan addressing directly the environmental issues in the study area. Of course, it is obvious from the case study analysis that strategic decisions for ecosystem management are oriented more towards the economic and social dimensions. This is mostly due to the lack of environmental education within local stakeholders and lack of environmental consciousness.

Scientific	Social	Economic	Conservation
Scientific research and observation	Confrontation of the disadvantages of the area as a near-border one	Promotion of soft alternative kinds of tourism, as ecotourism and agritourism	Protection of the natural environment (lake, mountains, forests)
Environmental education	Promotion of cooperation with neighbor countries	Promotion of innovative reforms for agriculture	Management of water resources, agricultural lands and forest lands
	Improvement of quality of life and services	Networking of the local enterprises	Waste management
	Alternative sources of income (ecotourism, trade of agricultural products, biological products, pharmaceutical plants etc)	Promotion of investments in the agricultural and tourist sectors	Rank the protected areas
	Support of the rural people		
	Improvement of the local transportation network		

Table 1. Management objectives and decision making

3. Governance Processes (Regulatory, Economic/Financial, Societal)

Tools	Use	Importance within the area
Regulatory (EU legislation, national legislation)	High	Very high
Economic/Financial (taxes, subsidies, liability, compensation, fees and charges)	Moderate	High
Societal (stakeholders involvement, access to information, lobbying)	Low	Moderate

Table 2. Governance processes

4. Impacts (Economic And Financial, Social and Ecological, including Biodiversity Change)

Identified impacts	Importance	Temporal dimension	Geographical extension
New market opportunities (eco tourism, bio-agriculture)	Very high	within the analysed period	within the case study areas boundaries
Intangible benefits (recreation, sense of place, aesthetic)	Very high	within the analysed period	within and outside the case study areas boundaries
Environmental awareness	Very high	within the analysed period	within and outside the case study areas boundaries
Alternative sources of income	Very high	within the analysed period and extending their effects into the future	within the case study areas boundaries
Negative change of the delivery of the ecosystem services	Very high	within the analysed period and extending their effects into the future	within the case study areas boundaries
Negative change of the ecosystem	Very high	within the analysed period and extending their effects into the future	within the case study areas boundaries

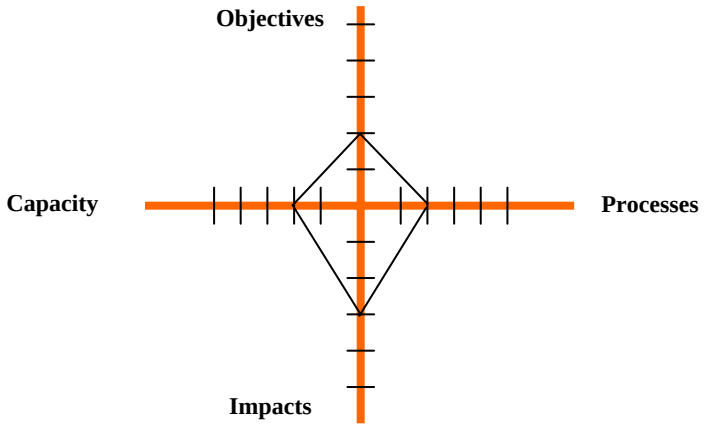
Table 3. Impacts

5. Evaluation of Governance Effectiveness

The major problem in the study area, as identified in the case study analysis, is the inconsistent governance processes. The governance form (state controlled) followed in the Kerkini Lake proved to be insufficient and inappropriate to address the environmental issues of the area. The strong centralised control over management, which is exercised through state agencies, the high use of regulatory tools and the low use of societal tools, are all affecting negatively the management process. Of course, it is of utmost importance that there is not a concrete ecosystem management plan in the area.

The great number of legislation applied often leads to controversial effects. At the same time, the level of local stakeholders' participation (farmers, citizens, NGOs, etc) is rather low.

The obvious ecological impacts leave us with no doubt that the governance process followed in the area appears to be insufficient and inappropriate. The local ecosystem has changed in a rather negative way due to the inconsistent management actions or even the lack of them. The number of buffalos has decreased; the water lilies have almost completely vanished; surrounding forests have reduced in size (20,000 sq.km in 1982, 1000 sq.km nowadays). The quality of the water is very good but the rise of the water level in order to satisfy the irrigation needs of the local farmers is leading directly to the extinguishment of the flora and the degradation of the ecosystem services.
Of course there are some good initiatives, such as the use of sand and other materials brought to the lake by the Strymonas river as construction materials.
All the efforts to conserve biodiversity in the study area, either they were policies and strategies or regulations, have not yet resulted in their initial aim, which is to protect the natural environment. On the contrary, the ecosystem of Kerkini Lake is in peril. Thus, we could only say that so far there is a net negative impact on the lake's biodiversity because of the inconsistent and inefficient management actions and the inability of the governance processes followed to address the ecological issues of the area.
The following figure presents a moderately negative evaluation of contributions for biodiversity conservation:



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5.2 Beginning with Habitat Program: Maine, United States

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social).

The study area (the 470 organized towns within Maine, US) is 43,400 km^2 in size, with 65% woodland forest and other wooded lands; 15% constructed, industrial and other artificial habitats; 10% inland surface water; and 10% various other. Human residential development is the largest threat to biodiversity. The vast majority of the study area (99 percent) is privately owned. Private landowners tend to bear the costs of actions to conserve biodiversity at the ecosystem/landscape level (e.g., through development and/or commercial use restrictions), while the benefits of such conservation are more broadly distributed among residents and visitors. The management of private lands, primarily timber extraction, is the next largest impact.

The population of the study area is 1,318,220, resulting in a population density of 30.4 people per square kilometre. Per capita personal income (PCPI) in 2005 was US$30,808. Unemployment is relatively low (approximately 4.5%). Governance capacity is high. Federal environmental programs are important in that they provide substantial funding (approximately US$10 million annually) to Maine that can be used for biodiversity conservation purposes (as well as other environmental priorities). Equally importantly, the State of Maine requires towns to develop growth management plans to become eligible for funds to cost-share infrastructure development and services, which provides a mechanism for the State to encourage town participation in biodiversity programs.

2. Ecosystem Management Objectives and Decision Making

The Beginning with Habitat program within the Maine Wildlife Action Plan is specifically designed to create a landscape that conserves all species, and thus is an ecosystem approach focused explicitly on biodiversity conservation. At the state level, the Maine Wildlife Action Plan is the most important umbrella plan defining what needs to happen to achieve biodiversity conservation across the entire state. Town Comprehensive Management Plans are the next most important management plans, since these are the local visions of how development and conservation will be achieved locally. The time frame for these management plans to achieve results is measured in decades. Town comprehensive management plans are designed to articulate how town citizens want the town to be 50 years into the future.

Major conservation objectives of the Program (all given equal priority) include: 1) maintain and increase number of large blocks of forest; 2) conserve high value plant and animal habitats; 3) protect natural communities; 4) provide adequate early successional habitat for wildlife species; 5) conserve riparian areas/wetlands; 6) increase amount and distribution of late successional habitats; and 7) minimize impact of roads. The Beginning with Habitat program recognizes that responsibility for ecosystem management regimes are shared among many stakeholders, including private management (~50%),state government (~20%), local community management (~10%) and multi-stakeholder management (~10%). All of these forms of management are used at various governmental levels.

To enhance the likelihood of achieving the conservation objectives, the Program also has several social objectives (all given equal priority), including: 1) working with stakeholders to help them design a landscape that works for local resources and development; 2) preserving the natural aesthetic and recreation elements of the Maine environmental for health, recreation and community benefits; 3) building capacity for cooperative engagement among all stakeholders, and ensure that the program is productive, so trust and confidence grown, and organizational and interpersonal relationships become strengths of the program; and 4) communicating effectively with stakeholders, other partners, and the public, early and often.

3. Governance Processes (Regulatory, Economic/Financial, Societal)

The Beginning with Habitat Program uses a mix of regulatory, economic/financial and societal processes to achieve its objectives. In the authors' view, the societal processes are most important and are widely used/implemented. With the Beginning with Habitat program, the state government (Maine Department of Inland Fisheries & Wildlife) takes a leadership role as a cooperative facilitator. The Department works to bring all of the stakeholders together to collaborate on developing and achieving the conservation goals, using acquisition, regulations, and financial and cooperative incentives. Stakeholder ability to achieve conservation can be incredibly effective, or completely ineffective, depending on the personal relationships and the personalities of the principals. Ultimately, town governments create their own vision, in the form of the Comprehensive Management Plan, using the knowledge and tools provide by the State Beginning with Habitat program. Towns use the habitat information and with the help of biologists, design a landscape with their knowledge and needs for development balanced with providing a landscape of functional wildlife habitat. Most of the actions are impacting private lands, and this is not, primarily, an acquisitions/public land based program. It is most important that the citizens of the town create their own vision of habitat protection, since that provides very strong support at the ground level.

Economic/financial incentives are important once conservation priorities have been established in conjunction with the Program. To become eligible for infrastructure and service cost-share funds from the State, towns are required to create Town Comprehensive Management Plans that provide local visions of how development and conservation will be achieved. Once these plans are in place, private property tax reduction incentives are an important means for encouraging landowners to adopt sound conservation practices. Subsidies that pay landowners (primarily agricultural landowners) to practice sound conservation methods also are utilized by the Program.

The primary role of regulatory processes is to provide funding (primarily through resource user taxes at the national level) that can be used by the State to provide personnel, collect information, facilitate local plan development and similar tasks needed for implementation of the Program. Command and control instruments are not utilized by the Program. Rights for stakeholder use of resources are already well defined.

4. Impacts (Economic and Financial, Social and Ecological, including Biodiversity Change)

With respect to the ecological impacts of the Program, available data are insufficient to quantitatively measure changes in ecosystem services arising from the management actions, as the Program was initiated within the last 10 years and the ecological impacts are expected to accrue within the study area over future decades (e.g., 50 to 100 years into the future). More time will be needed to judge its effect. However, there are reasons to believe that key threats to biodiversity (primarily human residential development in this case study) are being reduced by the Program. More than 100 towns have taken part in the Program. By initiating the Program planning process, at a minimum towns increase awareness/education and (often) help build vertical and horizontal trust among stakeholders, both of which help promote biodiversity conservation. Creation of a Comprehensive Growth Management Plan, reflecting landscape conservation design based on information and other assistance from the Beginning with Habitat program, provides a consensus-based, concrete plan for managing land-use in a manner that balances economic development and conservation needs. Socially, the Program has had positive effects relevant to biodiversity conservation, primarily through bringing together various organizations that wanted to see landscape biodiversity conservation in Maine and building trust.

While there are economic and financial impacts from the Program, these are generally recognized through the long term maintenance (primarily over the next several decades) of real estate values, agricultural products, and forestry products derived from voluntary protection of the resources targeted for conservation/enhanced management within the Program area (i.e., the 470 organized towns in Maine).

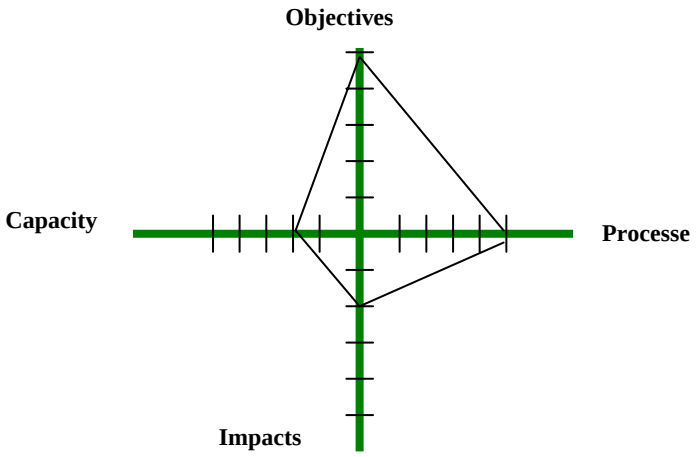
5. Evaluation of Governance Effectiveness

This case study involves governance that is a combination of policy network-based (75%) and market-based (25%). The approach involves a broad range of stakeholders, multi-level governance (local and regional) and is designed to be adaptive with important roles for stakeholders to shape the program's implementation at a local level. Market-based incentives are a part of the program, offering financial relief (generally in the form of tax breaks or subsidies) for private landowners and land users willing to limit future development and/or land management practices in a manner conducive to the protection of biodiversity.

The Beginning with Habitat program began with an ambitious goal of providing a landscape that would function as viable habitat for all species that presently live in Maine, and ensure that the functional landscape would be present 50-100 years from now. The goal was broken down into 3 objectives: 1) create a biological model for how the landscape should look to accommodate all species; 2) work with towns and landowners to locally plan a landscape that conserves habitat according to the biological model; and 3) work with towns and landowners using as many tools as possible (incentives, acquisition, and regulations) to implement the conservation according to the local plan.

An evaluation of the Program indicates that some elements are working, and some need additional attention if the original goal of ensuring long-term conservation of all species on Maine's landscape is to be realized. In general, using the public to create local conservation goals consistent with landscape preservation needs but based on their own perceptions and priorities works well and is essential to getting local support. In addition, having the most-local level of governance (in this case, the municipalities) make decisions about local conservation helped to build trust that the larger state governance level was more of a resource than regulator. However, there is little chance that the local governance level could or would make reasonable and effective conservation decisions without the information, priorities, and assistance of the state government level. Therefore, the state's role was as a cooperative facilitator – offering information, state-level conservation priorities, and conservation tools.

In the authors' view, state program biologists have provided enough data to local decision-makers to support the needed conservation actions. However, the facilitative role of governance needs to be adopted by all levels of government, and the systems to facilitate useful and collaborative ground-up conservation design need to be institutionalized so they do not depend as heavily on certain individuals or personalities for success. The figure below provides a positive evaluation of program contributions to biodiversity conservation, although it will take more time (decades) for program benefits to be fully realized.



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5.3 New York City Watershed Protection Program, New York, United States

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social).

The Catskill/Delaware Watershed study area encompasses 4,209 square kilometres within New York State. Regarding habitat types, 73% of the study area is woodland forest and other wooded lands; 15% is constructed, industrial and other artificial habitats; 10% is regularly or recently cultivated agricultural, horticultural or domestic habitats; and 2% is other habitat types. Approximately thirty-five percent of the Catskill/Delaware Watershed lands are controlled by New York City, New York State, or other conservation entities. The remainder (65%) generally is privately owned. While numerous ecosystem services are provided by natural resources in this area, the most emphasis tends to be placed on its role as the primary source of drinking water for New York City, its potential for large scale recreational development and its maintenance of historical agricultural uses. Primary threats to study area ecology include human settlement (vacation homes), water pollution from agricultural use and various development activities and increased tourism/recreation (potentially including development of resorts).
The Catskill/Delaware watershed west of Hudson has a year round population of 77,000 people. There is also a large seasonal population consisting of second-homeowners and visitors, which can more than double the year-round population (~200,000). Population density is 18.3 people per square kilometre. Per capita personal income (PCPI) in 2005 averaged approximately US$28,000. Unemployment is relatively low (approximately 5%). Governance capacity is very high. With respect to general social capacity, historically citizens in the study area have a low to moderate trust in the various levels of government (vertical). The level of trust between stakeholders is variable although generally moderately low, as stakeholders do not regularly interact with each other and often have differing interests/views.

2. Ecosystem Management Objectives and Decision Making

The study area is not managed using an ecosystem approach. There are multiple sectoral management plans (including the Watershed Protection Program that is the subject of this case study) that have applicability to at least some portions of the study area. Other areas within the study are not subject to any such plans. More specifically, the authors estimate that approximately 64% of study area lands are unmanaged (i.e., not subject to a specific management plan), 35% of study area lands are government owned and managed, and approximately 1% is subject to multi-stakeholder management (i.e., NGOs).
The main objective of the Watershed Protection Program is for New York City to work in close cooperation with both government and non-governmental partners to protect the unfiltered drinking water supply of nine million people while promoting economic viability and preserving the social character of the communities located in the upstate watershed. The program is up for renewal approximately every few years, and has been renewed several times. While difficult to predict how long the program will continue, the program is designed to promote the long-term (i.e., multi-decade) protection of drinking water supplies.
Conservation objectives include land acquisition to: prevent future degradation of water quality; establish a program to acquire Watershed Agricultural Easements; design, construction and implementation of stream corridor protection projects; and establish a forestry management program to promote forestry practices in the watershed that protect the City's water supply against runoff and other pollution.

Economic objectives include supporting environmentally sensitive economic development projects in the Watershed and preparing a comprehensive economic development study of community and economic development goals and opportunities. Social objectives primarily are focused on public education and preservation/creation of recreational opportunities.

3. Governance Processes (Regulatory, Economic/Financial, Societal)

In 1997, a Memorandum of Agreement (MOA) was signed by forty-eight entities including Federal, State and local governments, non-governmental organizations (NGOs), local industry and communities. This MOA was created to help guide the implementation of the New York City's Watershed Protection Program, which is the subject of this case study. The Watershed Protection Program (WPP) has three main aspects: 1) Land acquisition – a US$250 million funded land acquisition program for the City of New York to acquire land and/or conservation easement on vacant property in water quality sensitive areas on a willing buyer/willing seller basis; 2) Watershed rules and regulations – the implementation and enforcement of regulations including minimum treatment requirements for wastewater and stormwater systems; and 3) Watershed protection and partnership program – plans for partnerships and programs to preserve the economic and social character of the Catskill/Delaware watershed communities. While the primary objective of the Watershed Protection Program is the preservation of high quality drinking water supplies, biodiversity conservation benefits also may be generated.

Essentially, the Watershed Protection Program is a payment for ecosystem services program. As a result, economic/financial aspects of the Program are critical. New York City (NYC) water users tax is the primary funding source for it. Several financial mechanisms have been created to encourage landowners and land users to participate in the Program. For example, forest landowners owning 50 acres or more and agreeing to commit a 10 year forest management plan are entitled to an 80% reduction in local property tax. A US$40 million fund was set up to compensate dairy farmers and foresters who adopt Best Management Practices in NYC water supply areas. Foresters who improve their management practices (i.e. low impact logging) receive additional logging permits for new areas.

Societal processes also are important determinants of Program success. While the City of New York is the clear primary leader of the program, there is significant collaboration between stakeholders in various forms. There are often conferences and meetings of stakeholders in addition to the more formal collaboration that takes place to manage and implement the Program. With respect to regulatory processes, their most important role is as funding sources for programs and financial incentive programs summarized above.

4. Impacts (Economic and Financial, Social and Ecological, including Biodiversity Change)

The most significant benefit of the Program is economic/financial, and accrues to New York City tax-payers and the government who recognize large (hundreds of millions US$) in cost savings by implementing the Program instead of building and operating a water filtration plant. These two stakeholders also bear much of the cost for the Program. Other smaller scale, but still significant economic/financial impacts include the landowners, farmers, foresters, and communities participating in the Watershed Protection Program that incur costs (e.g., foregone development opportunities, increased land management expense) but also have realized financial benefits through subsidies and incentives that the government is making to encourage protection of the watershed through pollution prevention and land protection programs. On the other hand, some stakeholders believe that limiting development activities in the watershed region goes against the goals of many watershed residents who want to see more regional development to promote jobs and growth.

Positive social effects of the Program include protection of the water supply, preservation of scenic values and a sense of place, maintenance of a more intact forest and ecosystem, increased public access to lands for recreational opportunities, and modest improvements government/community relations (i.e., vertical trust) in the Catskill/Delaware watershed towns. With respect to ecological impacts, to date the quality of the water has remained very good. From a biodiversity standpoint, the results are mixed. Biodiversity conservation is not a goal of the Program, although the actions undertaken to protect drinking water quality have had some beneficial impacts on biodiversity conservation and some of the external drivers that

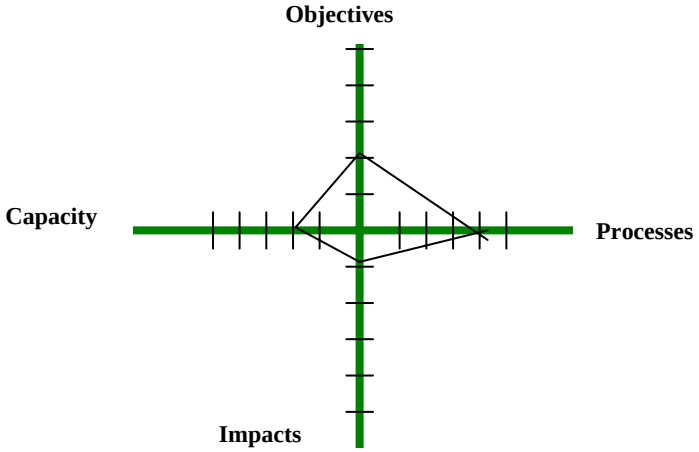
negatively affect biodiversity. For example, through the Program, New York City has protected through acquisition of land or conservation easement 70,000 acres in Catskill/Delaware region that may have otherwise been developed (forest land in the Catskill region is converting to development at a rate of one percent per year). The land and water pollution that has been offset or reduced because of the implementation of best management practices, whole farm management plans, and sewage and wastewater treatment also reduces pollution impacts on the ecosystem.

5. Evaluation of Governance Effectiveness

This case study involves governance that is a combination of market-based (75%) and policy network-based (25%). The financial backing for this program is unique, reflecting a payment-for-ecosystems service approach. More specifically, the City of New York decided to protect their water supply source from degradation rather than invest in a filtration plant. While the primary objective of the Watershed Protection Program is the preservation of high quality drinking water supplies, biodiversity conservation benefits also may be generated.

While the City of New York is the clear primary leader of the program, there is significant collaboration between stakeholders in various forms. The Program has at least modestly improved levels of vertical trust. While more time (decades) will be required to judge its ecological impact, initial results from a biodiversity perspective are mixed. Payments for ecosystem services between service users and resource owners/managers provide financial incentives for conservation and sustainable management that otherwise are difficult to create. However, the focus on a particular ecosystem service (protection of drinking water) in this case provides moderate biodiversity benefits. Where the needs of biodiversity and water protection coincide, both purposes are served. However, habitat important for biodiversity but with limited impact on water quality will not be protected.

Increasingly, payment for ecosystem service programs are emerging as a means for protecting specific, critical services that are threatened (e.g., water supply). Government officials and other stakeholders may be able to improve biodiversity results by modifying such programs to provide an incentive for prioritizing protection of areas that serve both purposes (i.e., provision of the resource service and conservation of biodiversity). The figure below provides a modestly positive evaluation of program contributions to biodiversity conservation.



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5.4 Governance of rural areas in Tuscany: Chianti Classico

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social).

The Chianti Classico area covers around 90,000 hectares in the very centre of Tuscany, between the two famous cities of Florence and Siena. The morphological characteristics of Chianti are those of an hilly territory, with an average altitude ranging between 300 and 600 mt. a.s.l. The climate can vary from valley to valley but it can be defined Mediterranean in average temperatures, as well as in rainy precipitations. The core study area extends on about 9.000 ha, and lies to the north of Chianti ("Chianti fiorentino"), corresponding to the upper part of the catchment basin of Greve river. The landscape follows a mix pattern consisting of forests and semi-natural areas (about 58%) and agricultural areas (38,5%) mainly vineyards and olive grooves (Fig.1), while artificial (urbanised) areas and water bodies are marginal surfaces. Mountain heaths and riparian forest are the most precious natural habitats. The first ones are semi-natural, due to a traditional, archaic system of pasture-agriculture, and risk extinction, being conquered by the forest. Riparian forests have a potentially small natural area where to grow, because of the hilly morphology of the land. Most of the small riparian plains are occupied by agriculture and modern settlements.
The socio-economic developments of agriculture in Chianti in the period 1950-1990 had obviously their environmental impacts protracting into the period analysed. The end of the share farming system, migration of population and the following specialisation in intensive production of wine and olive of oil, beside forest encroachment in some places, led also to the abandonment of maintenance of water runoff regulation works as well as that of terraces walls to control soil erosion. These facts resulted in very serious soil erosion and water run-off events, and the clearance of valuable semi-natural biotopes (Fig. 2).

Figure 1 -Typical landscape of Greve Basin (broadleaf forest and permanent crops). Photo by Paolo Degli Antoni (2004)

Figure 2- Visual impact of land levelling. (A) Just-levelled land; (B) Biotopes which will be removed for vineyard plantation. Photo by Bazzoffi (2004)

In the period 1990-2005 the disposable income of families in the two communes of the Greve river upper basin showed a situation in line with the regional average one. In year 2000 the total disposable income per capita was Euros 15,890. According to Census data, in 2001 the unemployment rate was 3.67 in the Commune of Greve and 3.71 in the Commune of S.Casciano. Governance capacity can be defined good as much as regulatory capacity and general social capacity. Coming to the external drivers, the period 1990-2005, the CAP reforms and the wine market price can be considered strong external driving forces influencing greatly ecosystem management in Chianti. On the same line it has to be considered an external driving force also the Italian lira devaluation of 1994, which influenced strongly the competitiveness of Chianti wine on international markets (Dini, 1997). All the above external drivers had a strong impact on both governance and ecosystem management in Chianti. The major threat at the beginning of the 90's was conversion of semi-natural areas into specialised cultivation.

2. Ecosystem Management Objectives and Decision Making System

The objectives of management plans in Chianti focussed on ecosystem services related to provisioning and cultural services such as high quality agricultural products and agro-tourism activities which characterise the area and reflect the predominant productive attitude of local population and institutions. Progresses have

been made by Public Administrations in adopting a broader view in planning territorial development. However to achieve an ecosystem approach in managing the countryside in practice, a long way has still to be done. The main reasons for this delay are essentially to be brought back to the productive ideology of the past century and to the recently not yet well developed environmental consciousness by decision makers. Also, despite the policy guidelines and statements displayed in favour of achieving environmental sustainability, the development of tools and instruments to put theory into practice, appears still not completely in place. The prevalent ecosystem management regime in Chianti is private management. In intensive farms, natural resources are seen almost exclusively as productive inputs. There is a widespread interpretation of natural and semi-natural areas as waste lands because they not allow production of commodities. Only in some cases of organic farming or agro-tourism activities, some sort of ecosystem approach is adopted in cultivation practices and maintenance of aesthetic qualities of the landscape.

3. Governance Processes (Regulatory, Economic/Financial, Societal)

In Chianti study area there are at least 5/6 institutional levels involved in the regulatory processes both for biodiversity conservation and agricultural activities: European Union, Italian State, Tuscany Region, Florence and Siena Provinces, 9 Municipalities, and local associations of producers and environmental organisations. While legislation related to agricultural activities has a good level of implementation, the same can not always be said for what concern environmental legislation.
The spending of resources in the Rural Development Plan 1994-1999 of Tuscany was a success given that all the available funds were allocated. A reason for this was that the programme favoured the interventions for old vineyards renovation and establishment of new plantations (IRPET-ARSIA, 2001). Around 7,000 ha of vineyards, enrolled in the register of Chianti Classico DOCG, making this denomination one of the more important in Italy. The Rural Development Plan 2000-2006 of Tuscany envisaged two typologies of interventions: a) aids at farms level; and b) aids at territorial level. For these measures the simultaneity of the programming envisaged the opportunity to develop synergies between territorial and farm investments. Beside the two types of aids above, training and advisory services was envisaged as a factor of great importance for the implementation of the plan. Many are the economics and financial tools that have operated in the Chianti area in the period 1992-2005. All the market tools available such as incentives, fees and charges, production quotas, tradable permits, compensation payments, and labelling concerning local traditional products have been put in place. However, the price of commodities seems to exert the most important impact on the management of ecosystem. Also new olive oil and wine quality products marketing campaigns are other market instruments widely used in Chianti. The demand for rural tourism has been constantly growing and it has been a driver for what regards the establishment of agro-tourism activities and the rebuilding of old farm houses and farm villas. There is also some public support in terms of tourism information points and organisation of entertainment events by local town administrations. The close connection between agriculture and rural tourism is beyond that of just an income integration, because it produces also a positive externality on what regards landscape and ecosystem management.
The stakeholders more or less directly involved in the management of ecosystems have been: the EU, Italian State, Tuscany Region, the Provinces of Florence and Siena, the 4 municipalities of Florentine Chianti Classico, single or associated private land owners and farmers, cultural and environmental local organisations. Horizontal collaboration is significant among stakeholders as it is testified by the LEADER initiative “Eurochianti”. This was joined by around 30 members such as private entrepreneurs, public administrations, and associations of industry, agriculture and handicraft sectors.

4. Governance and Ecosystem Management Impacts

Compared to the situation detected in the early 90’s, ecosystem management has not changed on respect of delivering of ecosystem services. This means that the predominance of provisioning services over regulating has not decreased, with consequent environmental problems. Up to the late fifties the ordinary picture of countryside landscapes in the Chianti area showed at least 15 to 20 distinct crops on the same farm and/or small valley. Nowadays the average farm does not cultivate more than 3 different crop species (Degli Antoni, 2004). However for what regards agricultural land use the current situation is characterised by a mix

of low inputs and specialisation trends within the same territories. In fact, small/medium agri-tourism farms usually present a good agro-biodiversity, by accompanying the vine-olive crops to cultivation of fruits, vegetables, flowers and officinal herbs. Small/medium agri-tourism farms beside adopting landscape management practices, provide also for the conservation of some local plant varieties and animal breeds used in the production of typical food products which are usually directly sold to rural tourists. These plant varieties and animal species (e.g. cinta senese pig) were probably destined to extinction because their market demand was not big enough in common distribution channel. Agro-environmental measures for conservation of species and varieties at risk of extinction played an important role on this matter. In all other more agricultural production oriented farms, agriculture is very intensive, sharply dominated by permanent crops (vine and olive trees) tilled each year or second year, and only a short term, species-poor vegetation succeeds in settling there. Usually large farms, compared to small ones, have a less proportion of UAA on total farm land. This means that most of forests, shrubs and other semi-natural biotopes are present more on large farms rather than in small/medium ones but only where slopes are too steep to be cultivated. Recent conversion of semi-natural scrubland to agriculture occurred in the 1990s, due to modernisation of specialised large cultivation of permanent crops (especially vineyards, prompted by the sharp price increase of top quality wine), has resulted in negative impacts on biodiversity and soil erosion control. By focusing management on ecosystem services which are related to the provision of commodities, being these agricultural products or agro-tourism activities in order to cash in the monetary values, stakeholders missed the possibly non-monetary values from other ecosystem goods and services. However in the case of cultural services, the results are quite mixed. Values related to spiritual, knowledge systems, educational values, aesthetic values, social relations, inspiration, cultural heritage are still underestimated but it has to be registered a rebirth in the last decade of cultural events which are probably a result of the increasing valorisation of recreational and tourism services of Chianti.

5. Evaluation of Governance and Ecosystem Management

The Chianti area definitively overcame the socio-economic crisis which led to land abandonment in the period between the 50's-70s. This was because of many causes among which the most effective were the big investments in the renovation of the agricultural sector made in the last 25-30 years. These investments have increased the economic returns of farms and favoured a general growth in the economic resources of the area. The new socio-economic situation and closeness to the city of Florence has exercised a great influence on the increasing number of residents in the area. In fact, population trend, which was negative during the '50s- '60s, due to rural abandonment caused by share farming decline, is nowadays positive for the four communes of Florentine Chianti because of high migration especially from the urban area of Florence. For what regards tourism, it has to be noticed that the increase in reception capacities has to be ascribed to the growing number of agro-tourism and other structures, (+28.2% in the period 1999-2001). The beginning of the agro-environmental policy in the years 1990-2005, has seen in Chianti the by far prevalent enrolment in agro-environmental measures mainly supporting organic or integrated cultivation methods. These agro-environmental measures, however, are still too much shaped towards production objectives, in the end only promoting a further qualitative development of agricultural production towards more friendly practices or, at best, focusing on conservation of traditional agro-biodiversity, while almost completely ignoring conservation of natural and semi-natural habitats. This fact can be seen as a confirmation of the still relevant preference in Chianti for ecosystem production functions, perceived as more important compared to regulating and supporting environmental goods and services. The designated Natura 2000 area Monti del Chianti is still not listed in the regional protected areas system and, according to Regional Deliberation 644/2004, the specific action plan for the conservation of the mosaic of secondary grasslands and shrub lands is still missing. The good news is the inclusion of the natural reserve Bosco di S.Agnese (271ha) in the Commune of Castellina in Chianti, in the official list of Regional Protected Area Systems. To promote more sustainable governance and ecosystems management in Chianti, there is the need to develop agro-environmental measures specifically addressing conservation natural and semi-natural habitats and promoting more benefits for farmers supplying biodiversity's goods and services.

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5.5 Velka Fatra National Park

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory, General Social)

Spatial level analysed: local/ecosystem. **Study area extension:** 437,56 sq. km of the proposed Site of the Community Interest (pSCI), including 403,71 sq. km of the NP's area. **Time period analysed:** 2000-2006 (status of the pSCI since 2004). **Prevalent governance type:** Government based. **Main ecosystem analysed (EUNIS Habitat type):** G1 Broadleaved deciduous woodlands; G3 Coniferous woodlands; E4 Alpine and subalpine grasslands.
The study area is located in the Žilina (southern part) and Banská Bystrica (northern part) regions. Velka Fatra NP was declared in 2002 as an upgrade of the Landscape Protected Area of the same name established in 1972. The NP and its protective zone comprise most of the Velka Fatra Range which belongs to the outer Western Carpathians. The protected area was established to conserve a mountain range with a high percentage of well-preserved Carpathians forests and diversity of species and ecosystems, including endemic species. In the NP also the UNESCO World Heritage village of Vlkolínec is situated. Wetlands along the Turiec River were designated as the Turiec Wetlands Ramsar Site because of their high importance as a resting place for migratory bird species. The NP was proposed to be included in the Natura 2000 network in 2004.
The approximate population size and density in the study area is 14 849 inhabitants (32 inhab./sq. km). The unemployment rate in 2006 was 6,9% (Žilina region) and 15,6% (Banská Bystrica region).
Governance capacity (voice and accountability, political stability and absence of violence, regulatory quality, rule of law, control of corruption, etc.) is moderately high. Slovakia adopted many international environmental agreements which significantly influence nature policy in the study area. The level of communication and co-operation between nature conservation authorities and local stakeholders/ municipalities is medium; the level of co-operation between state bodies varies from medium to high.

Figure 1. Velka Fatra NP (author: L. Vavrova)

2. Ecosystem Management Objectives and Decision Making

Management types implemented in the study area are: 1. Government management (ca 76% of the area) and 2. Multi-stakeholder management – co-management (ca 24% of the area).
The main decision-making body is the Ministry of Environment of Slovakia through the State Nature Conservancy of the Slovak Republic – Administration of the Velka Fatra NP.
Management plans for specific sites (e.g. Turiec Wetlands Ramsar Site, nature reserves) have been implemented. A management plan for the pSCI Velka Fatra has been developed in accordance with the Habitats Directive. Action plans for 8 threatened species (2 plants, 6 animals) have been implemented. The action plans are scheduled for 5 years period and have scientific (monitoring, genetic research, biological and ecological studies, etc.), social (co-operation between relevant institutions, public awareness, etc.),

economic (legislative protection, etc.) and conservation objectives (revitalization of habitats, restitution of species, 'ex-situ' protection, international co-operation, etc.).

Figure 2. Raksianske raselinisko National Nature Reserve – a fen with high diversity of species (author: L. Vavrova)

3. Governance Processes (Regulatory, Economic/Financial, Societal)

The most widely implemented factors are described in the following table.

Rank	Factors/Tools (Question)	Explanation
1 Regulatory processes	Legislative tools, regulations	The Act on Nature and Landscape Protection and the list of protected species and habitats are the most important regulatory mechanisms. All relevant environmental legislation is well known among stakeholders and nature conservation authorities are providing detailed information or explanation of its specific parts, if requested.
2 Economic/ financial processes	Compensations and subsidies (e.g. Common Agricultural Practices subsidies)	Funds as compensations are the most relevant instrument for the stimulation management measures for the conservation of biodiversity.
3 Social processes	Collaboration among state nature conservation authorities, other relevant state bodies (forestry, agriculture, water management, etc.), local stakeholders, NGOs, experts, scientific institutions, etc.	Involvement of state bodies, local stakeholders, NGOs, etc. in the process of development of a management pan for the study area significantly contributes to the sustainable regional development and ecotourism (municipalities), sustainable use of forests and water resources (forest and water managers), management of threatened and protected species (hunters, experts) and implementation of environmentally friendly agricultural and management methods (landowners). The collaboration among stakeholders could be described mostly as information exchange and cooperation at development and implementation of environmental projects.

4. Impacts (Economic & Financial, Social and Ecological, including Biodiversity Change)

Economic & Financial Impacts

New economic and financial values, including non-monetary values in the study area are realized through e.g. recreational value and possibilities for development of ecotourism (accommodation, agro-tourism, restaurants with local and organic products, local guide services, etc.), water filtration, flood protection and regulation of soil erosion through preserving forest ecosystems. Negative economic impacts have restrictions concerning accommodation capacities, agricultural practices and number of visitors and density of public transport in specific areas, in particular nature reserves.
The costs related to the management of natural resources and biodiversity conservation in the national park are mostly covered by governmental authorities.

Social Impacts

The main social impacts are meetings with stakeholders, presentations on biodiversity conservation, informational materials, guided trips, and educational programs. A flexible and efficient procedure concerning compensations and state subsidies for the nature conservation has to be set up. Although the process of the Natura 2000 sites identification was not received by public very positively, EU funds allocated to the Natura 2000 sites conservation and management are helping to increase the level of trust and co-operation between stakeholders and nature conservation authorities.

Ecological Impacts

The following main ecosystem services were assessed in the study: knowledge systems and educational values, cultural and natural heritage values, timber production, recreation and tourism.
Major changes to the major threats affecting the study area were recognized in the field of habitats loss and degradation (human induced), agricultural practices and methods, land management, distribution of invasive alien species, pollution and waste management and illegal collecting of and trading with threatened species.

5. Evaluation of Governance Effectiveness

Action plans' implementation is evaluated positively although an improvement especially in terms of funding and co-operation between relevant state authorities is needed. Listing in national red lists as well as monitoring, 'ex-situ' protection and public awareness have positive impact on the population density and distribution of threatened species. 'Ex-situ' protection carried out in co-operation with species' rescue stations and veterinary ambulances in Slovakia and the Czech Republic is lacking financial support from the state authorities.
Several multilateral environmental agreements (e.g. Convention on Biological Diversity, Convention on Migratory Species, Ramsar, Carpathian and Bern Convention) have been successfully implemented in the study area with positive feedback on conservation management and biodiversity protection.
Based on the case study results the following activities are proposed to be implemented in the study area:

- Intensive co-operation with stakeholders, private landowners (local level), municipalities (regional level), state authorities, institutions and experts (national level) and other countries (EU/international level) in the field of nature protection, sustainable development and ecotourism.
- Implementation of effective mechanisms concerning financial compensations from the state according to the national and EU legislation (EU/national level).
- Improvement of a mechanism concerning projects' submission and implementation (EU/national level).
- Emphasizing of importance of the biodiversity conservation (all levels).

The governance effectiveness is as follows: **Capacity** (4 – significant); **Impacts** (4 – significant); **Objectives** (3 – evident); **Processes** (3 – evident)

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5.6 Organic land in countries surrounding the Baltic Sea

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social)

In Central and Eastern European countries (CEEC), organic farming could only begin when land was privatised after the collapse of the Soviet Union in 1989. The collapse of the Soviet Union has also left a high potential for organic farming because the crash in farm-gate prices of most agricultural products and the reorganisation of the agricultural sector resulted in a more extensive land use where the utilisation of pesticides and chemical fertilizers is dramatically reduced. In theory, this would seems to make conversion from conventional to organic farming easier since the need to adapt machineries and agricultural practices is limited. The recent accession of some CEEC in the EU makes the realisation of this potential even more plausible. By opening a market, and by contributing new knowledge and providing new subsidies, the EU enlargement has opened a window of opportunity in the CEEC to promote the growth of the organic sector.
Laws that specify what organic farming is are important to create a market and a sense of identity for the organic sector. Political recognition of private standards or the creation of new standards by the state is an important step in the creation of a dynamic organic sector. However, it is not sufficient to boost the conversion rate, which requires the implementation of governance processes. The governance capacity increases over time in CEEC, while it remains stable or slightly decreases in Sweden. In CEEC, it means that the laws concerning organic farming become more rigorous and more valid over time.
It is important to understand that the national legislation for biodiversity conservation and the multilateral agreement for nature conservation do not affect the laws about organic farming which are instead a requirement from the EU. However, organic farming has the potential to influence positively the achievement of the objective of one such multilateral agreement: the Helsinki convention about the health of the Baltic Sea.
The general public as well as the farmers needs to be educated about the benefits of organic products to promote the development of the organic sector. This type of education is good in Sweden, but poor in CEEC. The extension services to the farmers need especially to be improved in CEEC. The general public awareness of benefits from organic farming is limited in CEEC even today. However, it is quite high in Sweden. The advisory services that are available to farmers in CEEC are slowly improving. This is very important to increase the conversion rate.

2. Ecosystem Management Objectives and Decision Making

The main ecosystem service is food provisioning, either from crops or animals production. However, organic farming also protects other services in the agricultural landscape, for example nutrient cycling, genetic biodiversity, aesthetic values, and recreation & tourism opportunities. Organic farming is promoted by government because it can fulfil many policy objectives related to environmental protection and social development.
The main objectives for agricultural land in general are divided in three main sections: economic, social and ecological. The economic objectives are to promote the diversification of economic activities, and to improve the competitiveness of rural area. The social objectives are to improve the quality of life; improve skills and knowledge; and increase the involvement of local community. Finally, ecological objectives are to promote the sustainable use of agricultural land and forest, which tie it with the economic objectives. Organic farming can help to fulfilled all of those objectives. The economic and social objectives are more emphasised than the ecological ones in the development plan and in the economic and social help measures that are put in place.

3. Governance Processes (Regulatory, Economic/Financial, Societal)

Governance processes are very important to promote the conversion to organic farming and thus to increase the area of land that is indirectly managed for biodiversity. The development of organic farming depends on institutions in three societal domains (state, market and civil society) which correspond to each category of governance processes.
The first process that needed to be put in place in CEEC was the development of property right for agricultural land. Then, there was a need, in all countries, to create standards for the production and marketing of organic products. These allow the setting up of a differentiated market for organic products and basically initiate the governance that this case study is looking at.
A very important process to initiate the growth of the organic sector in all the countries is the introduction of agri-environmental measures for organic farming in the form of area payments. In all of the countries, there is a spurt in the growth rate of organic farming after such financial help has been introduced. To maintain that growth rate, however, there is a need to develop the organic market. This allows farmers to sell their products as organic and to receive a price premium. Once a market is well-established, the farmers are less dependent on the financial help and are more resilient to change. The market for organic products is still very underdeveloped in CEEC, contrarily to Sweden where a complete market exist although still small. In CEEC, a complete supply chain (from producers to retailers, passing through processors and distributors) is missing. Furthermore, both the supply and the demand are still low. A domestic market for organic products is important to make the organic sector resilient to change in other processes, such as cut in financial help.
Finally societal instruments are very important to promote conversion, to maintain converted farms and to make sure that best practices are in place to favour environmental benefits. Training in all countries is provided by organic producers' associations, some NGO that promote organic farming and sometimes by state extension services. This training aims at providing best practices, increasing productivity and helping with the viability of the farm in general. Discussion, coordination and collaboration are also touched upon in the different countries.

4 & 5. Impacts (Economic and Financial, Social and Ecological, including Biodiversity Change)

The research literature highlights that main ecological impacts of organic farming are that biodiversity is higher, that habitat heterogeneity is higher and that nutrient leaching are less abundant. The threat to water and land pollution are reduced due to lower pesticides used, a greater care about closing the nutrient cycle and a greater care to reduce erosion.
The main economic impact is that food production is lower but that the prices offered to farmers are higher (price premium). Furthermore, organic farmers receive financial help to offset the lower production. This increases the viability of small farms. Another important impacts is a more diversified economy. Organic farming increase the aesthetic value of the landscape when compare with large scale farming, which in turn influence the recreation and tourist opportunities (e.g. bed and breakfast, restaurant, shops, bike trails). Furthermore, organic farming offers a wider range of products that are sought after by tourist. These products can also be processed locally, providing different incomes.
The main social impact is that organic farming maintains the viability of small farms and also diversifies the rural economy. This decreases the unemployment rate, which also decrease rural exodus. This also helps to maintain services and infrastructure in good shape and thus promote a better quality of life for people in rural region.
All of these impacts improve the biodiversity conservation both in the agricultural landscape and in the surrounding environment, e.g. the Baltic Sea.

6. Evaluation of Governance effectiveness

In developing the organic sector, the most important factors are the governance processes. There is a need for institutions in three societal domains (market, state and civil society) that can be developed with the help of state intervention and also other actors. Discussion, coordination and collaboration platforms are very important to achieve the desired objectives and to have efficient processes.

The initial capacity is also important. In this case, the establishment of individual private property right to owned land was a pre-requisite to start organic farming. Furthermore, the initial capacity to have organic farming is very high in all of the countries: the crash in farm-gate prices of most agricultural products and the reorganisation of the agricultural sector that followed the collapse of the Soviet Union resulted in a more extensive land use where the utilisation of pesticides and chemical fertilizers is dramatically reduced. In theory, this could make the conversion from conventional to organic farming easier since the need to adapt machineries and agricultural practices is limited. Furthermore, the accession to the EU makes the realisation of this potential even more plausible. By opening a market, and by contributing new knowledge and providing new subsidies, the EU enlargement has opened a window of opportunity in the CEEC to promote the growth of the organic sector.

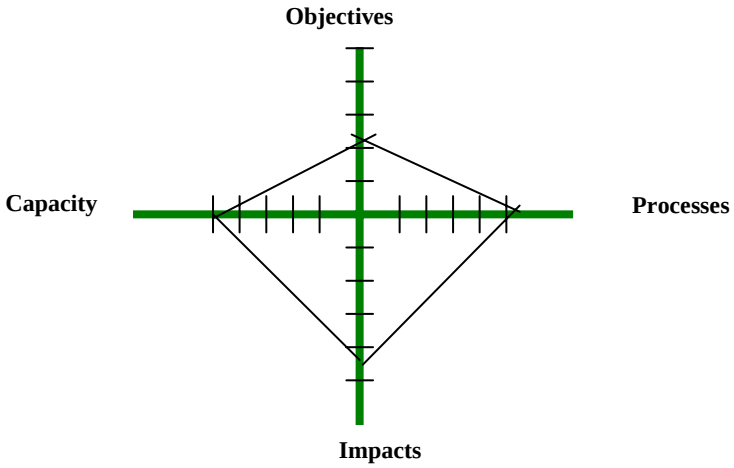

Figure 1. Visualizing the most relevant factors for biodiversity conservation in this case study

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5.7 Local organic food system in Järna– ecosystem management and multilevel governance in agricultural production

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1. Initial capacity

Natural: The total case study area is here defined as Järna community (105 km²) in Södertälje municipality (60 km south of the Stockholm). Järna community has very high concentration of organic and biodynamic certified farm land (55% of total agricultural area in the community) which is the focus of this study. The most important ecosystem services provided are food production, nutrient cycling and cultural, recreational and aesthetic values. Here we regard organic farm land as privately protected land and organic farming thus becomes a way of indirect biodiversity/ecosystem management. Compared to publicly protected areas in Södertälje municipality (e.g. natural reserves), the organic farm land acreage is slightly larger.
Socio-economic: Ownership of the organic farm land is mainly private, but some of the biodynamic farm lands are owned by non-profit foundations who lease the land out to farmers (on non-market conditions). The municipality also owns farm land, which is leased out for organic farming. Järna community is a rural area with a relatively low population density (80 people/km²). Contrary to the national trend in rural areas, the population is slowly increasing, unemployment rates are lower than the national average and the mean income is well above the national mean. All the above suggests a very positive social and economic development in the community.
Governance: Governance capacity in Sweden is generally high compared to the EU27. Drawing on the interviews it can also be extrapolated that the general levels of trust in institutions and actors is higher in Järna community than the national average.
Regulatory: Whereas the Environmental Code in general is an important regulatory instrument the regulations for organic production and certification have more direct impacts on the organic farming practices. All farmers expressed a very high degree of trust and dependence on the national certifying organizations (KRAV (organic) and Demeter (biodynamic)) whereas for the EU organization and regulations (e.g. EEC 2092/91 regulation) level of trust was considerably lower. Among the stakeholders the level of awareness of economic incentive structures and subsidies is high.
General social: The activities related to anthroposophy such as biodynamic farming, food processing, health care etc, collectively employs more people than any other businesses and many of these companies present increasing economic returns. Characteristic of Järna community today is the very high level of trust and cooperation between stakeholders at the local level and a high level of environmental awareness.

2. Ecosystem Management Objectives and Decision Making

Three different sets of management objectives were identified; organic farming management objectives, rural regional development programme and Södertälje municipality's local Agenda21-objectives. They are summarized in the Table 1 below.

Table 1

Objectives	Organic/Biodynamic agriculture*	Local Agenda21-objectives
Scientific	NA	Develop and increase use of environmentally friendly techniques.
Social	Social sustainability**: High quality food at reasonable price	Increase of urban and near-urban green areas and recreation areas. Increased environmental education. Increased community dialogue and

		consultation processes.
Economic	Economic sustainability**: Sustainable and reasonable income for producers within the sector Thriving agricultural sector	More efficient energy use. Sustainable economic growth.
Conservation	General objective: nature in balance: No use of chemical pesticides - protection of diversity of life No use of chemical fertilizers - recycling of plant nutrients Precautionary principle applied	Decreased overall negative environmental impacts, e.g. a non-toxic environment, rich biodiversity, increased organic agricultural production, etc.

*Organic rules according to KRAV. These need to be followed by biodynamic farmers as well
**Ministry of Agriculture, 2000,

3. Governance Processes (Regulatory, Economic/Financial, Societal)

Organic farming (indirect biodiversity governance) and the related direct nature conservation activities (through the private-public nature conservation agreements) are voluntary and primarily steered through economic incentives and cultural norms (biodynamic lifestyle conviction) whereas as the regulatory structures provide the fundamental framework.
Among market tools and incentives eco-labelling and price-based mechanisms e.g. environmental subsidies and incentives are more frequently used than others, followed by public procurement of organic/biodynamic foods.
The awareness of these mechanisms among the farmers was high. Worth noting is that taxes on conventional farming were only identified by one farmer as an important incentive. Five different institutional levels (EU, national, county, municipality and local/parish) are involved in management practices directly or impact practices indirectly. Significant collaboration among local stakeholders is identified as crucial in the governance process, see question 3.3.3. The level of institutional vertical interaction was identified as high, and the level of horizontal interaction was identified as very high. The level of regulatory compliance among farmers is high.

4. Impacts (Economic and Financial, Social and Ecological, including Biodiversity Change)

It is difficult to separate and rank economic, social and ecological impacts as these are all interdependent and interrelated. Overall, impacts identified were mainly positive and both of monetary and non-monetary values.

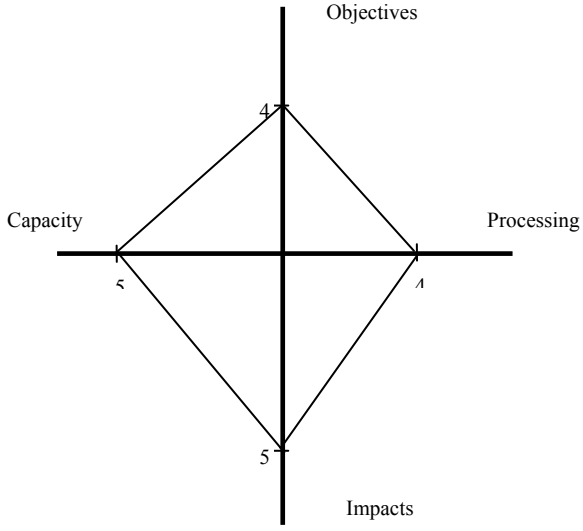
Table 2

Description	Effect (positive or negative)	Type (eco/fin, soc, or ecol)	Time dimension	Geographic dimension
1. Income, economic profit, price premium	+	Eco/fin	Immediate	Farm level and local companies
2. Nature, species and biodiversity conservation, nutrient cycling, increase in ecosystem services etc.	+	Soc + ecol	Immediate and future	Individual, local community, municipal level
3. Reduced eutrophication	+	Ecol	Immediate and future	Regional, national and international level
4. Aesthetic, cultural, recreational values	+	Soc	Immediate and future	Farm level, community and

				municipal level
5. Lower yields	-	Ecol	Immediate	Farm level
6. Increased costs for consumers	-	Eco/fin	Immediate	Individual, household, company, and municipal level
7. Increased levels of trust	+	Soc	Immediate	Community and municipal level
8. Regulatory induced stress	-	Soc + eco/fin	Immediate	Farm and company level
9. Cultural alienation	-	Soc	Immediate	Community level
10. Environmental awareness, education	+	Soc	Immediate and future	Community and municipal level

5. Evaluation of Governance Effectiveness

Järna is a very specific case, which is difficult to generalize from due to the anthroposophist culture and many biodynamic farms. The case is however an example of how different governance models and different incentives and objectives can come to reinforce each other – how different governance models can evolve or coexist. The main scientific, social, economic and conservation objectives of the MP (i.e. organic/biodynamic agriculture) are listed in Table 1. Food and other agricultural products are produced according to some basic ecological principles (www.krav.se, www.demeter.nu). The social and economic objectives listed are implicit rather than explicitly expressed in a MP. The listed objectives are proposed by the Ministry of Agriculture but the content in them can be derived from our interviews. The objectives of organic/biodynamic agriculture correspond well with the overall strategy of ecosystem management for biodiversity conservation, such as Local Agenda21- objectives. On the whole, these objectives are met or at least acknowledged, why it is concluded that the effectiveness of governance is high. Also when compared with broader commitments made at international level, e.g. HELCOM and CDB, the results meet the requirements.



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GEM-CON-BIO Case Study Report 'Local organic food system in Järna – ecosystem management and multilevel governance in agricultural production' (2007), European FP6 Project 028827 'Governance and Ecosystems Management for the Conservation of Biodiversity', Stockholm University, Centre for Transdisciplinary Environmental Research (CTM).

Deliverable 'D4.3 Reports on Case Studies' (2008), European FP6 Project 028827 'Governance and Ecosystems Management for the Conservation of Biodiversity'.

5.8 Wetland management for restoring ecosystem functioning in Swedish catchment areas

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social).

The answers to the questions in this section mainly reflect the status today. Concerning all catchment areas they do not follow traditionally administrative borders, hence they consist of different municipalities, habitats and ecosystems. For each case study area we try below to put forward the most crucial findings from this section. There are some differences among the study areas. Common for all case study areas is that the ownership structure is mixed. However, the wetland management projects only concern privately owned land, because the wetlands are created on farmers' properties. Since 1999, all environmental legislation in Sweden are gathered in the Environmental Code (EC). Another tool affecting the development and planning of environmental projects is the Plan and Building Act (PBA). The conformity of the environmental legislation and other acts affecting the environment projects/issues is high. There is financial support to achieve the 16 Swedish environmental objectives. Still, many of the objectives are likely to not be fulfilled within the time frame (until year 2020). Concerning the governance capacity the results from the World Bank indicate that the Swedish values of the indicators are higher than EU mean values. Two questionnaires were conducted in all three areas during 2007; PQ (public questionnaire) and SQ (stakeholder questionnaire) to the stakeholders that have been involved in water associations or other project in the catchment areas.

AREA K
The Kävlinge River Catchment area is about 1200 sq. km and an intense agricultural area. The losses of wetlands during the 19th and 20th centuries and the technology development and intensification of the agriculture have caused increased nutrient leakage from the area. A project of creation of wetlands and riparian zones established in the 1990s, in order to reduce nutrient leakage, increase biodiversity and increase public access to the landscape. Hence, the area has agreements of collaboration (between stakeholder, municipalities and so on) in the management plan of the Kävlinge River Project (KRP). The PQ in the area showed low trust of EU and national government but high trust of their municipalities, the Swedish Environmental Protection Agency and other citizens. The public awareness of services and dis-services/costs of biodiversity conservation was high.

AREA R
The Rönne River Catchment area is about 1900 sq. km and mainly covered by forest but the area is also an intense agricultural area. The area has likely to Area K a history of wetland losses and agricultural and industrial development. Hence, nutrient leakage from agriculture and industrial pollution has caused water pollution and eutrophication. A project of creation of wetlands and riparian zones was proposed in the 1990s, but was never established. A water association of stakeholders in the area exists though. The PQ showed similar values of trust as Area K, with the difference that the "do not know" answers were remarkably higher than in both of the other areas. The public awareness of services and dis-services/costs of biodiversity conservation was high.

AREA G
The Gullmar Fjord is a unique and vulnerable area of high marine value. For example it hosts the reproduction of one of the few local cod stocks on the Swedish West Coast. The catchment area is about 1700 sq. km and covered mainly by forest but agriculture is nevertheless the most important cause to the nutrient leakage. Erosion is a problem mainly because the rugged landscape. A project of creating wetlands and riparian zones established in the late 1990s to reduce nutrient loads to the fjord. During the project, the

area had an agreement of collaboration of the three largest municipalities and other stakeholders in the area. The PQ showed lowest trust to EU and national government and highest value for other citizens and landowners. Many of the respondents were also farmers/landowners. The public awareness of services and dis-services/costs of biodiversity conservation was high.

2. Ecosystem Management Objectives and Decision Making

AREA K

The management plan for Kävlinge River Project (KPR) has the time frame of 1994-2009. The most important features of the management plan is the long time frame, the focus on both ecological and social benefits of the project and that a large part of the project is financed by the involved municipalities. The ecosystem management regime in the project is a mix of the descriptions of joint and collaborative management (multi-stakeholder management). One can consider the working group as the authority that collaborates with other stakeholders (collaborative management). Conversely, one can consider the group as consisting of different stakeholders that collaborate and make decisions (joint management).

AREA R

The Rönne River Committee was established in 1978 and the main objective of the Committee is still the same i.e. basically monitoring activity. In 1995, a management plan was conducted and proposed but it was never implemented. The objectives of this plan were similar to that in Area K, i.e. to reduce nutrient loads by restoring wetlands and create riparian zones in the agricultural landscape. Another objective with the "new" habitats was an increased possibility for biodiversity and recreation and accessibility to the agricultural landscape. But as mentioned above, the current objectives of the area are basically the Committee duties of monitoring activity.

AREA G

The project we study in Area G is shortly called The Wetland Project. This project was established in 1997 and was finished in 2002. The decision-making in the project lies within the working group which consists of politicians from the involved municipalities and members from the County Board and other governmental agencies. Hence, the ecosystem management regime is multi-stakeholder (joint/collaborative – horizontal) management. The objective of the project's management plan was mainly ecological and the main financier was the Ministry of Environment (through the so-called Local Investment Programme) by 82 %. The municipalities in area G provided the remaining funds.

3. Governance Processes (Regulatory, Economic/Financial, Societal)

AREA K

Tools	**Use**	**Importance within the area**
Regulatory (EU legislation, national legislation)	Medium	Medium
Economic/Financial (taxes, subsidies, liability, compensation, fees and charges)	Medium	Medium
Societal (stakeholders involvement, access to information, lobbying)	Medium (high)	High

Table 1. Governance processes –Area K

AREA R

Tools	**Use**	**Importance within the area**
Regulatory (EU legislation, national legislation)	Medium	Medium

Economic/Financial (taxes, subsidies, liability, compensation, fees and charges)	-	
Societal (stakeholders involvement, access to information, lobbying)	Low	High (negative effect)

Table 2. Governance processes –Area R

AREA G

Tools	**Use**	**Importance within the area**
Regulatory (EU legislation, national legislation)	Medium	Medium
Economic/Financial (taxes, subsidies, liability, compensation, fees and charges)	Medium	Medium
Societal (stakeholders involvement, access to information, lobbying)	Low	Medium

Table 3. Governance processes – Area G

4. Impacts (Economic and Financial, Social and Ecological, Including Biodiversity Change)

AREA K

The value of the new ecosystem management is increased public access to the agricultural landscape and other recreational benefits, and cost-effective reduction of nutrient leakage/eutrophication. Both the general public and stakeholders seem to realize and emphasize these benefits (SQ and PQ). The municipalities take the main part of the costs. The public benefits from the project through recreation and a better environment in their own surroundings but also in the sea by reduced eutrophication. The social impacts of the new management seem to have been positive for Area K. Stakeholders mention that the project brings social benefits to the general public through increased recreational opportunities in the agricultural landscape (SQ). The project also seems to have succeeded in trust-building, both vertically and horizontally. The ecological impacts are studied and monitored within the project and are positive. The retention of nutrients in the restored/reconstructed wetlands is good and the biodiversity has increased in some of the studied wetland areas.

AREA R

The stakeholder questionnaire included a question of possible *economic* benefits of a wetland project (like the one proposed in 1995). The responses indicate that the stakeholders in area R were less certain about the potential economic benefits than those in areas K and G. However, the general public's perception of potential economic benefits was similar in all three areas. As to social and ecological impacts it is difficult to say anything about changes since the project was never realized.

AREA G

The *economic and financial* aspects of impacts are similar to Area K. The social impacts are not as obvious as in Area K. The municipalities have not succeeded in an extension of the project and the project time was quite short (five years). Also the ecological impacts are unclear. Some investigations indicate an increase in the nutrient retention (i.e. a decreased of nutrient leakage) but the results are uncertain.

5. Evaluation Of Governance Effectiveness

The following figure presents a moderately negative evaluation of contributions for biodiversity conservation:

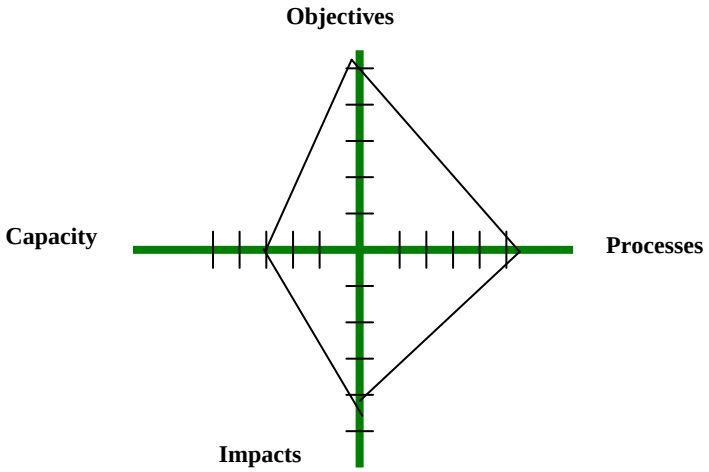
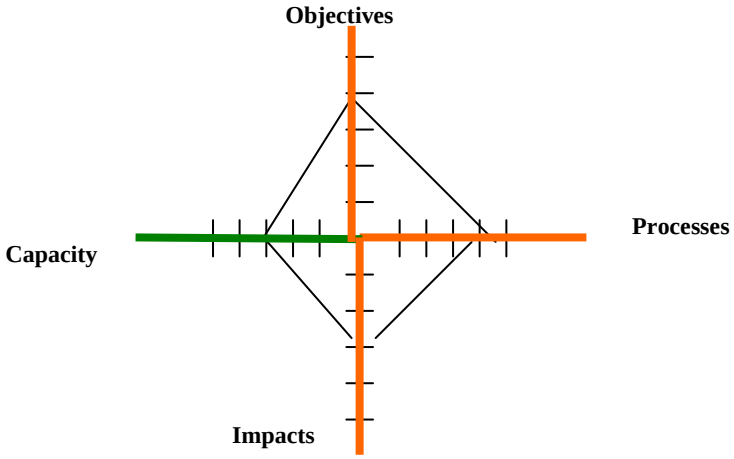


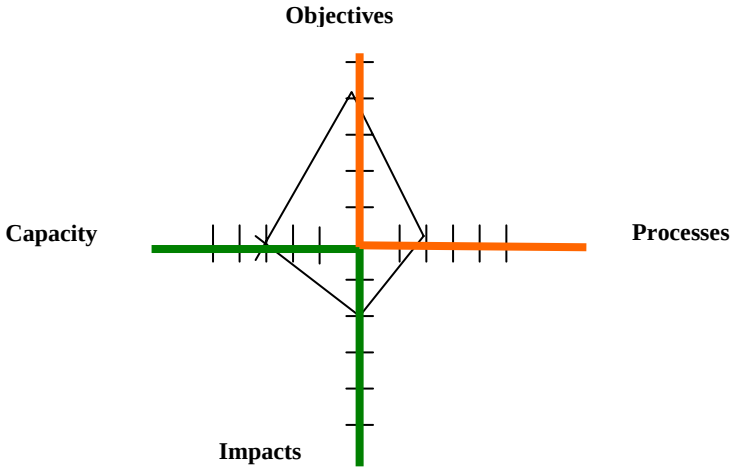
Fig. 1 Kävlinge River Catchment Area

Capacity = 3
Objectives = 5
Processes = 5
Impacts = 4



Rönne River Catchment Area

Capacity = 3
Objectives = -4
Processes = -4
Impacts = -3



Gullmar Fjord Catchment Area

Capacity = 3
Objectives = -4
Processes = -2
Impacts = 2

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GEM-CON-BIO Case Study Report 'Wetland management for restoring ecosystem functioning in Swedish catchment areas (2007), European FP6 Project 028827 'Governance and Ecosystems Management for the Conservation of Biodiversity', Enveco Environmental Economics Consultancy Ltd.

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5.9 Biosphere Reserve Rhön

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The study area's title is Biosphere Reserve Rhön. The spatial level analysed is local, regional and national, the extension of the area is 1.849,39 km² (184.939 ha) and the time period analysed is 15 years (from 1991 to 2007). The prevalent governance types are State Controlled (a), Community based, Policy Network Group, Market based (For what regards the main types of governance, these are identified by the document "Governance Types in GEM-CON-BIO: their identification, application and integration with the analytical framework" (Andrew Terry, 2007)). The main ecosystem analysed (EUNIS Habitat type) is woodland (42%), grasslands (32%), farmland (18%), constructed habitats (5%), others (3%) (see Annex 1 EUNIS Habitat type of the GEM-CON-BIO Guidance Manual, Vers.3., Andrew Terry and Riccardo Simoncini 2007).
The biosphere reserve Rhön was established in 1991 after Germany's reunification. The first steps were taken during adjustment of the **institutional structures** among the three federal states (Länder). The biosphere reserve Rhön extends among Bavaria, Hesse and Thuringia (former GDR), which means that two different forms of government/governance and three different policies (e.g. laws, subsidies) have to be aligned. These factors can be perceived as hampering the results of governance in terms of biodiversity conservation. Otherwise, developing this **unique landscape** among three borders (Länder) provided chances and new paths to interact on national and regional level.
The **framework concept** was finished in 1995 and aims to conserve both the **cultural landscape** with its meadows and pastures ("land of open vistas") and naturally occurring **biodiversity**: habitats and species (e.g. forest, orchids). Next to it, **agriculture** changed the appearance of landscape and biodiversity characteristically e.g. through sheep farming and it is still the most important economic sector. Therefore extensive agriculture and **organic farming** are considered within ecosystem management as well as increasing **abandonment** as a major threat.
The **tourism** sector, in particular wellness- and eco-tourism, is expanding which provides job opportunities and increases positive awareness of the biosphere reserve internally and externally on the one hand but causes also new conflicts between economic and ecological claims on the other hand.
The Regional Working Group Rhön (ARGE), is one of the multiform organisational structure with broad voluntary **participation** of local stakeholders and residents, was and is still affecting decisions and implementation of various regulations within the biosphere reserve. A **bottom-up approach** and a **high level of trust** (vertical and horizontal) could be identified.
Furthermore, **public relations** and **environmental education** have influenced **public awareness** and acceptance of ecosystem management and measures positively.
The Federal Nature Conservation Act, implemented by each Federal State Ministry, is the most important **legal framework** for the conservation of biodiversity. In addition, the **framework concept,** used as a regional governance tool, is non-binding but highly accepted and implemented and includes the sustainable management plan for the biosphere reserve Rhön. In order to conserve biodiversity, a broad range of measures were identified:

- provide **national funds** and **subsidies** to enhance extensive agriculture and organic farming,
- support cooperation among **local stakeholders** to identify synergy effects,
- introduce **regional label/eco-label** for internal and external recognition,
- further marketing of **regional products** and
- incorporate **local knowledge** into management plan.

Aside from the framework concept there are several plans at the local level which are focused on ecosystem management objectives, specifying measures for the **conservation of biodiversity** as well as socio-

economic aims. Therefore, main decision-makers are employed at the administrative offices in Bavaria, Hesse and Thuringia.

Overall, since its foundation the biosphere reserve Rhön is headed in the right direction because both the cultural landscape and its biodiversity are managed successfully.

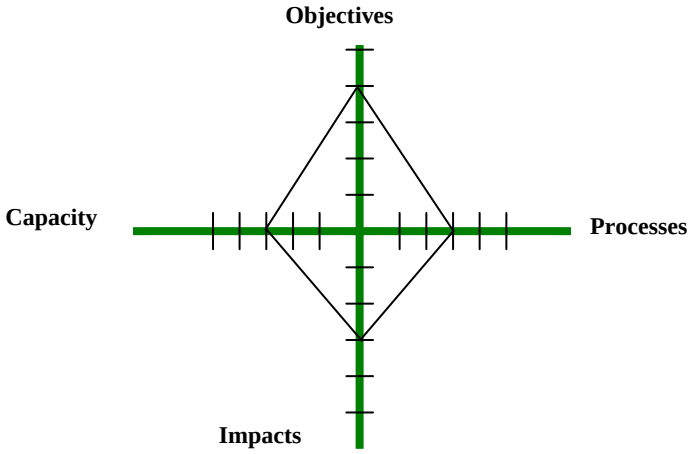

Figure 1. Positive evaluation of contributions by all the 4 clusters of variables (each ranked from 0 to 5) for biodiversity conservation as it results from outcomes of case study.

References

GEM-CON-BIO Case Study Report 'Rhön Biosphere Reserve, Germany' (2007), European FP6 Project 028827 'Governance and Ecosystems Management for the Conservation of Biodiversity', Institute for International and European Environmental Policy (Ecologic)

Deliverable 'D4.3 Reports on Case Studies' (2008), European FP6 Project 028827 'Governance and Ecosystems Management for the Conservation of Biodiversity'.

5.10 Biosphere Reserve Schorfheide-Chorin

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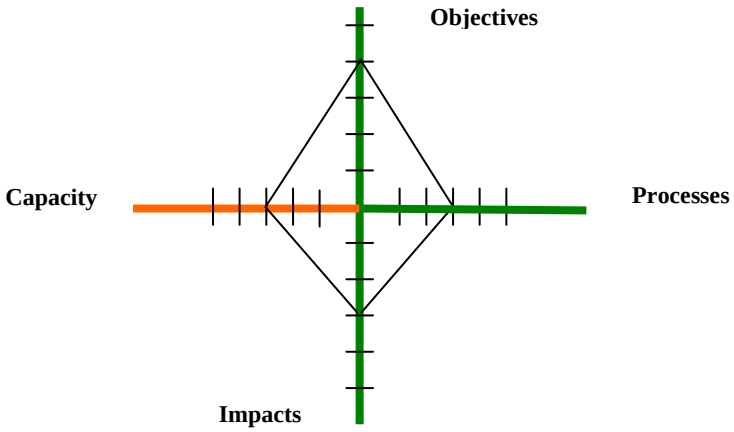
The case study's title is Biosphere Reserve Schorfheide-Chorin. The spatial levels analysed are local, regional (and national), the study areas extension is 1.291,61 km² and the time period analysed is 16 years (from 1990 to 2007). The prevalent governance type are State controlled (a), Community based, Policy Network Group, Market based (Andrew Terry , 2007). The main ecosystem analysed (EUNIS Habitat type) are woodland (50,2 %), arable land (26,4 %), grassland (7,9 %), inland surface waters (7,3 %), fens (4,2 %), constructed habitats (4,1 %) (see Annex 1 EUNIS Habitat type of the GEM-CON-BIO Guidance Manual, Vers.3. Andrew Terry and Riccardo Simoncini, 2007).
The biosphere reserve Schorfheide-Chorin, created in 1990 during the time of political turnaround, comprises the largest beech forests (Fagus sylvatica) in central Europe. The study area hosts a high number and diverse group of **endangered and vulnerable species** within its deciduous forest, surface waters and wetlands.
Important stakeholders and sectors (farmers, locals etc.) were not involved when the biosphere reserve was set up (**tendency toward a top-down-process**). In the first years of the biosphere reserve there were plenty of **funds** available and frequent local events. The current average population density in the area is 25 people/sq. km, which is one of the lowest in the whole region and Germany. Due to structural changes in the main economic sectors (**forestry, agriculture and fisheries**) after 1989, unemployment increased to 24 %, which piqued the local population's interest in new market opportunities, such as **tourism** or **eco- and regional labelling**. Organic farming was also stimulated by the "open soil market", by which stakeholders gained access to soil resources (this process is administered by the 'Soil utilisation and administration association' (BVVG) and gives private land owners favourable treatment). Another result of the restructuring was, and still is, **rural migration**, in particular among young people in this region.
One major driver of the implementation of **biodiversity protection** was the residual damage from intensive farming before 1989, which resulted in eutrophicated groundwater, loss of fens and wetlands, layers of digested sludge in surface waters and loss of species. Two-thirds of the forest area belongs to the federal state of Brandenburg, almost one-third is privately owned and a small forest belongs to the municipality, church and others. About 80 % of the agricultural land is **privately owned**.
Sustainable ecosystem management is the main objective within the biosphere reserve and is therefore integrated into all management plans. Moreover, **local knowledge** is included and considered when setting up these plans and concepts. All relevant plans have been implemented in recent years and focus either on **conservation of biodiversity** or **socio-economic issues**. While the Biosphere Reserve Administration and the Ministry of Rural Development, Environment and Consumer Protection, Brandenburg, are responsible for nature conservation and landscape protection in this area, most plans addressing economical development are developed by municipalities or counties with the technical backing of the Biosphere Reserve Administration. The level of stakeholder participation in the development of plans for the maintenance of biodiversity - in terms of full consideration of all important issues of nature conservation in a timely manner - seems to be restricted. The main **ecosystem services** utilised within these plans are provisioning services, such as food and livestock (through eco/regional labelling), as well as renewable energy, regulating services comprising water purification and regulation (through sustainable forestry) and cultural services, in particular tourism and recreation.
Several **monitoring** processes for biodiversity (e.g. integrated environmental monitoring) contribute to the evaluation of these plans. Plans addressing economic issues will be evaluated after a few years in order to justify continuation and funding of these plans.
The desired objectives in ecosystem management could be achieved through the highly implemented and well-recognised **Biosphere Reserve Decree,** which is another important piece of legislation is the Brandenburg Nature Conservation Act. This binding instrument is very important in maintaining sustainable

management and conserving biodiversity. In some cases, implementation of this legislation suffers from conflicts of interest with other land-use concepts.
In addition to national and international funds, market incentives are also essential economic/financial instruments for increasing sustainable land use and conservation of biodiversity. These include, for example, outcome-based payment schemes for ecological services of agriculture (contract nature conservation), CAP **subsidies** and, in particular, **eco-labelling** and the introduction of a **regional quality label**. A high percentage of farmers dedicate their agricultural management to eco-labelling regulations and/or take part in the regional labelling initiative. Leadership of the management process rests with the Biosphere Reserve Administration (state) (while enhancing nature conservation in the area, implementing and monitoring the Biosphere Reserve Decree, connecting different stakeholders etc.). In addition, some working groups, such as the working group "Sustainable Settlement Development" and "Regional development", and NGOs concerned with nature protection are involved in this process as well. In general, involvement of stakeholders in all relevant decision-making processes is not as high as it should be. Moreover, collaboration among stakeholders ranges from "relatively good" to "very bad", with the latter due to sectoral and competitive thinking among the organisations.
In the past 16 years, ecosystem management and external drivers have had an important effect on the biosphere reserve area. **New jobs and job markets** were created, in particular in the tourism sector. In addition, several economic benefits were gained from ecosystem services. One important factor was the change from intensive to extensive agriculture, encouraged by national subsidies and the preferential access to soil for private land owners. Some main results, achieved through **extensification** of agriculture, including the removal of drainage channels, are improved water purification and regulation, increasing rate of species and renaturation of habitats.
Over time, public **awareness** of biodiversity and ecosystem management was positively impacted by **environmental education** and **public events**, organised by the Biosphere Reserve Administration and NGOs. This process could be enhanced, for example, through incorporation of local knowledge and experience into management planning, creation of working groups and the moderation work of the Biosphere Reserve Administration among local stakeholder. Efforts of the Biosphere Reserve Administration to involve local stakeholders in ecosystem management and the permanent presence of the Biosphere Reserve Administration positively affected ecosystem management. Scientific knowledge of species and ecosystem functions strongly increased through monitoring programmes carried out in this area.
The governance process is influenced by several factors. On the one hand, the effectiveness of governance is strongly promoted by the **high level of implementation and enforcement of regulations** for conservation of biodiversity in the area, the rise in environmental awareness as well as the benefits resulting from good ecosystem management. On the other hand, the effectiveness of governance is restricted by the top-down-oriented approach, applied at the introduction of the biosphere reserve, the lack of funding possibilities and the lack of cooperation among all stakeholders. Overall, the governance process implemented in the area can be assessed as effective.
The following figure was created "under reservation" due the difficulties to evaluate and rank the importance of each of the 4 clusters in only one variable.



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Deliverable 'D4.3 Reports on Case Studies' (2008), European FP6 Project 028827 'Governance and Ecosystems Management for the Conservation of Biodiversity'.

5.11 Use Nationally of Wildlife Resources across Europe (UNWIRE)

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UNWIRE covered all 27 states of the 43 million km^2 European Union. It concentrated on provisioning and cultural ecosystem services from wildlife resources (e.g. food, recreation). It used an e-mail questionnaire survey administered by the European Sustainable Use Specialist Group (ESUSG) through 27 country coordinators, with 94 questions (in 19 languages) for national representative organizations (NGOs) and 21 for government departments. NGO response rates from six surveyed activities were: (i) 92% for hunting birds and (ii) hunting ungulates, (iii) 70% for angling, (iv) 74% for collecting fungi, (v) 44% for collecting wild plant products and (vi) 85% for bird-watching. Governments gave a 71% response (19 states) on hunting and 37% (10 states) on angling. More details at: http://iucn.org/themes/ssc/susg/news/sept07esusgvienna.htm.

UNWIRE investigated how capacity, objective and process variables associated with (a) numbers and trends (during 1996-2006) in users of the resources (as indices of ecosystem service provision), (b) in resources (indicating ecological sustainability) and (c) in biotopes of the resources (hence biodiversity). Here we show relationships of impact variables with capacity, objective and process variables across EU states within each activity. The following sections therefore start with potential impact variables and then show regressions on these variables at $P<0.01$. We analyse these effects across the 6 activities in chapters 6 and 7.

1. Potential Impact Variables (Economic And Financial, Social And Ecological, Including Biodiversity Change)

The total EU participants in each activity were grossed up from the sum of participant estimates in surveyed countries, the World Bank sum of citizens for the countries and the total EU population of 490 million. The 5.3 million bird-hunters from the 25 responding states, were adjusted for two other states and numbers of other hunters[1] to a total 6.6 million hunters of all types. Similarly, adding data from four more states[2] gave an estimate of 24 million anglers (for *94%* of the EU population surveyed). Table 1 shows means (and range of values as deciles, excluding the highest and lowest 10% of values) for density and spending. Estimates in **bold** are considered reliable, for hunting, angling and bird-watching, because data on 81-100% of the EU population were available, but for collecting fungi (42% surveyed) and especially use of plants (6.5%) were deemed *[unreliable]*, as were the mere 3 estimates of spending on collecting fungi and plant products.

TABLE 1 **Participant density, spend & trends**	% of EU population in survey	millions of EU participants (grossed up)	**Across all surveyed states:**		**Trend (change) during 1996-2006**		
			Participant density (number per km^2)	Annual spend per participant (€1000)	Particip-ants (%)	Resources (%)	Biotopes (index)
Hunting Birds	**96-100**	**6.6**	**1.1 (0.2-3.5)**	**2.9 (0.9-3.4)**	-15.4	-2.5	-0.23
Hunting Ungulates			**0.9 (0.2-1.7)**	**2.2 (0.7-2.5)**	-12.8	+17.4	-0.04
Angling	**64-94**	**24**	**5.8 (0.7-12)**	**0.65 (0.2-1.4)**	2.03	-5.6	-0.18
Collecting: Fungi	**42**	*[45]*	*[10 (0.1-47)]*	*[0.26 (0.03-0.50)]*	4.51	-6.9	-0.43
Plant Products	**6.5**	*[135]*	*[13 (0.3-70)]*	*[0.11 (0.01-0.24)]*	4.81	-2.2	-0.24
Bird-Watching	**81**	**6.2**	**0.7 (0.01-12)**	1.3 (0.07-3.1)	18	-9	-0.29

The 6.6 million hunters were each spending an average €2400 annually, or €16 billion in total. With €19 billion for angling and €8 billion for bird-watching, total annual spending in the EU on these three activities should be at least €40 billion. Participation tended to increase for angling, collecting vegetal products and (by 18%) for bird-watching, but declined 13-15% for hunting, despite an increase of 17% in populations of ungulates (wild deer, swine and goat), for which no state registered a decline. Overall declines of 2-9% were recorded for other resources, and for their biotope quality as an index of general biodiversity.

2. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory And General Social).

Numbers and trends of hunters, anglers and bird-watchers associated negatively with state or community management, but positively with urbanisation for angling and with government effectiveness for bird-watching (Fig. 1). Good vertical integration (communication and trust between national and local levels)

was associated with increasing fish stocks but decline of angling (Fig. 2). Biotopes were deemed worst by hunters where population density and urbanisation were high and by mycologists where land-ownership was mixed (Fig.3) and with little knowledge leadership (availability of an institutional source of knowledge).

Figure 1. Density of participants (on the vertical axis), for (left) anglers in relation to state ownership of water bodies (horizontal axis, bubble size indicates World Bank urbanisation index) and (right) bird-watchers in relation to the World Bank index of Government Effectiveness (bubble size for state management of wild birds).

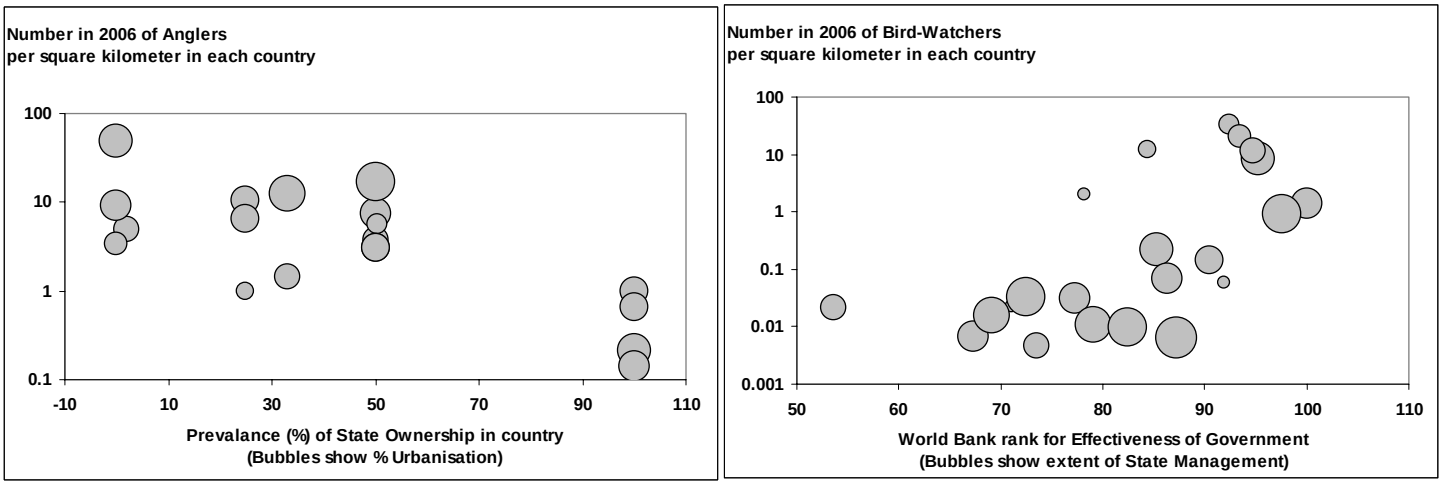


Figure 2. Change (%), in both cases on the vertical axis, in (left) numbers of anglers and (right) fish stocks (2 for increase >10%, 1 for increase <10%, negative values for decreases) in relation to vertical integration scores (on the horizontal axis, with bubble size on left showing extent of community ownership of water resources).

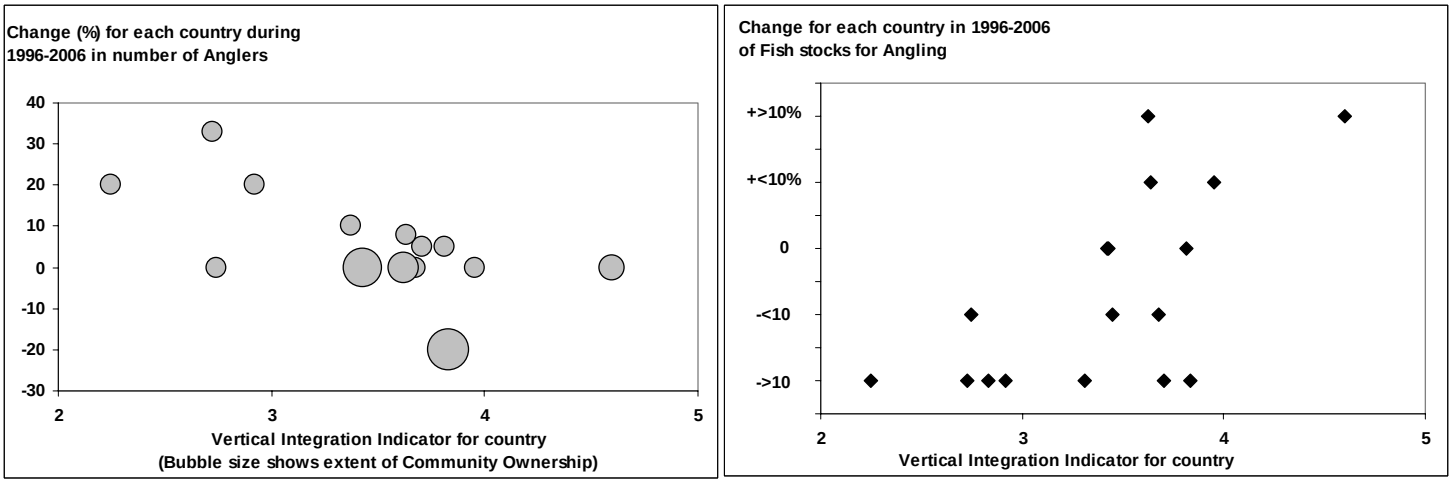
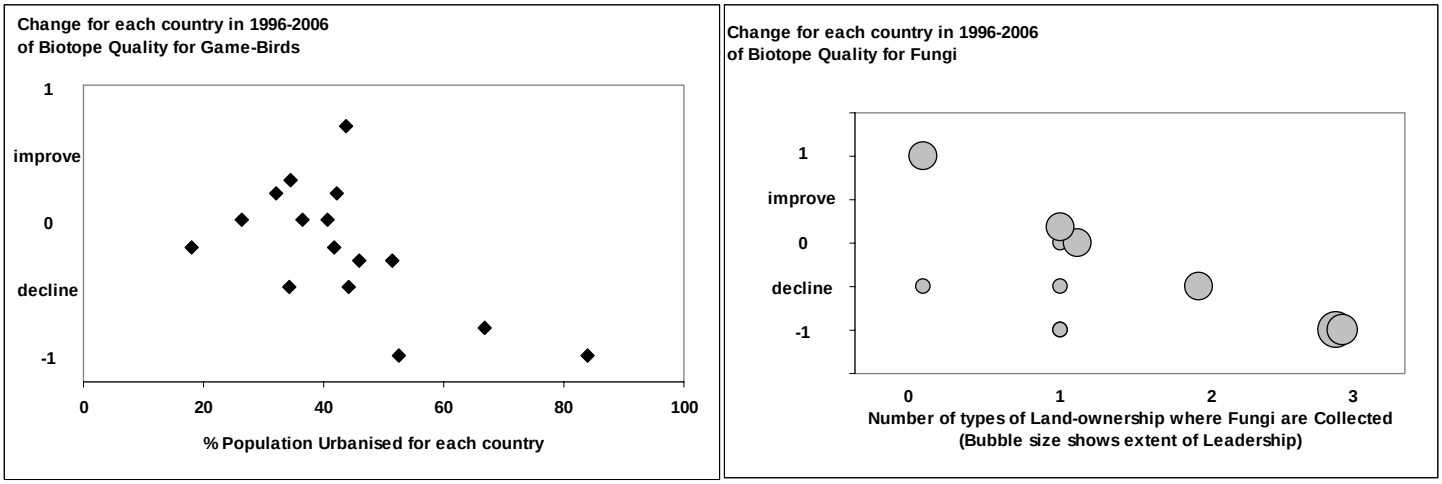


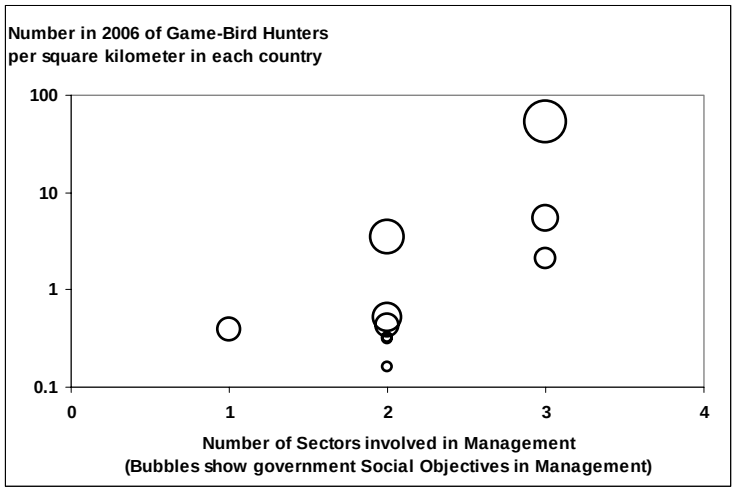
Figure 3. Assessment of change in biotope quality (vertical axis, from -1 for decline to +1 for improvement), for game-birds (left) in relation to urbanisation (on the horizontal axis) and for fungi in relation to the number of land ownership types (public, private, community, none; bubble size indicates the strength of leadership).

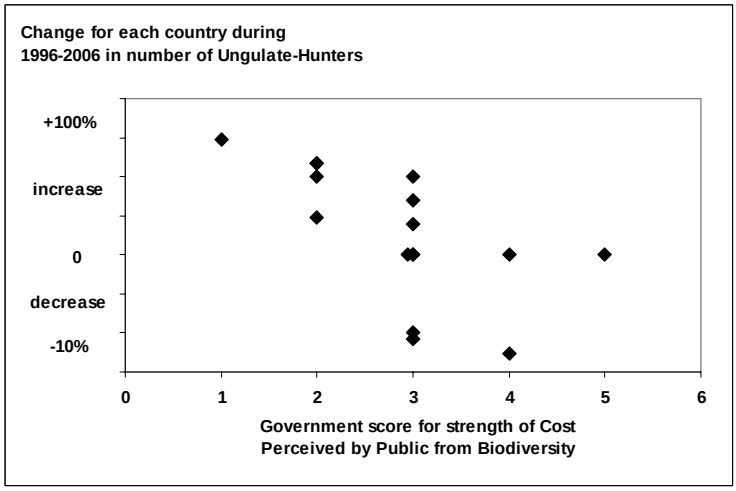


3. Ecosystem Management Objectives And Decision Making

In this nation-level study, there was a marked lack of significant relationships with ecological, economic or social objectives. However, officials tended to emphasise social objectives where bird-hunters were most abundant (Fig. 4).

Figure 4. The density of bird-hunters in each country (on the vertical axis) in relation to the number of sectors (public, private, local community) that managed game birds (horizontal axis); the size of bubbles indicates the percentage of effort that government officers attributed to social objectives in their management of hunting.





Where ungulate hunting was declining, officials perceived most cost from biodiversity (Fig.5) and emphasised economic objectives, possibly in response to damage from ungulates.

Figure 5. The percentage change in numbers of ungulate hunters (on the vertical axis) in relation to perception by government officers of the cost to society of biodiversity (from 1=low to 5=high).

4. Governance Processes (Regulatory, Economic/Financial, Societal)

Where numbers of ungulate-hunters were low, regulations were deemed a hindrance to conservation (Fig.6). However, increase in numbers of hunters was associated with perception of benefit from access regulations and especially with good horizontal integration (trust and communication with other organisations at local and national level (Figure 7). Game-bird stocks were considered most likely to be neutral or increasing where there was a high density of hunters and high awareness of regulations, whereas ungulate populations increased in association with economic incentives and hunter awareness of these (Fig.8). Perception by anglers of improved biotope quality was associated with an increased number of regulations, whereas good biotope for ungulates was associated with a combination of low human density and using local knowledge in management (Fig. 9). Bird-watchers too were most approving of regulations where they deemed bird populations and biotopes to be healthiest. In a striking parallel with hunter numbers tending to increase where there was best trust between organisations, there was most increase in bird-watching where their representatives considered hunting most beneficial for habitats (Fig. 7).

Figure 6. The density of ungulate-hunters (vertical axis) in relation to the score from their representatives for conservation effect (1=hindrance, 5=benefit) from regional hunting regulations (horizontal axis).

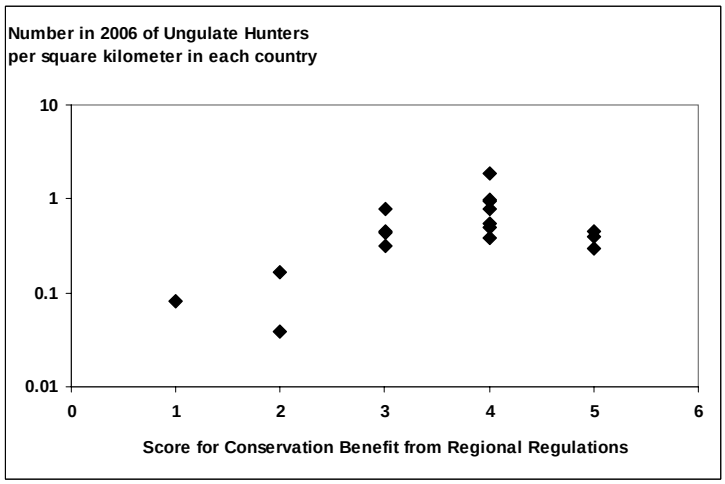


Figure 7. Change (%) in participation (vertical axis) for ungulate hunting (left) in relation to horizontal integration scores (horizontal axis, bubble size is benefit perceived from access regulations), and (right) for bird-watching in relation to bird-watcher perception of benefit to biotopes from hunting (horizontal axis).

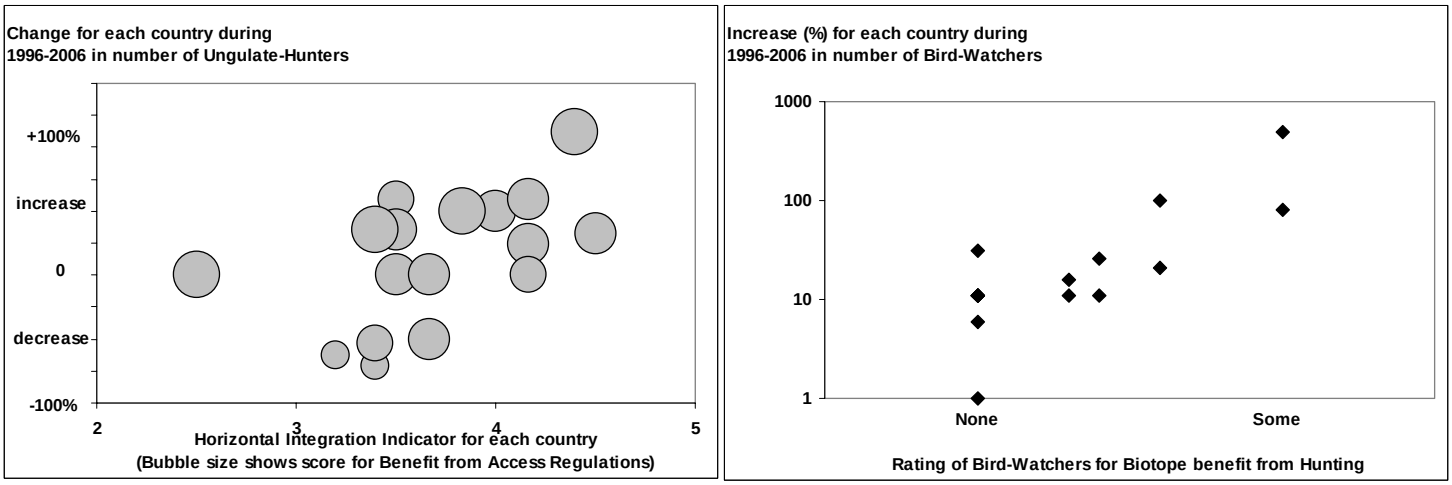


Figure 8. Change in game stocks (vertical axis) in relation to hunting organisation scores for awareness by bird-hunters of regulations (left, horizontal axis, 1=low to 5=high, bubble size is bird-hunter density) or by ungulate-hunters of economic benefits (right, bubble size is score for conservation benefit perceived from state payments)

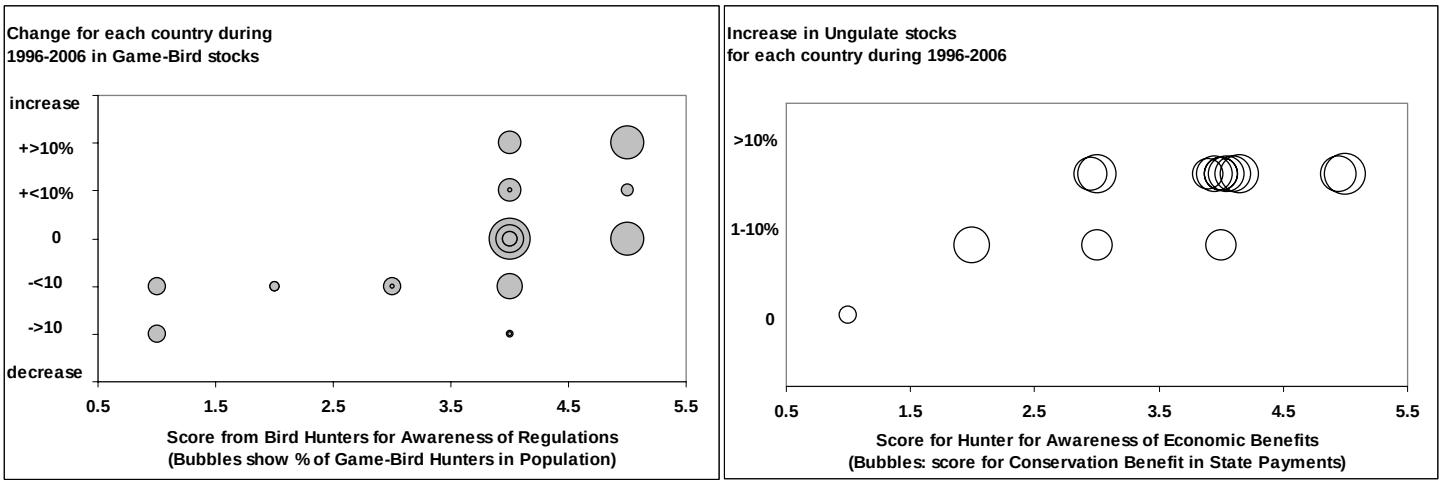
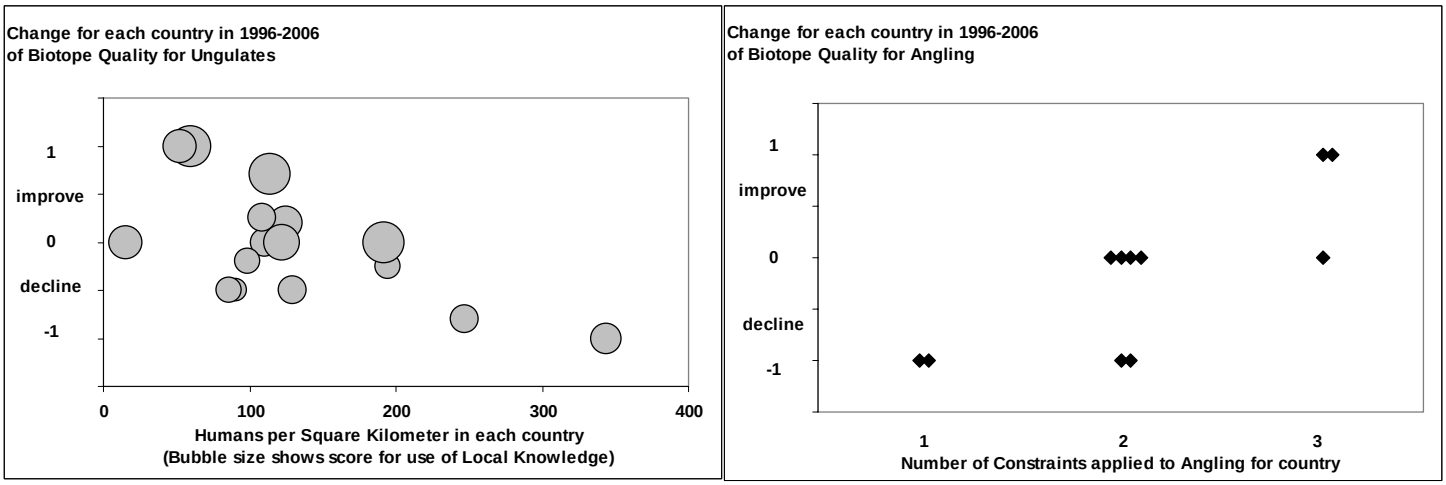


Figure 9. Change in quality of biotopes (vertical axis) for ungulate hunting (left) in relation to density of humans in each country (horizontal axis, bubble size is whether local knowledge was used for managing ungulates), and angling (right) in relation to the presence of constraints on access, quotas or close seasons in each country.



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5.12 North Sea Fisheries

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social).

North Sea is a large semi-enclosed area located between Norway and Denmark in the east, Scotland and England in the west, Germany, The Netherlands, Belgium and France in the south. Together with the estuaries and fjords, it occupies a total surface area of approximately 750,000 km^2, while the total catchment area is 850,000 km^2. Over 230 fish species have been recorded in the North Sea. However, only 18 per cent of the 113 North East Atlantic fish stocks assessed in 2001 were inside safe biological limits. The main threats are the grown industrial fishery, overfishing, exploitation of oil and gas reserves, accidental mortality caused by discarding of non-target fish species, extensive damage to the benthic habitats, pollution and intensive marine transport.
The starting point for the study is identified in 1983 where the Common Fisheries Policy (CFP) was born as the Member States decided that the EU was best placed to manage fisheries in the waters under their jurisdiction and to defend their interests in international negotiations. The CFP is the most important management tool in the North Sea. The European Commission is competent to take conservation measures for biological resources in all areas of the sea. There is one important reference date within this period: year 2002 where the reform of the CFP took place aiming to enhance the ecosystem-based approach in fisheries management. In 2004, the North Sea Regional Advisory Council (NSRAC) was established to facilitate this process by involving local stakeholders into the decision-making process.

2. Ecosystem Management Objectives and Decision Making

The management regime of the North Sea is a rather complex system. Governmental Authority plays an important role, as for example, fisheries are managed by the EU while the sea beds from the individual member states. There are also examples of private management practices, e.g. around oil & gas platforms and pipelines the control is exerted by each company. In addition, we are studying the fisheries sector in the open sea where open access regimes are also present.
The overall system for managing fisheries under the CFP operates as follows: Data collected by national fisheries research institutes from their national fishing fleets are assembled and the state of the stocks assessed by scientific Working Groups operating under the auspices of the International Council for the Exploration of the Sea (ICES). ICES carries out monitoring and stock assessment of fish species and benthos. Advice on the stocks is then presented to the European Commission and other States by the ICES Advisory Committee on Fisheries Management (ACFM). Proposals for management measures are forwarded to the Council of Ministers, although particular actions may also be negotiated with Norway (the only non-EU North Sea state) before presentation to the Council. The Ministers then negotiate amongst themselves to meet a compromise position which balances recommendations for conservation measures against the concerns of the industry and the communities affected. The Council's members are required by the Treaty of Rome to be *'authorised to commit the government*' of their Member States. This provision diminishes the power of national parliaments to exercise control over decisions which affect their interests.
The main objectives of the new CFP are presented in Table1.

Scientific	Social	Economic	Conservation
Support decision-making process based on sound scientific advice which delivers timely results	Establishment of Regional Advisory Councils (RACs) to contribute to the achievement of the	Establish an economically viable and competitive fisheries and aquaculture industry	Achieve responsible and sustainable fisheries and aquaculture activities that contribute to healthy marine

	objectives of the CFP		ecosystems
Long-term Recovery and Management Plans with mixed-fishery considerations to secure sustainable fisheries with high yields	Achieve a fair standard of living for those who depend on fishing activities	Ensure that supplies reach consumers at reasonable prices	Apply the precautionary approach
Specification of appropriate fishing locations and seasons	Fairness in allocation of fishing opportunities	Stabilise markets	Progressive implementation of an eco-system-based approach
Openness and transparency, in particular by improving the quality and transparency of the scientific advice and data on the basis of which policy decisions are taken	Accountability, through a clearer definition of responsibilities at European, national and local level	Increase individual earnings of the (fishing) community members	Manage fishing effort in line with sustainable catching opportunities, which will require an immediate and significant reduction of fishing effort
Real-time management of short-lived species	Effectiveness, through decision-making processes whose results are properly evaluated, controlled and complied with and coherence with other Community policies	Increase productivity by promoting technical progress and by ensuring the rational development of production and the optimum utilisation of the factors of production	Incorporate environmental concerns into fisheries management, in particular by contributing to biodiversity protection
	Ensure the principle of non-discrimination	Promote sound economic operation of fishing enterprises	Make the best use of harvested resources and avoid waste
		Use of economic instruments for management	Assure the availability of supplies
			Promote biological conservation

Table1. Management objectives and decision making

3. Governance Processes (Regulatory, Economic/Financial, Societal)

The CFP, the main legislation affecting fisheries in the North Sea, is one of only five areas of exclusive competence for the European Union, meaning that the Commission has extraordinary powers over fisheries. The directly-elected European Parliament plays a relatively minor part in the administration of the CFP, mainly having a consultative role as far as fisheries legislation is concerned. The Parliament is able to express its opinions on various aspects of the CFP, and on occasions it may issue own-initiative reports. However, the detailed scrutiny, ability to overthrow legislation and capacity to introduce new legislation which exists within many national parliaments is lacking. This is a profoundly undemocratic and top-down approach, showing poor governance. In addition, the lack of stakeholder's involvement in the decision making affects the level of compliance and enforcement with the conservation measures adopted.

4. Impacts (Economic and Financial, Social and Ecological, including Biodiversity Change)

Before the implementation of changes in the North Sea fisheries management (CFP reform, NSRAC, longer-term plans, etc.), the management plan was a failure. Many of the fisheries were not biologically sustainable, management was essentially short-term and based on a single-species approach, many fishers felt alienated and did not comply with rules which they considered impracticable or inappropriate, discarding was commonplace, the quality of biological advice was impaired by poor data, and fishers distrusted the advice.

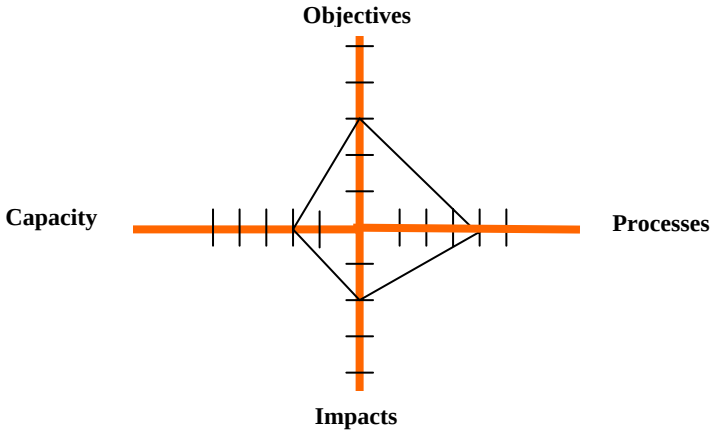
Turning to the current position in the North Sea, there are a number of serious ecological concerns. Although some stocks appear to be responding well to recent, strong measures, most of the main target fish stocks used for human consumption remain close to or outside safe biological limits. Quota reductions, restricted days at sea and increased fuel costs have restricted vessel profitability. Many fleets have experienced several years of low average profit levels, and some have contracted sharply in size. Processing plants are closing and the infrastructure which supports fishing is declining.

5. Evaluation Of Governance Effectiveness

There is poor governance and a topdown approach in the management of the North Sea fisheries. However, the objectives of the CFP were reformed in 2002 including more long-term plans and measures to deal with the chronic overcapacity of the EU fleet, to achieve better control and application of the rules and to involve the stakeholders in the management process. Figure 1 presents the moderately negative evaluation of contributions for biodiversity conservation.

The following main changes are suggested at EU level to meet the objectives of the CFP in the North Sea:

1. A stronger move towards co-management should take place if the NSRAC is successful.
2. Responsibilities for management could be devolved from the EU to NSRAC
3. The democratic deficit that exists within the EU especially in relation to fisheries must be overcome (regional devolvement, more power to parliament)



Negative evaluation of contributions for biodiversity conservation by the cluster of variables related to **Capacity** (ranked 2 negative), **Objectives** (3 negative), **Processes** (4 negative) and **Impacts** (2 negative) as it results from outcomes of the North Sea fisheries case study

Figure 1. Visualising conclusions on most relevant factors for biodiversity conservation resulting from analysis of outcomes from North Sea Fisheries case study

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GEM-CON-BIO Case Study Report 'North Sea Fisheries' (2007), European FP6 Project 028827 'Governance and Ecosystems Management for the Conservation of Biodiversity', Aristotle University of Thessaloniki.

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5.13 Közép-Tisza Landscape Protection District, Hungary

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social).

The Közép- Tisza Landscape Protection District (belonging to the Hortobágy National Park) has been established in 1978 to conserve the residuals of the earlier water world of Middle Tisza. The study area is about 84 sq. km, the spatial level analysed is local/regional. The prevalent governance type is state controlled, national. The most important habitat types are woodlands covering about the half of the study area, other important habitats are grasslands, arable lands, surface standing and running waters. These habitats provide shelter, nesting and breeding place for numerous important and valuable species concerning both flora and fauna. The most significant ecosystem services provided by the area are food (livestock, wild plant and animal species, crops), fibre (timber, wood fuel, reed), genetic resources (native, indigenous species), aesthetic-cultural values, recreation and tourism, water regulation and natural hazard regulation.
Threats and dangers the area has to face include the spreading of invasive species, change in native species dynamics, forestry and agriculture, and floods endangering the area.
The main external driver of ecosystem change is the anthropogenic limitation of natural disturbance processes. Both direct and indirect external drivers impacting the management of ecosystems in the study area, the most significant is the problem of invasive species and habitat change.
Citizens living in the surrounding settlements (210.000 inhabitants, 82 persons/km^2) have to face with the serious problem of unemployment (rate is more than 10%), and partly originating from the previous, a very low per capita income (about 1400 EUR/year).
The level of regulatory capacity varies from low to medium level. The conformity and correspondence between legislations is at medium level.
As regards the financial sources, financial mechanisms ensuring the implementation of nature protection policy, significant lack of sources are characteristic. The co-operation of different stakeholders, the level of vertical and horizontal trust is variable; due to the hierarchic, state controlled governance of nature protection, in the lack of bottom-up approach, a low/medium-level trust exists.

2. Ecosystem Management Objectives and Decision Making

Ecosystem management is realized by the Hortobágy National Park, belonging to the Ministry of Environment and Water. Governmental management regime (63%) dominates in the study area with partial contribution of local community management (about 21%) and private management (16%) also.
Nature protection including the conservation of biodiversity is governed by state controlled national governance type, namely a strong centralised control over management through state agencies, based on legislation and policy guidance. Ownership can be characterised by the predominance of state-owned areas.
Management plans developed have to be revised in every 10 years. Management plans define the direction of management and development targets and tasks of the national parks, but according to natural processes and nature protection demands, they can be modified when necessary.
Ecosystems are managed as a whole unit, but there are separate management and use regulations and rules for each ecosystem components.
The most significant objectives of the MP are as follows:

Scientific	• Research programmes, projects • Genetic preservation
Social	• Preserving traditional way of life, cultural values • Availability of protected sites • Formulation and influencing environmental awareness • Integration of nature into education

Economic	• Eco-tourist programmes • Reed management • Bio farming • Grazing
Conservation	• Conserving natural values, natural processes • Protection of specific avifauna • Rehabilitation of degraded natural values

Regulated use of the components of biodiversity can be permitted (hunting, fishing, extraction of timber, etc.). In case of especially protected species, this can occur only for nature protection purposes.
There are several monitoring processes in the study area implemented through different actors. Monitoring is used also for the changing of the MP.
No specific support is available for financial management. The necessary financing originates from governmental support, EU support through different projects, rental contracts and other incomes.

3. Governance Processes (Regulatory, Economic/Financial, Societal)

There are two main institutional levels (national level by Ministry of Environment and Water, regional/local level by National Park Directorate, Regional Development Plans) and other levels of smaller importance (county level, municipality level) involved in the regulation of biodiversity conservation.

Rank	Tool	Description
Regulatory	- laws, directives, regulations, agreements, conventions - plans, strategies	Regulatory tools are determinant. Regulations at national level provide a general framework of legislation. Regional and local regulatory tools have much higher importance in the concrete area.
Societal	- vertical and horizontal collaboration of stakeholders - local experience incorporated in the management - clear leadership role	Clear leadership role of the National Park. Different-level collaboration between stakeholders. Local knowledge, local experience is incorporated moderately in the management plan, but not in a direct form. Local knowledge, traditional customs and management types are available in a written form (descriptions, ethnical research, novels, and scripts of scientific demands) and this is applied in management (traditional grazing forms, burning, etc.)
Economic	- economic tools are not really effective, not really applied for biodiversity	There are no effective market tools or incentives for the conservation of biodiversity in the study area. Environmental taxes and penalties mean only a very small part of supports. Negligible part of environmental subsidies is used for the protection of biodiversity. Supporting forms contributing to the conservation of biodiversity through agri-environmental supports are also available, and Natura 2000 programme sources will be available after 2009.

4. Impacts (Economic and Financial, Social and Ecological, including Biodiversity Change)

No or very few new value is realized by stakeholders from the ecosystem goods and services (bio products from ecological farming, increase of ecotourism). Indirect impacts come forward through tourism/ecotourism. New market opportunities appears particularly in tourism (ecotourism, rural tourism), the preservation of natural values, genetic sources and real local traditions concerning the utilization of natural resources. Some domestic animals have been appeared, this resulted in the increase of livestock, but no significant changes occurred. As a result of governance processes, no really significant restrictions of market opportunities occurred; important impacts on local economies cannot be seen.

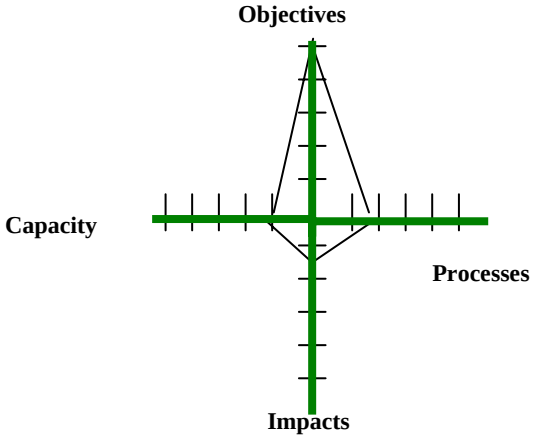
The costs of the management of natural resources for biodiversity are generally borne by the government amended with EU supports; the group getting the benefits is wider including, the government, local private sector, land owners and private citizens.
In social aspect there are positive impacts (raising awareness). Co-operation of stakeholders, the level of vertical and horizontal trust is between low and medium.
The spreading of invasive species could be rolled back in accordance with the water management interests. From services relating to supply the increase of livestock (grazing) and wood production (planned with indigenous species) will be significant. The improvement of water regulation and natural hazard regulation functions can be emphasized. Based on the above, the regulation of air quality, climate, water, etc. relates with the healthy operation of biosphere. The most significant result of interventions is the contribution to the conservation of biodiversity and the healthy functioning of biosphere.

Impact	Description
Ecological impact	Decrease of the threats by the spreading of invasive species expectedly rolled back; planned increase of livestock for grazing, wood plantations: from alien species into indigenous species; improvement of water regulation and natural hazard (flood) regulation – steps towards the healthy operation of biosphere Geographical extension: particularly in the Landscape Protection District, but causing favourable impacts along River Tisza, the floodplain area Temporal dimension: effects extended into the near future
Economic and financial impact	Few new market opportunities: eco-tourism, reed management, grazing (traditional use of the grassland). Restrictions, rules of protection: slightly transformed agricultural production Geographical extension: particularly in the Landscape Protection District, concerned neighbouring settlements and citizens Temporal dimension: analysed period and beyond
Social impact	We can talk about positive impacts, although social impacts develop only in the item of raising awareness. As citizens understood the logic, structure and processes of nature conservation, the reasons and the expected results, the importance of such measures, they realized the positive impacts on their living standards and circumstances (eco-tourism, traditions, and genetic resources), but they are still not engaged in nature protection. Geographical extension: particularly in the Landscape Protection District, concerned neighbouring settlements and citizens Temporal dimension: analysed period and beyond

5. Evaluation of Governance Effectiveness

The applied governance processes (top-down, state controlled) targeted the protection of nature, including the conservation of biodiversity. The objectives are totally in accordance with international and national legislations, programmes and plans, strictly applying rules and regulations (e.g. Natura 2000, New Vásárhelyi Plan). Human capacity would be ensured for the successful implementation. The most important problem is the lack of financial sources: although planned measures are generally implemented, the follow-up maintenance is not solved (lack of further financing).
There are several projects on the study area targeting nature protection effective on the concrete project area, but on other sites out of these implementations we cannot talk about a high level of effectiveness. So in general, the picture is mixed.
The interventions on the study area expectedly will result in the adequate native dynamics of the landscape, ensuring its natural patchiness, the presence of more and more indigenous species instead of invasive alien ones.

Visualising conclusions on most relevant factors for biodiversity conservation resulting from analysis of outcomes from case studies:



References

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5.14 Só út Area

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social)

The Só út study area is a 70 sq. km area situated in eastern Hungary. The time period analysed is 30 years and the prevalent governance type is state controlled national, state controlled corporatist and market based. Almost 60 % of the study area is protected area belonging to the Hortobágy National Park (state owned). Other areas are managed by Nature and Gene Conservation Company of Public Utility of Hortobágy and private farmers applying different management methods (traditional farming, bio farming).
Dominating habitat type of the area is arable land with almost 52 % of the area. Second most common type of habitat is grassland and steppes, and significant reconstructed wetlands (close to 1000 ha). However, woodland covers only 1.33 % of the area. There also man-made structures and infrastructure.
The main type of ecosystem service of the area is agricultural food production, i.e. crop production and livestock keeping. On grasslands and steppes the dominant type of use and ecosystem service is grazing and mowing. All the area has a purpose of the preservation of genetic sources, conservation of natural habitats and species. Main objectives of the management of the area is to gain back grasslands (loess grassland) taken for the introduction of agricultural production and create habitats similar than it used to be.
Main threat to be faced derives from agricultural production. Not only intensive farming methods on neighbouring areas endanger the conservation of habitats and species but the use of chemicals and pollution deriving from the production (land and water pollution).
There are different stakeholders in the area with different interests and measure taken cannot be suitable for everybody. It is also a problem that inhabitants do not really trust the government and the management mainly for the reason that they do not understand thoroughly the goals of the provisions, the objectives of the regulations and directives, only they experience is that they are unable to produce crops or use grassland for grazing because of flooding the area.
However, it has to be mentioned that during past decades the attitude of people significantly improved and far more better than it was 30 years ago.

2. Ecosystem Management Objectives and Decision Making

Ecosystem management of the area is carried out by the Hortobágy National Park. The Park belongs to the Ministry of Environment and Water. The National Park develops a Development Plan for the management of the ecosystem of the area. Such plan is useful and effective in terms of the territory of the National Park but 40 % of the area do not belong to the National Park and use other management methods (intensive agricultural production, bio farming). Naturally, the Development Plan meets the requirements of higher level plans, regulations and directives or conventions. The Development Plan is for 6 years and there is also a Management Plan including local actions and measures. It has to be revised in every 10 years but can be amended for environmental reasons at any time.
The dominant management regimes are Government management (National Park) and private management (farmers, private owners). Government management allows the application of ecosystem approach during the management of the area, but private management on private areas of the study area mainly economic and commercial purposes dominating (including bio farming).
Subsequently, objectives of the management of ecosystem services, habitats and species can only be defined for the territory of the National Park. Main objectives:

Conservation: (key element of the management plan) preserve natural resources, rehabilitation of damaged areas, conservation of biodiversity
Scientific: genetic preservation, research
Social: education, awareness

Economic: eco-tourism, reed management, grazing,

Here has to be mentioned that licensing for use is allowed, namely, reed management and hunting but additionally, hunting is done for environmental purposes.
Naturally, monitoring is carried out on a frequent basis and details of the monitoring report are used to be built in the management plan.
However, significant problems are encountered in the financing of the management plan and the everyday operation of the National Park because budget of the Government is enough for the administration and basic functions of the National Park but still not enough for the implementation of specific targeted programs and to support development.
The National Park substitute its budget from different sources: EU sources (LIFE), and occasional support (basing on bilateral agreement like Danish Aid, Wetland International etc.)

3. Governance Processes (Regulatory, Economic/Financial, Societal)

As mentioned before, management for the conservation of biodiversity is a responsibility of the Hortobágy National Park that belongs to the Ministry of Environment and Water. These are the 2 levels that take part in the management parallel the EU level. Occasionally, regional plans and activities may amend the plans of the National Park but not significantly.

Rank	Tool	Description
Regulatory	- regulations, directives, conventions - plans, strategies	The management of the biodiversity is mainly dominated by regulatory tools. On the study area this means the dominance of the Government, i.e. the National Park. Naturally, it complies with every international and national environmental regulation and convention.
Societal	- collaboration among stakeholders - local experience incorporated in the management - clear leadership role	The study area is clearly dominated by the leadership of the National Park. Research and ethnological resources are intensively incorporated into the management of the area. Naturally there is collaboration among stakeholders, mainly in the area of the National Park, the collaborative management is incorporated into specific projects (Life). However, co-operation could be and should be improved on other areas of the case study as well.
Economic	- economic tools are not really effective - agricultural subsidies	Economic tools are not effective and not applied for the conservation of biodiversity. However, there are agricultural payments (SAPS, Agri-environmental programs, LFA) that can be considered as market tools.

4. Impacts (Economic and Financial, Social and Ecological Including Biodiversity Change)

The study area does not include any settlements. Naturally, there are neighbouring villages and towns and citizens live dominantly on agriculture. They manage arable lands, or have some livestock or carry out reed management.
In the light of the above mentioned, the following impacts can be detected:

Impact	Description
Ecological impact	The main result and impact of the management actions is ecological. Some changes can be detected in ecosystem services and the changes were positive. Livestock increased, subsequently areas for grazing increased as well. The area of arable lands decreased and turned into grasslands (loess). The amount of water surfaces also increased creating natural close habitats

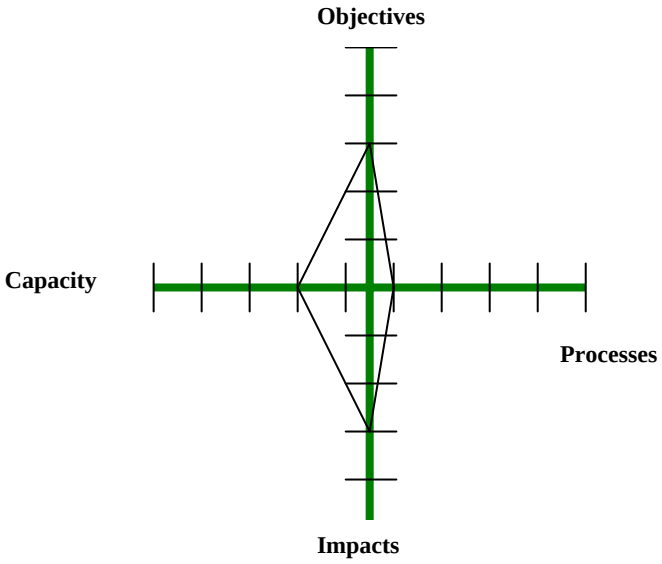
	for lots of species. However, there is a negative effect to be mentioned, namely, the homogenization of reed beds. As agricultural areas decrease, agricultural pollination was also mitigated. Parallel with the improvement of the ecosystem services, threats endangering the habitats decrease (mainly agricultural threats).
Economic and financial impact	There are new market opportunities gained as a result of the management actions: eco-tourism, reed management, grazing as traditional use of the grassland, however, parallel with positive effects some negative impacts emerged mainly because of the decrease of arable land. Such decreased agricultural potential of the landscape caused some economic problems to farmers who cannot cultivate as much land as before.
Social impact	Positive social impacts can be detected as a result of the management actions. Public awareness of the measures and the environment itself improved and people start to understand some elements of the whole system. After scepticism in the beginning of measure, attitude of citizens improves after experiencing the results.

5. Evaluation of Governance Effectiveness

Management processes are based on former rehabilitation programs, research of other elements of the Egyek-Pusztakócs marsh system and present monitoring. New landscape after the fulfilments of the program, and connected management types, brings positive changes for the local economy building on landscape resources and ensures biodiversity conservation capability of the area. In case of ecologically positive use of resources sustainability are enforced in terms of the use of the natural resources. Such positive effects can be detected both in economic and natural landscape that is ensured by harmonized use (within the protected areas).

Outside the territory of the National Park the situation is different. On those non-protected lands, the environmental objectives cannot be enforced as effectively as previously mentioned in term of the National Park, economic interests and production for commercial use is much more intensive (including bio farming).

Naturally, the results meet the requirements of the broader commitments as they are incorporated in the set of objectives and fulfil the commitments of the management plan.



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5.15 Danube Delta Biosphere Reserve

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social)

The Danube Delta Biosphere Reserve (DDBR) is situated in one of Europe's most outstanding natural regions, being a key component of the natural heritage of Romania and the world. Reconciling the balance between the economic activities and the environmental management is the challenge all stakeholders involved in the protection of this area are faced with. The total area of the DDBR is of about 5,800 km^2, including an impressive range of habitats and species which makes the Danube Delta a vital centre for biodiversity in Europe and a natural genetic bank with incalculable value for global natural heritage [Gastescu et.al., 1998]. The governance is analysed on local/ecosystem spatial level for the time period of 1989 to 2006. The ecosystems, in accordance with EUNIS Habitat types, of DDBR are: 1) Inland surface water, 2) Coastal habitats, 3) Inland salt steppes 4) Woodland, forest and other wooded land and, 5) Dry grassland riverine and fen scrubs. Main ecosystem services, according with Millennium Ecosystem Assessment [2005], are: 1) Food (Crops, Capture Fisheries, Aquaculture, Wild Plant and animal products), 2) Fresh water, 3) Water regulation, 4) Recreation and tourism, 5) Genetic Resources, 6) Water purification and waste treatment, 7) Climate regulation 8) Air quality, 9) Educational values, 10) Aesthetic values, 11) Cultural heritage values, 12) Fibre (Wood fuel), 13) Soil formation, 14) Nutrient cycling, 15) Erosion regulation, 16) Pollination, 17) Natural hazard regulation, 18) Inspiration.
The Danube Delta Biosphere Reserve comprises lands under national state control (public ownership), lands under local government control (public and state ownership), and private land distributed across seven communes and one town. The population density is very low, 4.6 inhabitants/km^2, with a high unemployment rate and a low income. The governance capacity is low to medium and the regulatory capacity for International conventions is from very low to very high. The major threats are represented by the development of the anthropic activities. The public has a moderately high awareness of the link between ecosystem services and the biodiversity conservation.

2. Ecosystem Management Objectives and Decision Making

For the use and management of the natural resources within the case study area, the following plans are available: 1) Management Plan of Danube Delta Biosphere Reserve and 2) Master Plan for Sustainable Development in Danube Delta Biosphere Reserve. The biosphere reserve status assigned 47.2% of the ecosystems to be managed using an ecosystem approach only. This percentage is represented by the strictly protected zones and the buffer zones. Specific objectives and projects are designed for these areas to fulfill their role of conservation and protection of the existing natural heritage. The economical usage zones are also directly managed for the natural resources sustainable use and biodiversity conservation. A time frame for management plan of 5 years and the main ecosystems services must be specified in order to accomplish these issues [Management objectives, 1995].
Considering the unique biological resources of the Danube Delta, the monitoring activity is accomplished in conformity with the objectives pursued by the Romanian Environment Integrated Monitoring System and provided by the DDBR Management Plan. These requirements are achieved by observing, recording and measuring the following component parts: the quality of the environmental factors, the biodiversity, the natural resources, the economic activity and the human settlements. The strength of the impact of the Sectoral Plans - Regional Planning Organization governing the use and the management of natural resources ranges from medium to high.

The overall decision making system leads to the establishment of the objectives for the conservation and protection of the biological diversity in the natural ecosystems, the development of the human settlements

and organizing the economic activities in accordance with the carrying capacities of the ecosystems. The mentioned planning system is strongly implemented in real management activities. The main decisions are taken by the DDBR Authority (DDBRA) which has the status of a regional environmental agency. The rank of its reasonability is quite high due to the participation of the Danube Delta National Institute, of other research institutes and universities, specialized companies (Romanian Waters National Administration, Romsilva), commercial companies, the Tulcea County Council and due to the local people's support.

3. Governance Processes

The economic/financial and regulatory as well as the societal processes are implemented within the management of DDBR ecosystems. The management of ecosystems is strongly steered by the regulations made by the numerous ordinances issued for protected areas. Most of these ordinances and regulations are in accordance with the European or global environment legislation and conventions. The compliance of the general public (land owners, land users, residents, visitors) with these applicable regulations is moderately high in order to obtain benefits as payment compensations. Funds as compensations are the most relevant instrument to stimulate the management measures for the conservation of biodiversity. The awareness level of these incentives among the stakeholders is also relatively high. The stakeholders successfully keep contact with each other and cooperate and therefore they hold the leadership role in local biodiversity management processes in terms of their related area. The overall leadership role is played, however, by the DDBRA which cooperates with the mentioned leaders in establishing the regulations, carrying out the actions for ecological education and public awareness, assessment of the ecological status of the natural resources, organizing scientific research, elaborating the strategy for conservation and improvement and assuring the necessary measures for the conservation and protection of the genofound and the biodiversity.

4. Impacts

Major economic/financial impacts: New economic and non-monetary values are achieved, for example, through the new values of the resources as well as the aesthetic and recreational values of the ecological reconstructed fish ponds and agricultural polders [Ecological restoration in DDBR, 1997]. The new market opportunities are achieved, as a result of the governance processes, through the participative management, ecological education, ecological tourism development, cultural heritage conservation activities, public utilities and infrastructure improvement and the wind and solar energy potential in the area. The cost for the management of natural resources for biodiversity is predominantly covered by the governmental authorities.
Major social impacts: In accordance with the shareholders opinion, the numerous difficulties with which DDBR is facing are a direct result of or are generated by the lack of cooperation and coordination among the different institutions and important "actors". The development of a clear responsibilities frame and the coordination's capacity among interested governmental authorities were also seen as major challenges. Compared with the previous analysed period, the moderate improvement of the vertical and horizontal trust is generating now a steady background for further goals in nature conservation.
Major ecological impacts: Predominantly positive changes in the delivery of ecosystem services, in the major threats and in the biodiversity status were assessed during the study period. Most of the c*hanges in the ecosystem services* resulted from the change in human demands and the technical possibilities to influence the environment. These changes are mainly positive. As a result of the human activities and their increasing life standards, the cultural heritage values decreased over the studied period. However, the situation regarding the educational values was improved. For the delivery of the ecosystem services, the c*hange in the major threats* is mainly positive, too. However, major threats still exist in the area and they are represented by the human disturbances. The *change in the state of biodiversity* is evaluated positively, as well. The monitoring data, which are now more valuable and numerous in comparison with the previous period of time, are showing a moderate increase in the populations of the former declining species and the habitat quality.

5. Evaluation of the Governance Effectiveness

The effectiveness of the governance processes in relation to the management objectives included in the sectoral plans is evaluated as being positive. The optimization of the actions/activities for biodiversity conservation is the approach developed for the sustainable development of the Social-Economical System (SES), both at local and regional level. Besides the conditions imposed by the necessity of keeping the natural balance, in the equation must be included, however, the evaluation of the activities thresholds in order to "charge" the area between several limits which are not causing the balance changes. The essence of the sustainable development in the DDBR is given by the conservation, for the present and future generations, of the biosphere reserve's patrimony which contains not only the capital produced by the people's work and the scientific state of knowledge but also the natural capital.
The governance of DDBR, state national controlled type, even has rather low initial capacity, but with implementation of significant ecosystem management objectives and stirred by evident processes of monitoring, regulation and enforcement achieved a significant positive impact for conservation of biodiversity and sustainable use of natural resource (Figure 1).

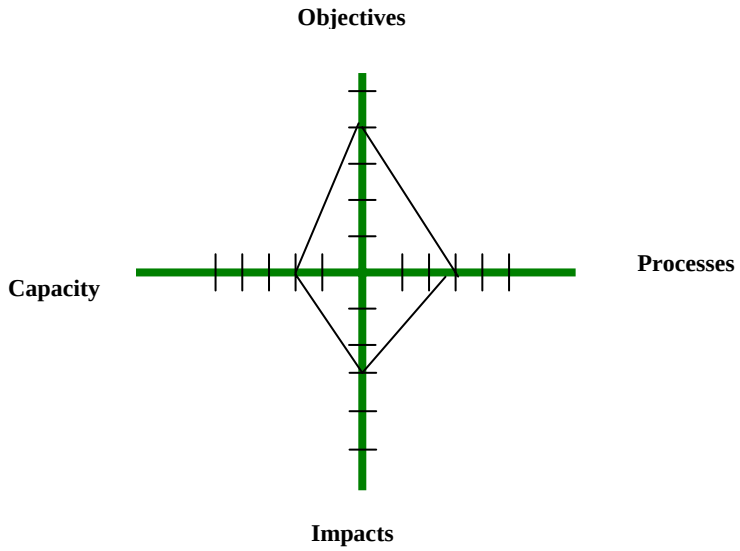

Figure 1 Conclusions on most relevant factors on biodiversity conservation

References

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5.16 Macin Mountains National Park

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social).

The Macin Mountains National Park (MMNP) is located in the South-Eastern part of Romania and it is a natural protected area of national and international interest. According to the Law no.462/2001 MMNP was included in national parks category, in accordance with the 2nd category of protection of IUCN The total surface of the National Park is about 11,321 ha. This National Park is a relatively new one on the map of the protected areas in Romania. It is a special protection regime area, dedicated to the biodiversity conservation. The territory of the Macin Mountains National Park is under public ownership, containing no human settlements; 6 villages surround the park amounting 36,539 inhabitants (43.61 people/sqkm). Its zonation includes two types of areas: strictly protected areas and buffer areas. 5 groups of ecosystems according to the EUNIS Habitat classification can be found, being represented by: temperate and mediterranean-montane scrub, temperate shrub heathland, mixed deciduous and coniferous woodland, screes, inland cliffs and rock pavements. The forest represents 97% of national park's surface.

The main threats for the Macin Mountains National Park are: grazing, fires, forest clear, harvesting of medicinal herbs and linden tree floors, poaching, mass tourism, granite quarries from the neighbourhood area. The governance capacities at national level for v*oice and accountability, government effectiveness, regulatory quality, rule of Law and control of corruption* are between 50-60%, according the World Bank database for Governance indicators for 1996-2005 period.

The regulatory policy is moderately influenced by European and international conventions and legislation. The key environmental legislation is in place with a moderate level of conformity. The social capacity is characterized by a medium level of trust between stakeholders and an increasing public awareness of the services gained from the biodiversity conservation.

2. Ecosystem Management Objectives and Decision Making

In the Macin Mountains National Park all the economic activities are forbidden, with only one exception: ecotourism, which is carried on by tourism agencies just in buffer areas, on strictly terrestrial routes. Traditional activities (pasturing, beekeeping, gathering of medicinal plants and mushrooms, etc.) are also allowed in buffer areas. The disuse of the local knowledge in protecting the natural areas and the fact that the local population has absolutely no benefit from the park's management, not even from the tourism activity, is still certitude.

From the ownership point of view, the Macin Mountains National Park is 100% public (state-owned), being managed by the Macin Mountains National Park's Administration. The Administration is ruled through a Scientific Council whose role is to supervise all decisions referring to the Macin Mountains National Park. At the same time, the park's different natural resources are administrated (but not owned) by different governmental institutions. This means that from the management point of view, there is only one institution that takes decisions concerning the Macin Mountains National Park and develops them.

The management and governance of the Macin Mountains National Park is oriented to biodiversity conservation. The ecosystems are managed by the Macin Mountains National Park's Administration using an ecosystem approach, but at another level (The Ministry of Environment and Sustainable Development, Romsilva) it is used as an approach based on an ecosystem's resource. Monitoring of natural resources is not carried out, even if its pointed out in the Management Plan. At the present a project of monitoring and evaluation of the fauna and flora of the Macin Mountains National Park is developed; it will be conducted by the Park's Administration in collaboration with Romanian Universities.

The Management Plan of the MMNP for using natural resources is in place for a 5 years period containing the following objectives:
• Increasing or maintaining the actual level of animal and plant population of the MMNP and maintaining the habitats in strictly protected areas in their natural state or closer to this; furthermore the limitation of anthropic impact;
• Maintaining and conserving of geological characteristics;
• Regulating, monitoring and activity control of using the resources of the park so that the traditional activity could be developed properly.
• Encouraging the local communities to develop economic activities outside the limits of the MMNP, which should bring them benefits and contribute to the decrease of the pressure on the resources of the Park;
• Promoting ecotourism activities which should bring earnings without affecting the MMNP;
• Educate the public and the stakeholders for understanding the importance of the nature conservation and to support the MMNP Administration objectives.
The state supports the MMNP Administration and implicitly the implementation of the Management Plan with some additional international project grants.

3. Governance Processes (Regulatory, Economic/Financial, Societal)

There are three institutional levels involved in the regulation of the biodiversity conservation: the MMNP Administration, The Ministry of Environment and Sustainable Development and Romsilva. The environmental legislation for biodiversity conservation is implemented from a medium to a high rate for both, national regulations and European and international conventions. The institutional interaction during the implementation of the regulations is perceived as positive and the awareness among the stakeholders is quite moderate.
The economical and financial processes include market tools as: 1) EU Compensations, 2) Ecological labels, 3) Prices, 4) Taxes and fees, with a perception of a moderate influence on the conservation of the biodiversity and on the awareness between stakeholders.
The societal governance processes include different stakeholders (MMNP Administration, Romsilva, The National Agency of Natural Protected Areas and Biodiversity Conservation, The City Hall of the surrounding villages, Local Environmental Protection Agencies, Romanian Academy), in general with a low collaboration, except for the project funding applications. The local experience is just sparely utilized in the management planning procedure except for the tourism sector. The informal network of the key persons representing the institutions and the stakeholders across the organization level is represented by the Scientific Council of the MMNP and the Consultative Council of the Nearby Local Communities' Representatives of the MMNP. The management processes are under the clear leadership of the MMNP Administration.

4. Impacts (Economic and Financial, Social and Ecological, including Biodiversity Change)

Generally it is considered that the new management has determined a rather high monetary value loss for the stakeholders by closing the mine quarries, forest exploitation or hunting. However, new monetary and non-monetary values of the ecosystems goods and services exploited by the new market opportunities have been achieved as a result of the biodiversity governance by tourism and ecological education, traditional activities, harmless for nature activities like beekeeping, gathering of medicinal plants and mushrooms. The cost of the natural resources management for biodiversity conservation is supported by the state and private sectors as tourism. The local people are the beneficiaries.
The governance processes positively affected the vertical trust by increasing the leadership of the MMNP Administration and the compliance of the other stakeholders with positive effects on the biodiversity conservation. There are no clear perceptions of changing in horizontal trust and influence for nature conservation.
It was not clear if the new governance generated changes in the ecological status because of the short period of functioning as a park and the one-time biodiversity inventory. It is clear, however, that the degradation of the landscape was stopped by closing the quarries and hunting prohibition. An increase of the

biodiversity conservation of the area is expected through maintaining or increasing the actual populations of the wild flora and fauna while practicing a green tourism.

5. Evaluation of Governance Effectiveness

The improvement of the nature conservation within the Macin Mountains National Park is the direct effect of the governance and management of the Park's Administration, due to the fact that this is the single institution assigned to administrate this area. The different actions and measures implemented over the last years are showing a progress in the sustainable management of the special protection areas. However, the viability of the forest management practices in the natural protected areas like the Macin Mountains National Park - based on a multifunctional approach which is simultaneously serving the economic, social and environmental objectives –is increasingly being challenged in the context of a competitive, open and global market. Reflecting the changes in society, there is a growing public interest in the management of the protected forests for their environmental and social benefits. This, in many cases, requires changes in the management practices that may reduce the long-term economic benefits of forestry. From this point of view, the Macin Mountains National Park could be an example of how a natural area may offer economic benefits (tourism) through biodiversity conservation (Fig. 1).

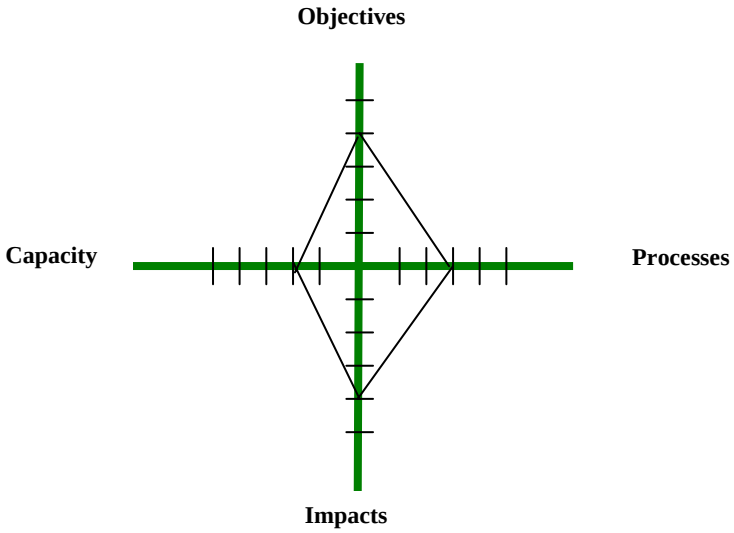

Figure 1. Visualising conclusions on most relevant factors for biodiversity conservation resulting from analysis of outcomes from case studies

References

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5.17 Case studies from Saxony (Germany): "Moritzburg forest and pond area" and "Moritzburg hilly landscape"

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The two Saxonian study areas are situated only few kilometers northwest of Dresden, the capital of the German Free State of Saxony, around the well-known village of Moritzburg. One of the study areas, the "Moritzburg forest and pond area", is a famous historic cultural landscape. The second study area, the scenic "Moritzburg hilly landscape" is mainly used by agriculture (cp. Bastian 2007).

Moritzburg forest and pond area

The hunting castle Moritzburg and several other historic cultural monuments are the main focus of public attention in this study area. The surroundings are dominated by a rich-structured forest landscape, where many ponds are embedded, and where a lot of additional habitats like swamps, meadows, pastures and small fields are existing.
The size of the study area is 59 km². Thus, we analysed the local/ecosystem level. The time period we took into consideration was from 1990 to 2006. The prevalent governance types are market based (approx. 74 % of the area) and state controlled/federal (approx. 26 % of the area). The main ecosystems analysed (EUNIS habitat types) have been: 1. woodland, forest and other wooded land; 2. inland surface waters.
Along with the interesting scenery, the "Moritzburg forest and pond area" offers a very high biodiversity. From the phyto-sociological point of view the semi-natural forests, the silting zone of the ponds and the reed and willow belt around them are of high importance. Due to the rich flora and fauna (birds, reptiles and amphibians, insects) the ponds have to be especially emphasized. The study area deserves special attention as a breeding, resting, feeding and migrating area for numerous bird species (esp. waterfowl).
The vicinity of Saxony's capital Dresden and the high importance of the castle and the surrounding forest and pond area for tourists result in a strong recreational pressure, associated with land use interactions between forestry, fishery, and the requirements of nature conservation.
The most important initial conditions and available resources, which are influencing the results of governance in terms of biodiversity conservation for this case study are:
External drivers, especially economic ones, are dominating the management of natural resources. The economic interests also cause the major threats on biodiversity, such as wood plantations and infrastructure development. Regarding financial mechanisms, funds as subsidies or financial incentives are the only state instruments for the stimulation of nature-related management measures. Most of these funds are co-financed by the EU. Formal regulations for biodiversity conservation are not very powerful. Mechanisms to support collaborative management are not available. A management based on communication and cooperation between the relevant stakeholders doesn't take place.
Because of the notably valuable habitats and species almost the whole area is covered by different categories of nature conservation. Thus, these areas should be protected against conflictive land uses, but usually an adequate management of the sites according to the defined management objectives is not enforced. Land users who are suffering from obstacles while managing protected areas are paid for special measures to balance economic losses. The Saxon Nature Conservation Act also regulates other concerns of nature conservation as landscape planning and impact regulation.
Regarding the ecosystem management objectives and decision making, we have to highlight the huge number of partially overlapping sectoral plans governing the use and management of natural resources. Unfortunately, the contribution of most of these nature- or biodiversity-related plans to meet the challenges of biodiversity conservation in reality is poor. The management of the main part of the area (all private forests and the ponds) is predominantly influenced by individual, mostly economic decisions of the land owners or the persons who are responsible of management (leaseholders) according to the legal framework and available subsidies.

The most important sectoral plan is the forest management planning (time frame: 10 years; main ecosystem service: fibre/timber, wood fuel). It is just concerning the forests owned by the Free State of Saxony and contains mainly economic as well as some social and ecological objectives.
A monitoring of water birds is carried out by two local NGOs, but until now the results have not been interpreted and considered in further management activities.
The decision making system leading to the selection of objectives for ecosystem management is very indifferent. Generally, all sectoral plans focusing on biodiversity except the forest management plan are developed by the state to counter the economically based individual decisions that mainly cause the loss of biodiversity. Some plans are oriented strongly towards the ecological dimension (contracts about the management of natural resources, ordinances, and management and development plans for the protected areas, etc.), others are looking for a well balanced trade-off between the economic, ecological and social dimension (land use planning, regional plan, etc.). The plans are developed by state agencies under voluntary involvement of local stakeholders. However, most of the plannings are weakly implemented in real management activities.
Among the governance processes related to biodiversity and ecosystem management in the area, two complexes are dominating:
1. Economic (financial) instruments (market tools and incentives): Funds as subsidies or financial incentives are the most relevant state instrument for the stimulation of nature-related management measures.
2. Legislative tools, regulations: The management of ecosystems is also driven by the regulations for protected areas according to the Saxon Nature Conservation Act and other derived regulations. Also the Saxon Forest Act and the Saxon Fishery Act and related regulations are partly relevant. Both are containing simple standards of a "good practice" but no regulations that directly support biodiversity conservation.
The impacts exerted locally by ecosystem management on the conservation of biodiversity are not very strong. Within the analysed period, they haven't essentially changed the situation in management of natural resources.
The costs for the management of natural resources for biodiversity are predominantly covered by public authorities for the benefit of private land users. This is the dominating system of biodiversity management in whole Germany, and it will be maintained also in the future.
During the studied period (which is in fact very short – just max. 6 years for the forests and 16 years for the ponds) we assessed small positive as well as negative changes in the delivery of ecosystem services, in the major threats facing the area as well as in the biodiversity status.
Most changes in the ecosystem services result from external drivers, esp. from the change in human demands. Examples are the increase in recreation and tourism in forests, the use of wild plant and animal products, and the exploitation of wood for fuel.
Increased threats result from human disturbances. But there are also positive changes as the decrease in wood plantations and water pollution.
Regarding the change in the state of biodiversity we can state partially positive as well as negative changes in habitats and species. In the case of the ponds we have to notice a very negative development of the biodiversity, which is especially demonstrated by the ongoing loss of bird species. The reasons for this development are not very clear. There can be both local and regional but also global reasons (predators, habitat detoriation, worse migration conditions).
The impacts influencing the study area are mainly caused by external drivers. A particular governance for addressing economic, social *and* ecological aspects in a well balanced importance doesn't occur in the case study.
Despite the high biotic value of the "Moritzburg forest and pond area", the extensive network of different protected sites and the huge number of sectoral plans regarding or respecting nature conservation issues, in fact the described efforts in nature/biodiversity conservation are too weak to meet the huge challenge of biodiversity loss.
The effectiveness of the governance processes in relation to the official – mostly well balanced - management objectives, named in a huge number of sectoral plans, is very low. Beside the formal planning, there are no adequate instruments for implementing their contents. Economic interests are mostly dominating the practical management decisions.
The endeavours in ecosystem management for biodiversity are small and not sustainable. They are just a "drop in the ocean". There is also a lack of monitoring data. Thus, the current state of biodiversity and all

the influences on its change are not known by the essential stakeholders. This situation also contributes to the unsatisfactory situation, and it is a handicap for an effective management.

Moritzburg hilly landscape

The study area "Moritzburg hilly landscape" is dominated by arable fields, grassland and small woods. It contains several predominantly rural settlements. The study area's geomorphological structure is characterized by a small-scaled pattern of hills, low ridges with out-jetting rocks and flat hollows.
The size of the study area is 54 km². Therefore, the spatial level analysed is local/ecosystem. We analysed the time period from 1990 to 2006. The prevalent governance type is market based. The main ecosystems analysed (EUNIS habitat types) are: 1. Regularly or recently cultivated agricultural, horticultural and domestic habitats, 2. Grassland and land dominated by herbs, mosses or lichens.
Because of the heterogeneous natural conditions there are rather complicated preconditions for farming. But a rich-structured rural landscape with an interesting scenery as well as a high frequency of various biotopes and a notably high biodiversity developed according to the local conditions.
The high diversity of habitats includes a mosaic of dry and wet biotopes, valuable grassland and semi-dry meadows, semi-natural forest islands, edge communities with many endangered plant and animal species. The area also became important for providing a large-scale habitat connection between adjoining forest areas and the Elbe river valley.
The vicinity of the big city of Dresden results in land use interferences between agriculture, settlement, recreation, and the demands of nature conservation.
The most important initial conditions and available resources, which are influencing the results of governance in terms of biodiversity conservation for this case study are as follows: The main ecosystem service is the production of food (crops or livestock). Private farmers or agriculture enterprises are managing the land for their own livelihood. Therefore, agricultural production is the main focus of management in the area. External drivers, especially economic ones, which are mainly affected by the EU-Common Agricultural Policy (CAP) (market prices, subsidies), are dominating the management of natural resources.
Due to the strong rights of land owners in terms of use and management of natural resources and the low enforcement of available regulations concerning nature conservation issues, the external drivers push back most of the state or private endeavours for a governance for biodiversity conservation.
The overriding interests of economic development have also effects on the major threats on biodiversity, such as agro-industrial farming (e.g. maize and rape for energy production, nowadays even genetically modified maize), and infrastructure development. The financial mechanisms affecting the biodiversity in this area are very similar to the "Moritzburg forest and pond area". Mechanisms to support collaborative management are not available, too.
Also the key legislation for biodiversity is the same like in the "Moritzburg forest and pond area", and several categories of protected areas are existing here. The public awareness of the services from biodiversity conservation is different depending on the social groups. The present acceptance of conservation measures stops at economic interests of landowners.
Regarding the ecosystem management objectives and decision making, a huge number of partially overlapping sectoral plans governing the use and management of natural resources we have to mention also here. Most of these nature- or biodiversity-related plans in reality don't have a significant influence on the management. The management of the area is predominantly governed by individual economic decisions of the land owners or the leaseholders according to the legal framework.
Only some of the small areas, which are influenced by contracts about the environmentally friendly management of natural resources between land users and state agencies are managed directly for biodiversity conservation (time frame: 5 years; main ecosystem service: genetic resources).
Several monitoring activities, especially on birds, are carried out. But the results do not influence the main agricultural activities so far.
Generally, all sectoral plans with a focus on biodiversity are developed by the state to counter the economically based individual decisions about management that mainly cause the loss of biodiversity. Some plans are oriented strongly towards the ecological dimension (contracts about the management of natural resources, the SAC management plan, ordinances for protected areas, etc.), others are looking for a

well balanced trade-off between the economic, ecological and social dimension (land use planning, regional plan, etc.). The plans are developed by state agencies under voluntary involvement of local stakeholders. However, despite the contracts about the management of natural resources, the plannings are weakly implemented in real management activities.
Among the governance processes related to biodiversity and ecosystem management in the area, the following factors belonging to three complexes are the most widely implemented:
1 Economic/financial instruments (market tools and incentives): Funds as subsidies or financial incentives are the most relevant instrument for the stimulation of nature-related management measures also in this area.
2. Legislative tools, regulations: The management of ecosystems is also driven by the regulations for protected areas according to the Saxon Nature Conservation Act and the Federal Soil Conservation Act and other derived regulations as well as by agricultural regulations related to CAP: Cross Compliance.
3. Social processes (Collaboration among local stakeholders; leadership role in management processes): A comprehensive cooperation in terms of biodiversity management results from the continuous work of the very active N.G.O. "Großdittmannsdorf Ornithologisits" (bottom-up approach). This organisation successfully keeps contact to and cooperates with all stakeholders involved, and therefore it holds the leadership role in local biodiversity management processes. Unfortunately, its influences on the dominant resource management activities of the farmers or agriculture enterprises is also very poor.
As in the case of the "Moritzburg forest and pond area" the effects of land management for the conservation of biodiversity are not very strong. Within the analysed period, they haven't changed the situation essentially.
The costs for the management of natural resources for biodiversity are predominantly covered by public authorities for the benefit of private land users. This is the dominating system of biodiversity management in whole Germany outside strictly protected areas such as national parks.
The participatory processes exercised by the local nature protection association mentioned above for more than 30 years have resulted in positive social effects on the area. It is mainly caused by their constant, collaborative and successful work in nature conservation issues. Since the N.G.O has established contacts to the responsible state agencies, also the level of vertical trust within the managed area has increased. This continuous growth of horizontal as well as vertical trust is generating a permanent background for further endeavours in nature conservation. The described social effects generated by this local N.G.O. distinguish the "Moritzburg hilly landscape" from other areas.
During the studied period, we assessed predominantly negative changes in the delivery of ecosystem services, in the major threats as well as in the biodiversity status. Monitoring data show losses or population declines of the most significant bird species, for which the area is especially worthy of protection. Also negative changes in biotopes can be identified.
Most changes in the ecosystem services result from the change in human demands and technical possibilities to influence the environment. Resulting from the increasing production of food, the genetic resources, aesthetic values as well as cultural heritage values decreased over the studied period of 15 years.
As for the delivery of ecosystem services, also the change in the major threats is mainly negative. We have to notice unfavourable changes in the intensity of farming, as well as in the infrastructure development and human disturbance as the main threats that are facing the area.
The impacts described above are mainly caused by the influence of external drivers on the local ecosystem management, which is dominated by conventional agricultural practices. Particular governance activities don't lead to essential successes in biodiversity conservation.
As we have already shown in the "Moritzburg forest and pond area", despite the high biotic value of the "Moritzburg hilly landscape", the extensive network of different protected sites and the number of sectoral plans regarding or respecting nature conservation issues, in fact the described efforts in nature/biodiversity conservation are too weak to meet the huge challenge of biodiversity loss.
The effectiveness of the governance processes in relation to the official – mostly well balanced - management objectives, named in the sectoral plans, is very low. Beside the formal planning, there are no adequate instruments for implementing their contents. Economic interests are mostly dominating the practical management decisions.
The endeavors in ecosystem management for biodiversity by state agencies and by farmers are small and altogether not sustainable until today. Basing on voluntary work, the leading nature protection association is not able to fill this gap.

References

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5.18 Borana-Oromo Community Conserved Landscapes, Ethiopia

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social)

The Borana conserved landscape is a low population density territory with different habitats. It hosts a rich biodiversity, including restricted-range species of birds. It is a coherent management unit used for pastoralism by a single mobile indigenous people (the Borana), but open to other pastoral groups.
The existence of an ancient and full-fledged customary (indigenous) governance of natural resources is the most effective enabling condition. Customary governance is based on the *gadaa* system of generational classes, which developed in strict association with the natural resources for pastoral livelihoods and includes a full range of customary institutions, leaders, laws and procedures in addition to a variety of cultural practices assuring regulated access to and sustainable use of natural resources. Participation, transparency and accountability are the constitutive characteristics of *gadaa* governance and of the Borana customary procedures in general. Several programs and policy documents explicitly refer to the customary institutions and to the need to 'consult', 'involve', 'integrate' them in the administrative practice, but the indigenous institutions, laws and common rights on water and other natural resources are not legally recognized by the State and development programs. Under the pressure of external threats, customary governance -- based on enforcing mechanisms that are only effective with the indigenous pastoral community and with other pastoral minorities -- is increasingly de-legitimized and unable to cope with the new challenges.
The main **external drivers** impacting the management of ecosystems in the study areas are: population growth mainly due to uncontrolled immigration, diffusion of small holding agriculture, selective logging, inappropriate development policies (not recognizing common holding and water rights and promoting agriculture), private investment (especially in private ranching, leading to individualization and privatization of common resources in general, unregulated and unequal access to grazing, and degradation of pasture and grass composition), and most of all the shrinking of the customary territory of the indigenous Borana people.
The **regulatory capacity** is favored by the ratification of the CBD in Ethiopia and by a Constitution assuring several community and environmental rights. Environmental and biodiversity policies at federal level incorporate the key CBD principles and have also recently resulted in some important Federal Proclamations. However, integration with the regional state level is highly problematic. Most Regional States have not yet approved the regional versions of the relevant proclamations. In addition, environmental policies and law are in contrast with other sectoral policies and laws, particularly those concerning land use and pastoral development, not recognizing the communal rights of the pastoralists on which the entire system of sustainable natural resources tenure is based.
The **general governance capacity** of Ethiopia is rated very low by the World Bank. Under these conditions it is very unlikely that the rights of the local and indigenous communities will be recognized or respected.
The **social capacity** has strengths and weakness. The level of vertical (institutional) trust has sharply dropped over the last few years (-2). Horizontal trust is high within indigenous communities (bonding) (+2), good across NGO and civil society organizations, with specific international programs promoting it (+1), very low between civil society and governmental agencies (-2).

2. Ecosystem Management Objectives and Decision Making

Within the case study, a distinction is made between the broad Borana Conserved Landscape, and the State forests under collaborative managed, these being a small portion of the landscape.
The broader landscape is managed according customary community-based rules governing access to underground water, rivers and ponds. There are also rules for the sustainable use of grazing areas, for the

protection of well sites, ceremonial grounds, natural monuments (crater lakes) and religious and ethical values (e.g. to protect birds and snakes, specific grass and certain trees species). The overall objective of the customary regulations (of the entire landscape) is not the direct conservation of biodiversity, but assuring sustainable environmental management of the grazing resources, and equitable access to natural resources to the different families. The customary resource management system is by definition based on an ecosystem approach, since individual pastoral families need differential access to all resources at different time/stages. Conservation of biodiversity is the indirect outcome of the cultural attention to the conservation of different and interdependent habitats. Awareness about this relation and specific attention to biodiversity has developed as an effect of this GEMCONBIO participatory action-research case study.
Collaborative management of the State Forests has been introduced by SOS Sahel with a specific attention for customary (indigenous) regulations and governance. There are specific management plans, based on a 3-5 years time plan framework, developed with the local community and accepted by the relevant regional governmental agencies. The objectives of these Management Plans are: sustainable environment and sustainable livelihoods; preserving livelihood opportunity (income generation by selling forest products, fire wood, timber for domestic construction, honey production); providing other ritual, cultural and health benefits, including, ritual and medicinal plants, ceremonial grounds. These management plans prioritizes the following ecosystem services: timber, livestock, wood fuel, spiritual and religious values.

3. Governance Processes (Regulatory, Economic/Financial, Societal)

The **regulatory process** is undermined by the scarce integration between the Federal and the Regional State level. The OPADC (Oromia Pastoral Areas Development Commission,) a governmental institution with a mandate for the pastoral areas of Oromia, is failing to produce positive outcomes since it is currently promoting pastoral policies that stands in opposition to environmental policies.
At the lower administrative levels (zonal, district, peasant association) the regulatory function of the States overlaps with the regulatory function of customary (indigenous) governance. But the customary institutions are only informally consulted and linked to the formal structure.
The awareness among indigenous people/pastoralists (rural) about the State regulations is very low (**-2),** but it has improved with the GEM-CON-BIO action-research**.**
Among governance processes, the **societal** factors are the most widely implemented in the management of ecosystems, particularly in relation to establishing collaborative management of the State forests.
All stake-holders have been involved in the process: forest management groups (local community), various governmental organizations, SoS Sahel (an Ethiopian NGO), small-holding farmers, town-based merchants.
Local knowledge has been investigated at the very beginning of the project and has informed the governance structure later designed. Good results were achieved by the effective engagement of an informal network, the "Participatory Forest Management Working Group".

4. Impacts (Economic and Financial, Social and Ecological, including Biodiversity Change)

Over the last 100 year period, encroachment of other ethnic groups, town immigration and agriculture expansion have systematically been encouraged by the imperial, socialist and post-socialists Ethiopian governments. During the last 15 years, various international NGOs have supported resettlement schemes and implemented both EU-funded and World Bank-funded projects whereby new motorized boreholes with large water output where provided in area where grazing was only seasonal. A nearly complete up-rooting of the system of water and land rights took place by which town-based merchants could raise cattle and gain access to the limited grazing resources, seriously affecting the grazing grass composition and the availability of grass for rural families. Customary leaders and customary governance in general were incapable to influence these State-induced processes.
The indigenous pastoral community has acquired a painful awareness about the impact of external drivers of change, particularly about the negative effects of policies promoting agriculture, reduction of mobility and failed recognition of collective rights over water and land, as in the current policy of privatization of land (based on market-oriented assumptions). The ecosystem services about which the indigenous community

are crucially concerned are: livestock; cultural diversity; spiritual and religious value; knowledge systems; social relations; cultural heritage values.
The collaborative management of State forests promoted over the last 8 years has produced a stronger awareness of gains in ecosystem goods and services as a result of the governance processes, in particular about: timber; wood fuel; spiritual and religious value; knowledge systems; social relations; cultural heritage values. The same process has also raised awareness about biodiversity. The elders are systematically trying to apply their existing regulations concerning selective conservation of trees, and trying to protect mammals in the entire landscape, without any type of support from external, governmental or NGO agents.
Over the long term (50 years) the impact on ecosystem services show a sharp decline in livestock and a gain in crops at the expense of spiritual and religious values and with an overall very negative effect on biodiversity. The overall impact is negative in relation to the entire landscape within a 50-year time span, but stationary in the forests under collaborative management in the last 8 years:

Main Threats	*Forests under participatory management (last 8 years)*	*Broader landscape (50 years)*
Small holding farming	0	- 2
Selective logging (in forests)	0	- 1
Invasive alien species	0	- 1
Change in native species dynamics	0	- 1

In terms of biodiversity, a sharp decline of the monitored restricted-range birds species has been recorded over the last 10-15 years, but the process of habitat change has been stopped in the forests under collaborative management.

5. Evaluation of Governance Effectiveness

During the GEMCOMBIO Third Country action-research, **customary laws, customary leaders and institutions and indigenous resource managing systems, including collective and customary rights over water sources and land**, were identified as the **elements of governance** that are **positively correlated with conservation of biodiversity**. The prevailing modernizing and globalizing development paradigms are de-legitimizing customary governance and undermining its efficacy at an increasing speed. The positive SOS Sahel initiative of introducing collaborative management in the State forests fails to take an ecosystem approach, but it proves:

- the possibility of giving value to customary governance of natural resources,
- the possibility of building upon the existing informal networks
- the possibility of achieving practical results even in the absence of specific legislation at the level of Regional State
- the effectiveness of the new governance modalities in relation to the management objectives

The implementation of the landscape approach requires important steps to be taken at all levels, to prevent the appropriation by external actors (immigrants, investors…) of the natural resources customarily used and managed by the Borana indigenous people, and to assess the implementation of development policies that may result in a breaking down of the system of internal allocation of land and water rights. At federal and national state level, *ad hoc* updating of policy and legislation needs to be promoted, with special attention to the legal recognition of customary governance, institutions and law in relation to natural resources and, specifically, of the customary and collective rights of the various communities to water, land, and other natural resources.
The regulatory capacity in the country requires particular attention. The Environmental Protection Authority (EPA) and the Institute of Biodiversity Conservation (IBC) are two important governmental organizations that have promoted the translation of principle contained in the CBD into environmental policies at federal level, providing some consideration of community and pastoral rights, tenure systems and environmental impact assessments. But there are serious gaps when transferring these principles into actual legislation and in implementing it at regional state level. The problems of conformity between environmental legislation

and other sectoral legislation are particularly serious. In the more recent political phase the legislative process seems more strongly influenced by the lobbying activities of national and international investors rather than the advocacy demands of local communities. This is particularly threatening in consideration to the very low governance rating of Ethiopia by the World Bank.

References

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5.19 Camili Biosphere Reserve, Turkey

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social)

The Camili biosphere reserve is located in the north east of Turkey, on the Georgian border, and is 25258 hectares large. Two Strict Nature Reserves were designated in the area in 1998. In 2005, the entire region was designated as a biosphere reserve. The area contains large natural old growth forests, large mammal populations such as brown bear and wolf, is an important bird migration corridor, and is the only place where the Caucasian bee race has remained pure. The main goods and services produced are agriculture (mainly hazelnuts), forestry for local use, bee keeping, ecotourism, hunting (sometimes illegal).
Camili is officially under the authority of Ministry of Environment and Forestry and the governor of Artvin and a project managed by GEF Turkey is coordinating the implementation of the biosphere reserve. However, *de facto* the forests in this remote area have been governed since time immemorial and are still governed today by a traditional system based on the customary share of forest resources among villages and households.

2. Ecosystem Management Objectives and Decision Making

A management plan of the area has been developed for 5 years (2007-2011) but has not yet been approved. The main conservation management objectives of the biosphere reserve are the old growth forests and temperate rain forests, the extensive alpine and subalpine ecosystems and aquatic communities; further several species are considered of particular importance, such as the genetically pure Caucasian honey bee race, the brown bear (*Ursus arctos*), chamois (*Rupicapra rupicapra*), and Caucasian black grouse (*Tetrao mlokosiewiczi*). Another important management objective is the preservation of local culture: Camili has for centuries supported an isolated and near self-sufficient local culture that supported over 1,000 people for centuries and has maintained its own traditions, styles, ways of life, patterns of resource allocation and use. In recent years, tourism in the area has increased and its promotion and regulation are part of the management objectives.
Monitoring of the natural resources is expected to be carried out according to the management plan. The impacts of management activities on the ecological system will be monitored.
The zoning, management and forest management plans were structured to take into consideration the traditional use of the forest. The management of the biosphere reserve aims at participatory management involving local people.

3. Governance Processes (Regulatory, Economic/Financial, Societal)

At this moment in time, two overlapping governance processes exist in the same area: the *de jure* state governance through the Nature Reserves and State Forests, and the *de facto* local governance through customary institutions. Due to the remoteness of the area, the traditional institutions have operated independently for a long time; they have even actively resisted the involvement of the national forestry agency in the area when the latter came to exploit timber in the forests.
Recently, three committees were formed through the GEF project, for bee-keeping, ecotourism and agriculture and livestock activities. When the Management Plan and the Draft Biosphere Reserves legislations are approved and become official, the area will be under a shared governance system (co-managed protected area), with a local biosphere reserve commission, consisting of representatives of local people and stakeholders.
Land ownership and use rights have traditionally been determined within the community and are not formally documented. Forest and land cadastral work has not taken place, nor has the demarcation of

grazing areas by agricultural authorities. With the exception of the core zone, the area does not have formal protected area status in Turkey, and its designation as a biosphere reserve does not automatically confer that status.

4. Impacts (Economic and Financial, Social and Ecological, including Biodiversity Change)

Resource management objective	*Are the objectives under realization?*	*Text justification*
Important ecosystems and ecological communities		
Old growth forests and temperate rain forests	Yes	There is no excess use or trade of forest products. They are in good condition.
Extensive alpine and subalpine ecosystems	Yes	Grazing is declining but livestock are still important to the subsistence of local people.
Aquatic communities	Partly	Current systems may not be able to cope with increased waste generation from tourism.
Fauna		
The genetically pure Caucasian honey bee race	Yes	The Caucasian bee remains pure within the time period of study since 2003. The local people are keen on monitoring the entrance of foreign bee races and keeping the race pure.
Brown bear (*Ursus arctos*)	No	Although brown bear is a conservation target, it is still being illegally hunted by the local people. Local people suffer economic losses to hazel nut crops and beehives every year, so human- wildlife conflict continues.
Chamois (*Rupicapra rupicapra*)	Yes	There is increased threat and it is not hunted.
Caucasian black grouse (*Tetrao mlokosiewiczi*)	Yes	There is increased threat and it is rarely hunted.
Caucasian viper (*Vipera kaznakovi*)	Yes	This specie mostly lives on the Turkish-Georgian border and it is not under threat. Culturally, it is believed that if you kill a snake, your family will have bad luck.
Caucasian salamander (*Mertensiella caucasica*)	Yes	See above.
Big spotted trout (*Salmo trutta macrostigma*)	Partly	The trout is hunted by the local people and sometimes by the tourists.
Migratory raptors	Yes	A bird watching centre has been constructed. Recently, a Bird Watching Day is being celebrated in line with the management plan.
Cultural and Socio Economic Values		
Local styles of construction and handicrafts	Yes	Local communities need development, but this should be in harmony with the landscape and culture of the area.
Organic agriculture	Partly	Very few among the local people use chemical fertilizers.
Recreational and educational values	No	Tourism is relatively scarce, but the area is becoming better known. Work is needed to predict, prepare for and minimise the impacts of tourism.

The management plan has been completed quite recently and it has not been implemented yet, so there is no data available on the changes of biodiversity in the area as a result of the new management plan. The Management Plan ensures that in the long term existing conservation continues in the area. There are no

immediate severe threats to biodiversity in the area, so the management plan tries to identify and prevent future threats. Exceptions to this are the illegal hunting of the brown bear by local people, the construction of new roads to the pastures, the enlargement of the Borcka-Camili road and the bark beetle coming from Georgia. Illegal hunting of brown bear still continues and there is no implementation of management decisions regarding the conservation of brown bear. Further, there is no evidence or monitoring regarding the increase or decrease of the hunting of brown bear since the beginning of the Biological Diversity and Natural Resources Management (GEF-II) Project.

5. Evaluation of Governance Effectiveness

The governance setting of the area is in a state of transition. The traditional *de facto* governance of the area has historically managed to conserve the forests, even enabling local residents to resist logging of the *de jure* state forests in the past. Through the establishment of the biosphere reserve, there is a chance to establish real shared governance of the area, if the traditional institutions are recognized and involved appropriately. Significant steps have been taken to establish means for improved community representation, but some concerns remain: up to now, there seems to be a certain feeling among villages and households that structures are being imposed from the outside and that benefits are not likely to be shared equitably.. Greater attention should be paid to an inclusive process when setting up the future governance structures of the biosphere reserve.

The lack of clarity concerning land ownership and the lack of formal protection of part of the area is not a direct threat at the moment, but without formalization of land tenure and rights there is a potential for future disagreements between local people and authorities and even between different authorities. More importantly this lack of clarity will make the area vulnerable to unscrupulous and opportunistic exploitation by outside interests for resource extraction, tourism development, speculative land acquisition, etc. Advocates of biodiversity conservation have all interests to formally recognize an important governance role to the local, customary institutions that protected the local biodiversity for centuries.

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5.20 Gobi Gurvan Saikhan National Park, Mongolia

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social)

Following the transformation of the country to a market economy and the disintegration of rural collectives, local institutions for NRM, in particular for pasture management, were weak. When households went back to herding, their use of pasture could not suddenly re-acquire the community coordination mechanisms that existed in the past before collectivisation.. Poverty left many households unable to move, exacerbating pressure on local grasslands. Lack of non-livestock income sources, and of the ability to add value to products and to reach markets, drove pasture degradation.

Climate change is having significant impacts on ecosystems and livelihoods in the study area. Water sources are rapidly disappearing and vegetation patterns are changing, and this has profound effects on pastoral resources and lives. Added pressure comes from a rapidly developing mining sector, whose activities are mostly unregulated and uncontrolled.

Faced with the challenges of a lack of institutions for NRM, and with severe climate events, pastoralists have revived their own community organisation to restore mobility as a tool for dry land pasture management. These organization are having far-reaching results on the management of pasture and other natural resources and biodiversity. Pastoralists' community organizations are now a driving force in local development. The actions of community organizations in conservation have resulted in their recognition by local governments and by the national park administration as partners in co-management or as main actors in NRM. Ongoing national policy development is giving community based natural resource management and conservation ever greater attention and communities responsibilities and rights.

2. Ecosystem Management Objectives and Decision Making

Primary management objectives in the study area are for a) biodiversity and ecosystem management - in the national park, b) sustainable management and protection of primary pastoral resources such as grassland, water sources and saxaul areas (camel pasture), as well as biodiversity conservation in the informal "community protected areas".

The main ecosystem services used are pastureland use (food), and the use of the national park for tourism and recreation. Secondary uses include cultural, scientific, and educational services.

Monitoring of natural resources is carried out to varying degrees and efficiency. Local governments are mandated to monitor pastureland resources, while the park administration is mandated with "monitoring and control" inside the park. Community organizations maintain their own monitoring system based on economic, social and environmental indicators. Effective, integrated monitoring of natural resources and analysis by government staff to inform management decisions, is not in place.

Decision making processes for management objectives are varied as well. Formally, all decisions are taken with public consultation, but the practice of consultation and participation varies. The initial establishment of the National Park was driven by the research and conservation community, both Mongolian and International. Consultations were held with local communities, however this was far from active or functional participation. As a result, initially hostilities between the park administration (and a donor-supported project) and local communities were present. When a dialogue was established and the approach of the park administration changed, it became apparent that the objectives of communities and park administration were in fact largely the same and that local communities were becoming the primary actors in the project and stewards in conservation.

Decision making in the areas and sites managed by communities is in many cases a bottom-up process, whereby communities develop plans, which are later incorporated in district plans. In the Buffer Zone surrounding the park, buffer zone councils are bodies for collaborative management. They are made up of

representatives of citizens, local government, the park administration and local business, and they are mandated with developing a buffer zone plan for their district.

3. Governance Processes (Regulatory, Economic/Financial, Societal)

The following list ranks processes and factors that promoted outcomes in ecosystem management, and that are being recognised now as important elements to achieve objectives in ecosystem management:

1. Social organization and collective action of the primary resource users (pastoralists)
2. Restoring traditional pastoral practice and management processes based on mobility
3. Participatory processes and stakeholder involvement (collaboration among park staff, local government and communities)
4. Developing community norms – e.g., on using fuel efficient stoves, adhering to community grazing schedule, seasonal schedule, protecting bushes, etc.
5. Having a Community Organizer at district level, supporting and linking community organizations
6. Communication – radio communication system used by park administration and community organizations
7. Collective action/collaboration among herder households to improve income through adding value to livestock products and diversifying income sources to alleviate grazing pressure
8. Local technologies (locally developed fuel efficient stove, support to fuel efficient technologies)
9. Building environmental awareness (schools, students clubs, general public, community organizations)
10. Green taxes (exemption from fuel wood tax for communities using fuel efficient stoves)
11. Recognition of community organizations, and extension of certain use rights over resources
12. Financial mechanisms - Community Funds, to finance community initiatives in conservation, mutual support, pastoral risk management, micro-credits to households
13. Capacity development for all local institutions (park, local government, community organizations)
14. Support in product development and linking to markets
15. Financial mechanisms – bufferzone funds
16. Experience sharing, primarily among community organizations
17. Empowerment of pastoralist community organizations, through linkages to pastoralists globally
18. Developing enabling legal framework for community based organisations and their role in NRM

4. Impacts (Economic and Financial, Social and Ecological, including Biodiversity Change)

Impacts	Temporal	Spatial
Rotational grazing increased, i.e. pasture management improved	Over the last 6 years, and extending into future	In all community managed areas, through community led learning/ experience sharing beyond study area
Increase numbers of livestock	2002 – 2005	In community managed areas, and beyond, as pastoralists undertake migrations with their livestock
Increase of income of pastoralists	2002 – 2005, will extend into future (trend may reverse if natural disasters occur)	Limited to study area, except where through inter-community learning the approach is multiplied, and also, where good weather conditions have promoted livestock number increase
Recreation and tourism income increase for community groups	Will extend into future	Will extend beyond study area as experience sharing progresses
Improved protection of water sources, mitigation of Climate Change impacts.	Extension/future trend will depend on severity of climate change	Potential extension beyond study area.
Financial mechanisms for conservation established	Will extend into future	Limited to study area

Improved governance and service delivery	Will extend into future	Limited to study area
Improved environmental awareness among all stakeholders	extends into future	Impacts beyond study area
Improved access to information and education for pastoralists	Extends into future	Limited to study area
Revival of traditional governance/ management system and knowledge	Extending into future	Study area, and related migration areas (seasonal pastures, reserve pastures, long-distance pasture areas)
Revival of community organizations, and empowerment of pastoralists	Extending into future	Beyond study area, as community organizing is becoming a wide-spread phenomenon throughout the country
Improved monitoring and protection of wildlife	Extending into future	Study area
Improvement of local livestock breeds/domestic animal genetic resources conservation	Extending into future	Study area and beyond/neighbouring areas in the same districts
Land degradation/desertification slowed/controlled	Depending on climate change	Spatial: study area

5. Evaluation of Governance Effectiveness

The governance system of natural resources in our case study area is evolving: community based, customary governance is taking on a more prominent role in the face of lack of effectiveness and capacity to protect resources by the formal government based governance system (due to inconsistencies among the legal and institutional framework, the large territories, and the evolving economic and political system).
There is a clear link between changes in biodiversity and the evolving (at this point informal/de facto) governance, the most important ones being the following:

- Improvement of pasture management, and arrest of pasture degradation. In this ecosystem and management system it is not possible to measure a "direct" connection between governance and state of resource, as rainfall is the most important, totally independent variable regulating the status of rangelands. The best indicator we can use over several years is the health of livestock and well-being of pastoralists. Protection of pasture resources in Mongolia is at the same time a significant contribution to biodiversity protection, as there are more than 2000 species of pasture/forage plants.
- Protection of endemic plant species and medicinal plants. Community management/involvement is helping to protect areas in the park where endemic plant conservation is a primary objective.
- Protection of wildlife, including snow leopard, ibex and argali (wild sheep). Community management and collaboration is improving monitoring and reducing poaching.
- Conservation of domestic biodiversity/local breeds. Though improved collaboration among community organizations, and improved well-being through collective action, herders can afford to undertake activities in livestock breed improvement.

Previous and ongoing trends in land degradation have been driven by both climate change and previously, weak governance (local government institutions, legal framework, weak implementation of National Action Plan to Combat Desertification); in the study area, the influence of the new governance setting is positive, but climate change impacts may outweigh it. (Noticeably, in other areas in the country, improvements in pasture management through community organizations have been annihilated by massive in-migration of pastoralists from areas stricken by drought and desertification. Climate change is likely to be a factor that will have significant and possibly catastrophic impact regardless of the type of governance).
The effectiveness of the governance setting that has emerged in the study area has been crucial to contribute towards the management objectives of the national park. An indicator is that efforts are ongoing to translate the role of communities in park management (and conservation in general) into national legislation. With regard to sustainability of related ecosystem management for biodiversity conservation, governance settings like the one evolving in the study area will be of outmost importance. The reasons are a) the very large

territories of Mongolia cannot be managed by government institutions alone, b) the production system and ecosystem (mobile pastoralism, an dry lands) is based on traditional knowledge, and on the inter-linked well-being of pastoral resources (pasture and water), biodiversity, livestock and people.

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5.21 Shahsevan Rangelands, Iran

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social)

The governance setting of the Shahsevan rangelands is mixed and in a state of flux, with important interplay of *de jure* and *de facto* conditions**.** The territory comprises land that has been managed for centuries as Indigenous Territories (Community Conserved Areas) for sustainable livelihoods and for protection of essential habitats for livestock and wildlife. In 1963, these territories were usurped by the Government of the Shah under the pretext of "nationalising" the country's natural resources. At the moment they are government-managed lands and include some lands under special protected status, but the influence of many pressure groups (e.g. agriculturalist and industry) is mounting. Importantly, however, after decades of assaults in the name of "development", the indigenous pastoral communities are re-organising to assert their rights over their ancestral territories and their capacity to manage them as Community Conserved Areas. In parallel, the government is re-evaluating the role of mobile pastoralist communities as effective rangeland managers.

In the Shahsevan territory, several inter-related factors have combined to determine the current governance system for the management of natural resources and the conservation of biodiversity:

- the natural wealth of the land, harbouring an important potential for sustainable livelihoods (e.g. rangeland resources, water, wildlife);
- the existence of customary governance institutions of the nomadic pastoralists, possessing unique knowledge and skills for the sustainable management of the territory and its biodiversity as part of pastoral livelihood systems;
- the existence of strong "modern" interests, forces and development models coveting the same resources utilized by the pastoralists (in particular land and water) in ways that are antithetical to the conservation of biodiversity and likely unsustainable from several points of view
- the laws and government policies and regulations that for several decades have supported the "modern" interests and are now realizing the need to turn the tide and promote sustainable livelihoods (such as nomadic and transhumant pastoralism) friendly towards the conservation of biodiversity

As shown in our case study, for centuries the customary governance institutions of the Shahsevan mobile pastoralists have proven effective in sustaining a rich livelihood and ensuring the conservation of biodiversity and the sustainable use of natural resources. The Sahshevan management systems rested on **mobility**— meaning seasonal use of rangeland resources— which is the primary and most important linkage between human knowledge and the sustainable use of natural resource, as well as on a variety of social mechanisms such as *qorukh, yurd, kham*, ancient rangeland revival methods, and spiritual beliefs that emphasize hard work, frugality, moderation and harmonious relations with nature. The Shahsevan natural resource management system and nomadic way of life have been critical to the preservation of the territory's wealth and local livelihood. But that very wealth has increasingly attracted numerous interests and powers, which took advantage of the government policy for "development purposes" that for a few decades, starting from the misinformed policies of the Palhevi dynasty, have squarely opposed the mobile way of life. These policies are rooted in the forced sedentarisation of many mobile communities through land reform initiatives, individualisation of property regimes, nationalisation of rangelands, forests and water resources— the so-called "White Revolution" of the early 1960s and military and cultural interventions.

2. Ecosystem Management Objectives and Decision Making

In the Shahsevan territory, there are two main ecosystem governance systems, each with its own management objectives and decision-making structures.

The first is based upon the customary institutions of the mobile pastoral communities, and aims at conserving the rangelands and various species within it (e.g., plants valuable for food, industrial and medicinal purposes) to support nomadic livelihood, spiritual values, sense of place, culture and traditions. This is a *de facto* system based on customary laws and indigenous knowledge and skills for the sustainable use of natural resources.
The second comprises the government institutions and the various modern actors that interplay with government through permits, concessions and development initiatives. This governance institution mostly follows "development" objectives and is increasingly integrated with market activities. The conservation of biodiversity is restricted in protected patches of land. A major element of this strategic approach is the sedentarisation of the nomadic tribes. This is a relatively new governance system, but it is supported by the law (*de jure*).
Recently (in 2006 and 2007) a shift in policy has been slowly taking place to promote more participatory approaches to conservation efforts and to include more voices from the grassroots. As part of this, the value of mobile pastoral lifestyle is being re-assessed for both development and conservation purposes.

3. Governance Processes (Regulatory, Economic/Financial, Societal)

The two governance systems mentioned above too often operate at cross purposes in the Shahsevan territory. The customary governance institutions of the Shasevan mobile pastoralists, in particular, have had to face strong negative pressure from many factors, including dispossession, fines, rangeland destruction, and the loss of their traditional migration routes. The government regulations are implemented by the Department of the Environment (DOE), the Ministry of Agriculture and Rural Development (MOJA), and the Forest, Rangeland, and Watershed Management Organisation (FRWO) and their local offices.

4. Impacts (Economic and Financial, Social and Ecological, including Biodiversity Change)

For the purpose of this case-study we consider the socio-cultural and ecological changes that took place as a consequence of the imposed changes in the customary management system of the Shahsevan institutions. Such changes are not felt as "separate dimensions" by transhumant pastoralists. From the socio-cultural perspective, a way of life that promotes living "within" the environment and as one with nature (rather than living "on top of" the environment and in constant combat with nature) is being lost. Inherent to this change is also a loss of biodiversity and ecosystem wealth.
From a quantitative perspective, the area utilised by mobile pastoralists has been greatly reduced. It is estimated in 2007 as 2,200 km^2 while prior to 1963 it was estimated to be about twice as much. The number of Shahsevan pastoralists who continue their mobile lifestyle has however not changed much, and is around 73,000 nomads in 2007. In fact, all over the country, the number of nomadic people has remained dynamically stable, ranging between one and two million, depending on the condition of rangelands, rainfalls, etc. The excess population of nomads, beyond their own estimates of carrying capacity of the land, has always migrated out into rural and urban areas. However, a number of factors have changed, including:

- many nomadic pastoralists have now a variety of sources of livelihoods, including seasonal urban work, some crop agriculture, etc.;
- many of the nomadic pastoralists have now access to hand feeding with animal feed supplements such as barley and hay, which they purchase from outside the region;
- the primary purpose of livestock raising has shifted from largely subsistence to include market orientation;
- the rangelands are not managed in strict rules based on indigenous knowledge, since the government imposes much external— usually "bad science-based"— rules;
- some nomadic pastoralists move their animals between their wintering and summering grounds by lorries.

Changing patterns such as above have meant that the relationship between the rangelands and livestock has become subject to extremely complex and sometimes little understood phenomena.

5. Evaluation of Governance Effectiveness

Simply put, the negative ecological and socio-cultural impacts described in our case study are the results of major changes in ecosystem management practices that, in turn, are most directly imputable to changed systems of governance. The best results for ecological and socio-cultural harmony in the Shahsevan territory would be obtained by continuing the traditional customary governance practices of mobile pastoralists with the addition of new capacities, interests and concerns in judicious and respectful ways. Our crucial conclusion is thus the sad acknowledgement that a major change in governance has proven detrimental to environment and people. There are, however, important signs of hope.

The government officials with the *de jure* capacity of governing natural resources are developing a new awareness of governance issues and the value of traditional lifestyles in the Shahsevan territory as well as in other rangeland areas of Iran. In large part, this is owing to an increasing realisation that technocratic policies, projects and prescriptions have failed to meet their declared objectives and that technocrats are not able to manage the land. At the same time the influence of civil society and international conventions and trends that emphasise the value of indigenous knowledge and community rights is beginning to have its impact on policy thinking. In parallel, the traditional institutions of the mobile pastoralists are being strengthened through participatory and deliberative action research practices and active support to their customary organisation (some projects supported by CENESTA/ CEESP are active in that sense and the GEMCONBIO participatory action research initiative has acted in the same direction). In many ways, the pastoral communities are also rekindling their relationship with the land through their own recognition of their willingness and need to conserve its biodiversity. They are asking the government to assign their territories to them to govern as Community Conserved Areas, following the recent recommendations of the CBD Programme of Work on Protected Areas (2004). These two developments, combined, have enormous potential to give rise to new, more collaborative forms of community engagement in the conservation of biodiversity and "shared governance" of the landscape. This would indeed take advantage of the best that traditional and modern governance institutions have to offer.

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5.22 Sylvo-Pastoral Community Conserved Areas, Zinder Region, Niger

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social)

Governance context of the country:

- Political stability within the country means that informed debate and objective decisions are allowed and receive government attention;
- Democracy and democratic systems of representation allow for popular expression, even if this 'expression' could be further developed through increased information.

A favourable legislative and policy environment

- Natural resource management is viewed as a multi-sectoral issue with a corresponding need for multi-sectoral approaches to legislative reform;
- Participatory processes are starting to be tested in elaborating texts/policies;
- Dispositions are available within the texts for responsible/collective management of common resources;
- There exist institutional as well as legislative dispositions that can secure the vocation of natural resources, particularly common property resources (Land Tenure Commissions of the Rural Code) altough options for arriving at equitable governance systems are less clear;
- Decentralisation and the process of transferring management rights and responsibilities to the regions and communes create a 'responsibilising' social environment and provide forums for multi-stakeholder consultation and dialogue intra and inter levels;
- Civil Society is increasingly taken into account in texts and policy strategies and there is increasing understanding about social mobilisation (even if experience is still relatively scarce).

Perceptions of natural resource governance/management/conservation

- The importance of the resources for the communities in terms of their contribution to primary production systems/livelihoods, nutrition and economic buffers is clear;
- The experience of the effects of the loss of similar areas and the degradation of remaining resources is already painfully known to the stakeholders (pressure and growing conflict)
- Stakeholders are conscious of the problem, motivated and ready to seize the opportunity to do something about it including the necessity of revising the governance system.
- State has no other "option" than delegating more responsibility to local communities.

Defining the new governance setting

- Stakeholder agreement about the main management objective (common interest/concern)
- Judicious merging of traditional aspects into new governance institutions and practices;
- Recognition that multiple stakeholder collaboration is necessary;
- Appropriate facilitation approach (time, process, equitable inclusion, real participation);
- People setting their own management agenda according to their own objectives local specificities and potential opportunities;
- People are not excluded from using the resource just because they are to be "conserved".

2. Ecosystem Management Objectives and Decision Making

Main management objectives	Ranking	Quality
Promotion of social peace / reduction of conflicts	1	Social
Preservation sylvo-pastoral vocation of the space /existence	2	Conservation
Preservation of the resources 'integrity' (avoid cutting up)	3	Conservation
Promotion of social communication/improved soc relations	4	Social

Rational natural resource exploitation for max pot. Benefit	5	Econ
Assured access by all the stakeholders	6	Soc/econ
Satisfaction of diverse stakeholder needs	7	Soc/econ
Restoration of the resource for improved productivity	8	Econ
Improved conditions for local development/investment	9	Soc
Identification/development of new products and services	10	Econ

The management objectives assigned by the stakeholders at each of the 5 sites are not directly related to bio-diversity conservation. Not surprisingly, given the poverty of the communities concerned, it was social objectives that were most highly rated. This is a reflection of the building tension in the area concerning access to common property sylvo-pastoral resources and the fact that in the memorable past there was much greater complementary/reciprocal relations between the two systems. Stakeholders seem to feel quite strongly that if their social and economic objectives are achieved, biodiversity will be conserved.

Time plan: The management documents at each site regard management as a dynamic process evolving over time, with a strong accent on the need to be flexible and adapt to highly variable circumstances, but not constrained to a specific period. The complementary Action Plans are developed on an annual basis according to the local circumstances and the means available.

Main ecosystem services used: Pasture (grazing and browsing) ***and*** wood (fuel and service)

Monitoring: Mostly local guards employed by communities/user groups, associations; the Forest Department is in a support/control role; all others reports and control through Annual General Assemblies.

Decision-making system: The objectives were defined collectively by the stakeholders themselves after analysing the situation, the resource; the tendencies, their different needs and preoccupations. Major decisions concerning the management orientation, vision, principles rules and regulations and activities are made by the Annual General Assembly of the Association and partners and applied by the executive committee. All decisions are therefore made locally with participation of higher authorities for information and advice at particular occasions but according to the local management document.

3. Governance Processes (Regulatory, Economic/Financial, Societal)

The Case Study sites are examples of social governance processes towards **collaborative governance institutions uniting several communities of users and carers** of the same resources**.**

The factors and tools identified as playing particularly important roles in the governance process and its success at the 5 sites are listed below, ranked in order of importance.

Process	***Inclusion/ Participation***	***Social Communication***	***Collaborative Forums***
Open, dynamic and evolving at the rhythm of the stakeholders; Multi- faceted (organisation management structure, technical management, communication) Recognizing the value of and building up confidence in local knowledge, skills, capacities; Group dynamics and giving actors the chance to build their own system with own surveillance guards Facilitated not piloted	Equitable inclusion of all actors; Self selection; Engagement; Inclusion by persuasion; Persuasion by inclusion of actors who are initially unsure; Confidence building; Learning how to participate and negotiate	Understanding that one needs the others to advance; Construction and maintenance of good relations/ collective spirit; Respect/Talking and Listening Common vision of problem and how to proceed together Networking	Neutral multi-stakeholder collaborative forums; Clear purpose and function; Defining and agreeing principles and rules of conduct; governance structures; management system; conflict management processes. Accepting the rights and preoccupations of others

4. Impacts (Economic and Financial, Social and Ecological, including Biodiversity Change)

Impact	Rank	Temporal	Geographical
Reduced conflict/ Greater social harmony	+2	Within analysed period and beyond	Expanding effects elsewhere. Conflict resolution and negotiation techniques of stakeholders.
Improved social dynamics and confidence	+2	Within analysed period and beyond	Expanding effects already seen in neighbouring areas
CP Sylvo-pastoral resources under threat are now secure in their vocation and biodiversity;	+2	Within analysed period and beyond	Expanding effects; Technical services and land tenure commission using experience elsewhere.
Wood fuel availability	0	Within analysed period and beyond	Study area for the moment
Ecological restoration	-1	Takes time but already some indicators at Takieta	Study area for the moment
Inclusive collective management decision-making has been shown to work;	+2	Within analysed period	Expanding effects. Others watching and trying.
Security of Access for all stakeholders;	+2	Within analysed period and beyond	Likely to become the norm.
Improved resources meaning improved production systems and livelihoods	0	Within analysed period and beyond	Expanding effects elsewhere with introduction of local management
Investment in development of resource base	+2	Within analysed period and beyond	In the study area
Investment in Social development	+1	Within analysed period and beyond	In the study area

5. Evaluation of Governance Effectiveness

The table below summarises whether the impacts noted in the previous section are directly or indirectly attributable to better ecosystems management because of the new governance system; the effectiveness of governance in relation to management objectives during the period analysed and its sustainability; the sustainability of the governance system

Impact	**Direct**	**Indirect**	**Effectiveness**	**Sustainability**
Reduced conflict	☑		3	3
Improved social dynamics	☑		3	3
Resources Secured	☑		3	3
Wood available	☑		2 Need time	3
Ecology restored	☑		2 Need time	3
Inclusive management	☑		3	3
Secure access	☑		3	3
Improved livelihoods		☑	2 Need time	3
Investment resource	☑		3	3
Investment Social	☑		2 Need time	3

(Scale: 0 Not at all; 1 Low; 2 Medium; 3 High)

The effectiveness of the governance has been rated very highly in related to the management objectives originally set out but the different associations in charge of managing natural resources in the 5 sites of this study area. The stakeholders identified conflict as a major problem and though the search for social harmony was cited as an

objective, no-one foresaw just how powerful the process would be in bringing stakeholders together to understand each other and negotiate the future. The process took some time to evolve at each site depending n the degree of confidence already existing between stakeholders. In addition, sometimes relations had to get worse in order to get better. All in all and for several reasons the time invested in bringing people together and giving them the 'luxury' of time to really discuss in an informed way has proven its validity . The associations are up against a huge challenge, the context if favourable but the stakes are high and the risks of failure are many. Yet, people said that because of their common process, things can never be as before: relations have changed and the example rests for others to judge for themselves and follow.

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5.23 Parapeti River Basin, Bolivia

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social)

The Parapeti River Basin covers 61,000 square kilometers in Bolivia. In many ways, it is a unique river. The Parapeti runs down from the semi-humid forests of the Andean foothills into the dry Chaco forests in the flatlands of Isoso, where it spreads into the seasonal wetlands of Kaa Iya National Park, the largest tract of dry forest remaining in the world. In the Lower basin in Isoso, vast dunes and blowing sand fill the river channel six months of the year (May to October). In the other six months (November to April), the waters flow above ground and below ground through deep sands of Isoso until reaching the deep rock of the Guiana Shield, where the Parapeti re-forms aboveground as a small seasonal stream that runs northward from the wetlands to the Concepción Lake. Nontimber forest products (honey of various types, wild carob, artesanry, etc.). Environmental services include basis for agriculture, nontimber forest products, free-range cattle ranching, fishing, hunting, forest products, underground aquifer renewal and habitat for diverse wildlife and birds.

The Parapeti Basin is home to some 100,000 people, over half of whom are indigenous and majority of whom live in extreme poverty as measured by basic needs met as measured by indicators, but actually depend on subsistence production to meet most of their needs. Local and indigenous communities, ranchers and the wildlife of Kaa Iya National Park, depend on the river and the seasonal wetlands it creates. The watershed contains a mosaic of different land tenure associated with the different sectors of civil society - ranchers, titled indigenous territories (TCOs), peasant farm communities with uncertain tenure but traditional rights, communities with titles, indigenous communities who are indentured (cautivas) on ranchers´ lands, mining and oil-gas concessions, and protected areas.

In 2000, the initial ¨capacity" is an evolving situation linked inextricably with the previous hundred years of changes – moving from a frontier largely occupied by indigenous people and haciendas, to the situation in 2000. Because the area is relatively isolated, the ecosystem remained relatively intact in 2000, with the exception of the negative impacts of significant deforestation during the last century in the Upper and MIddle Parapeti basin, and local extinctions of rare species. The introduction of land reform, popular participation and local government laws in the mid 1990s opened the opportunity for governance changes but these opportunities are largely unrealized, except in the case of Kaa Iya National Park where the indigenous Guarani Isoso people requested that the government declare a Park as a co-managed area to consolidate their territory in the mid 1990s.

In the full Basin, every one of the environmental services are slowly being reduced by deforestation upriver, overgrazing, expanding urban development in small towns along the river and by intensive agriculture in Mennonite settlements who are diverting the river for irrigation prior to its entrance into Kaa Iya National Park. The drivers of change include the slow processes of overuse of the land and the more sharp impacts of the oil and gas companies who have operated in the area since the early 1900s, instigating the Chaco War in the 1930s, which had a profound social and environmental impact in the Lower Parapeti. These companies also opened up *brechas* (roadlike openings in the forest) which opened the way for extractive commercial entrance (hunting, logging, etc).

Other drivers include poor project design due to the imposition of external criteria by financial institutions and the turnover governments´ lack of serious attention to environmental issues in development plans. The local participation is subverted by approved workshop participant lists to narrow participants´ perspectives.

Politically, the local campesino and indigenous populations have long been marginalized from participation in government management decisions. When Yangareko began its work in the Parapeti, the strategy was to promote local people's analysis of their environmental, social, and economic situation in order that the people could determine what actions they might take collectively to address the problems that they faced, and how they might raise their concerns to government.

2. Ecosystem Management Objectives and Decision Making

There is no Basin-wide plan for environmental management. In the Lower Parapeti, Kaa Iya National Park has its management plan, which does not include the river (only the wetlands). In the subBasin of the Bañado river, the 37 communities of the Bañado Watershed Management Committee worked with Yangareko to prepare recommendations and objectives for the management of their ANMI (Area of Integrated Management), as declared by local government at their petition. Main objectives are conservation of wildlife and forest, reforestation, and prevention of erosion.

3. Governance Processes (Regulatory, Economic/Financial, Societal)

Regulatory tools are largely coercive and bureaucratic, and not respected or implemented in any consistent manner. Economic incentive tools for conserving the environment are not being implemented while market-oriented development is having negative impacts. As Bolivia is a transitional democracy and spaces are being negotiated, juridical insecurity means that tenure is not secure in the context where "landless" are demanding land rights. The facilitation of local people´s own assessment and analysis of their environmental and natural resource situation (a participatory tool) and subsequent organization for action has led to governance change.
There is insufficient data to rank factors rigorously, but it is clear from historical analysis that the only factor to make a difference to date is participatory analysis, with subsequent self-organization leading to organized grassroots-led action.

4. Impacts (Economic and Financial, Social and Ecological, including Biodiversity Change)

Reforestation led by the 37 community committee in the Middle Parapeti (Bañado sub-watershed) is resulting in less erosion and better flood control, bringing the river back into equilibrium downriver (at a larger scale beyond the area of the reforestation) and protecting the wetlands from siltation.
The continued maintenance of biodiversity inside the protected areas (30% of the Parapeti Basin) is mostly related to the relative isolation and inaccessiblity of the areas, as there is no real active management. It also appears that awareness raising associated with self-analysis and participatory land-use planning has reduced pressures on the edges of these protected areas.

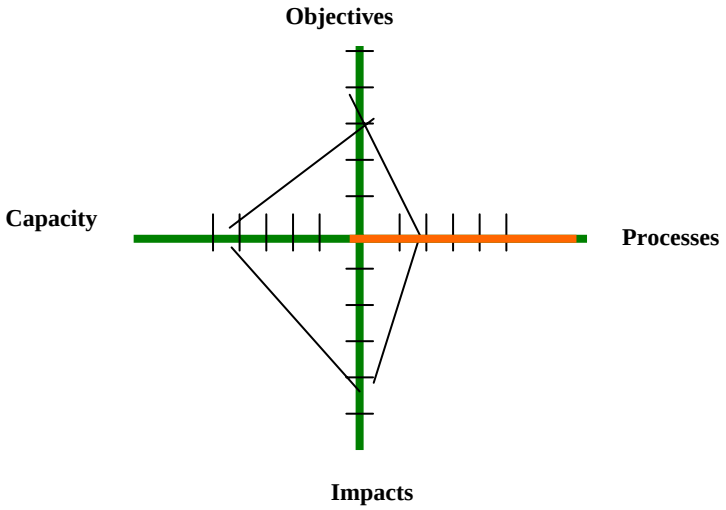
5. Evaluation of Governance Effectiveness

The positive conservation results noted above are related to improved local governance that involved empowering grassroots organizations who live with the biodiversity. The sustainability of the reforestation, according to initial indications, is good; the local organization is struggling with gaining voice in a region where ranching patróns have long dominated and spent local government resources as they wished. Bolivia is in a democratic transition, and the outcomes are not predictable.
The viability of solutions is based on firm and consistent political will that obeys the interests of the state to protect the common good (rather than the interests of shortterm "turnover governments") with the aim of opening dialogues that are necessary between the diverse interest groups present in the river basin. Considering that the river basin is fundamentally a single territorial unit, it lies in the interests of every single one of the social actors present in the river basin to participate in management. The establishment of consensus must be free of particular individual interests and rather be for the common or collective good.
Laws and sectoral policies fail if there is no longterm commitment to a policy of dialogue and negotiation of interests with a vision of sustainability. That vision can be developed from a proposal that integrates input from different experts (incorporating scientific and local knowledge) and then is discussed to gain commitment from the different interest groups in the watershed/basin. This is the process that Yangareko achieved in the Bañada and other subwatersheds of the basin as a pilot of what could be possible throughout the Parapeti basin. However, this NGO led process can only demonstrate the possibilities, because this process requires more longterm commitment and followup than what is possible through the short-term

projects of NGOs. Only the institution of the state has the legitimacy and convening power to negotiate between interest groups with different levels of power over the longterm.

The key criteria for creating the context for the above solution include: human commitment to deal with issues of global and local environmental sustainability; viable technical knowledge and alternatives; financial feasability; and coherent longterm policies. For this, it is essential to have a coherent agenda with proposals that guide but do not limit options categorically or definitively, that open the way for options to emerge according to a balanced consensus – for which the majority must be open and not intransigent according to their interests.

Capacity rank = 4 positive, Objective = 3 positive, Process = 2 negative, Impact = 4 positive, each ranked from 0 to 5 for biodiversity conservation by professional opinion



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5.24 Pilcomayo River Basin, Argentina

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1. Initial Capacity (Natural, Socio-Economic, Governance, Regulatory and General Social)

The Pilcomayo River Basin of Bolivia, Paraguay and Argentina, includes one of the world's largest inland deltas – a vast, globally important site for migratory birds and home to many rare and endangered terrestrial and aquatic species that adjust to seasonal cycles of flood and drought. The Pilcomayo is a river whose natural behavior is a keystone element of the Gran Chaco ecoregion. The river supports all biota found there, as well as the human inhabitants. The basin covers 200,000 square kilometers, of which 70,000 square kilometers are in Argentina. This study covers the Argentine section of the basin but considers relevant upriver aspects in Bolivia where the river originates. Environmental services provide the basis for agriculture, nontimber forest products, free-range cattle ranching, fishing, hunting, forest products, underground aquifer renewal, flushing of oil/gas/mining contaminants, and habitat for wildlife and birds.
Some 148,000 people live in the Argentina section of the basin. Water is critical in this dry region (rainfall 300 to 1200 mm per year) crossed by the Pilcomayo River with seasonal wetlands and oxbow lakes. Northern Argentina´s "interior" has long remained a frontier with little modern development. The majority live in poverty or extreme poverty (particularly indigenous and criollo people) as measured by indicators of "basic needs met." The entire ecosystem is under threat from drivers of change that include new foreign investment-driven infrastructure development (IIRSA) affecting fish migration and changing flooding patterns to produce short-term benefits in potential new soy and cattle production areas in the fragile relatively undeveloped Gran Chaco forest in remote Northern Argentina. Pollution from oil and mining are also serious issues. Other drivers include poor project design due to imposition of external criteria by financial institutions and the lack of serious attention to environmental issues in development plans. Local participation has been subverted by approved workshop name lists to narrow participants´ perspectives.
Older local governance and cultural patterns correlated positively with conservation. Over the past century, extreme changes have occurred via violent colonization, migrations of people and cattle during the Chaco war in the 1930s, and more recently rapid modernization and intrusion of the national and provincial administrative apparatus. The older systems and patterns (marginalized) adapted to feedback from the ecosystem, and in turn protected biodiversity. In the past decade, efforts have been made to reconnect these older governance structures and knowledge with the modern state apparatus. The national and provincial regulations and laws are good, but they are poorly implemented. The challenge is to develop a robust cross-scale institutional mechanism that acknowledges the values of the diverse living ecosystem, and effectively uses decision-making processes that integrate indigenous and local ideas and knowledge of the river's behavior and native forest and river products for sustainable development -- basing development on the principle of preserving the biodiversity and the living river ecosystem which is essential for longterm sustainable development of the region.
The governance setting is "shared governance," within a federal democracy with good policies. However, it is weak because the involvement of civil society is weak and undermined by clientelism. Civil society is poorly organized. National and provincial government agencies are weighing in with different agendas.

2. Ecosystem Management Objectives and Decision Making

The EU funded Pilcomayo Master Plan project ends in December 2007, without significant success in designing an institutional mechanism to manage a Trinational Master Plan, nor with a solid master plan to guide development in the trinational basin. A Trinational Master Plan for the Pilcomayo Basin could offer support for conservation and equity, but the 5 year project has not achieved this goal.

3. Governance Processes (Regulatory, Economic/Financial, Societal)

At local levels, communities attempt to manage their local scale ecosystems according to their decisions, but restrictions on land tenure rights and the larger scale processes have swamped their efforts. Marginalized indigenous communities organized themselves to interface with the Trinational Pilcomayo River Basin Commission. Criollo ranchers developed a nascent alliance with the indigenous communities to defend themselves against threats to their ecosystem and wellbeing. NGOs are attempting to influence policies in the three countries' very different national political environments. There is insufficient data to rank the factors rigorously, but our longterm analysis and efforts over the past 20 years shows that the only factor that might make a difference is participatory analysis, with subsequent self-organization leading to organized grassroots-led action. However, the continuing lack of higher-level institutional interest in local participation has effectively blocked local efforts to participate in ecosystem level management decisions.

4. Impacts (Economic and Financial, Social and Ecological, including Biodiversity Change)

There have been many changes over the past 100 years as the area moved from a region controlled and governed by semi-nomadic peoples living with a moving and changing river basin and inland delta, to an area actively controlled by government. At the beginning of the 20th century, 95% of the area was occupied by indigenous people who were 90% of the population. Today indigenous people are less than 10% of the population and occupy approximately 9.2% of the basin (6.3% is claimed in conflict with others, so they have clear legal rights over only 2.9% of the basin). This process of brutal change was through colonization enforced by military and police which created anarchic violence in the society, as they responded to the local interests of ranchers more than to the responsibilities of the nation and/or province. Traditional governance structures were severely damaged by the brutal colonization of the area.

Over the past four years, as a result of the conflicts due to governance issues, people have a renewed awareness of the environmental services and goods provided by the wetlands and river ecosystem, and the importance of better governance processes. New values are also arising from increased incomes from beekeeping and honey production, and algarrobo production that use traditional systems of production. Evidence of new values can be seen in the increasing defense of forests against illegal loggers and charcoal makers. People, however, do not see the Pilcomayo National Park (1% of the area) as a source of new goods and services (only the few people who are employed there appreciate its value for themselves).

Local populations bear the cost of bad management and would benefit from good management. The government would bear the cost of better control. Illegal loggers and speculating agriculturalists would face costs due to reduced opportunities. Impacts on the ecosystem and rural society are negative in all aspects. Everyone in the Pilcomayo Basin would benefit if there were good management. In addition, the world would benefit from the regulation of climate provided by the extensive wetlands and forests.

The expected future impact is negative unless there is a change in governance that incorporates more local participation. The living ecosystem of the Pilcomayo basin and its vast internal delta wetlands will be destroyed. The likely future scenario will be intensive cattle production and vast monoculture industrial agriculture in the eastern part of the basin and degraded lands in the west, without the species, habitats, and ecosystem processes which currently characterize the area. In this scenario, crillo inhabitants/constituents will largely disappear, and there will be profound changes in the indigenous communities that remain.

5. Evaluation of Governance Effectiveness

While lands under indigenous control (2% of the basin) show increased protection of forest over the past 15 years, ecosystem goods and services have generally been negatively impacted by the violent colonization destruction of traditional governance and land use patterns. New infrastructure construction has caused new patterns of flooding, major destruction of wetlands and bird habitat, and disruption of fish migration.

Laws and sectoral policies fail if there is no longterm commitment to a policy of dialogue and negotiation of interests with a vision of sustainability. That vision can be developed by integrating input from different experts (incorporating scientific and local knowledge) and then discussed to gain commitment from the different interest groups in the watershed/basin. This is the process that FUNGIR has supported in one sector of the Pilcomayo basin. NGO led processes can only demonstrate the possibilities, however, because

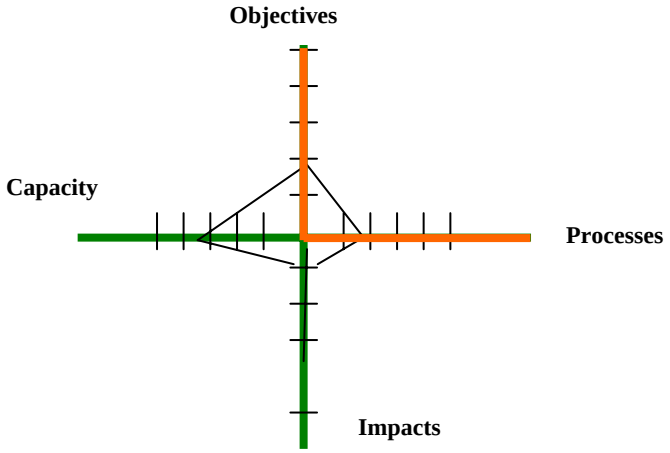
to be sustainable, the process requires longer term commitment and followup than is possible through the short-term projects of NGOs. Only the state has the longterm convening power to negotiate between interest groups with different levels of power over the longterm.

The key criteria are: human commitment to deal with issues of global and local environmental sustainability; viable technical knowledge and alternatives; financial feasibility; and coherent longterm policies. For this, it is essential to have a coherent agenda with proposals that guide but do not limit options categorically or definitively, that open the way for options to emerge according to a balanced consensus – for which the majority must be open and not intransigent according to their interests.

The characteristics of governance system that correlate best with conservation and equity include: horizontal links, with decisions based on local knowledge and concerns; interactive dialogue with emerging innovative ideas; and the participation of civil society that knows empirically the reality of the basin, its ecology and biodiversity and understands the longterm value of conserving it. Over a hundred years ago, this system existed locally, formed de facto via migrations and associated interactions between different cultural groups. Today cross-regional linkages among local groups remain essential for cross-scale communication so that local governance is not swamped by top-down decisions. Given that trends are negative in the present, it appears that good policies and laws do not correlate with conservation of biodiversity and equity. Alone they are inadequate in the context of powerful industries, the clientelism approach of government, and the multilateral bank loans implemented within an economic model that does not value equity and biodiversity.

Only by replacing clientelism with democratic participation, transparency and rule of law, will it be possible to achieve a different type of politics and a different vision of development that conserves nature and supports equity. By facilitating communities´ knowledge of viable, ecologically-sound alternatives for production and marketing, it may be possible for local residents who care about their environment to overcome the pressures of clientelism and pressure for a change in vision and roles of the state in the basin. And if this pressure were to result in a Basin Master Plan that was designed to maintain the ecology and services of the river basin, then it could help to guide ecologically sustainable development in the region. An new, effective, institutional model for cross-scale monitoring would also be necessary.

Capacity rank = 3 positive, Objective = 2 negative, Process = 2 negative, Impact = 1 positive, each ranked from 0 to 5 for biodiversity conservation by professional opinion



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5.25 Impacts of Decentralised Governance on Biodiversity: Lessons from Participatory Conservation in Chitwan National Park, Nepal

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Introduction

Nepal's participatory conservation policies and practices are well recognised both nationally and internationally. Such policies were adapted since the early 1980s in the Annapurna Conservation Area Project, one of the protected areas (PAs) in the high mountain region, where local people were actively involved in integrated conservation and livelihood activities. The experience from Annapurna Conservation Area was then gradually replicated in other high mountain PAs followed by similar efforts in the Terai, the low land PAs. Since 1996, a new programme called the buffer zone management programme has been implemented covering 12 PAs across the country. Under the programme, a certain area outside the PAs is designated as a buffer zone where some restrictions are imposed on resource use. In return, 30-50% of PA income is shared with the nearby local communities for their socioeconomic development through locally formed buffer zone user committees (UCs) and user groups. The programme has resulted in positive outcomes both in biodiversity conservation and local livelihoods.

Despite these inspiring lessons, there has been continued mistrust among the government officers on the ability of local communities to conserve biodiversity. As a result, the UCs and other buffer zone institutions are not fully authorised in buffer zone management; rather they have been given responsibilities mainly for protection. The current governance modalities, including the authorities and responsibilities exercised by various social actors such as government agencies, international organisations, civil society groups and local communities have been increasingly contested. The role of the Nepal Army in protection of PAs is strongly contested, particularly in the context of the current political transition and the widespread public sentiment against the Army. The indigenous communities around the PAs, members of the buffer zone councils, and some civil society groups have been challenging the continued top down policies and have demanded further decentralisation. These conflicts and contestations are largely the result of the slow pace of decentralization and the continued reluctance of the government authority to fully devolve power to the local communities in managing the PAs and buffer zones.

The relationship between ecosystem governance and biodiversity outcomes should inform the PA governance debate. However, there is little documentation and inadequate appreciation of the existing lessons on the impacts of decentralised and participatory practices on biodiversity conservation. In order to enhance our understanding of the relationship between ecosystem governance and biodiversity conservation, ForestAction recently carried out a study in Chitwan National Park (CNP). During this research, the key areas of decentralised practices were identified, their links with biodiversity conservation were explored and the conservation outcomes were assessed. The study is based on secondary information, interviews, observations and the authors' own experience in the field. While some of these initiatives were part of the buffer zone programme, others have been undertaken in an experimental mode, with encouraging results. These lessons may help policy makers and practitioners to reflect upon and adopt better PA management policies. The following sections outline the key conclusions on the link between decentralised governance and improved biodiversity management.

[2] **ForestAction Nepal** is a Kathmandu-based NGO specializing in participatory and policy oriented research on natural resources and livelihoods. It carries out participatory action research projects on diverse issues such as environmental governance, biodiversity conservation, forest management, protected areas, and rural livelihoods. It strives for linking research with the policy process through publications including the *Journal of Forest and Livelihoods* and wide ranging research papers, policy briefs, articles and books.

Areas of Decentralized Governance in Chitwan National Park

Chitwan National Park (CNP), established in 1973 as the first national park in Nepal, has a 932 km^2 core zone and a 750 km^2 buffer zone is also a World Heritage Site. CNP has rich sal (*shorea robusta*) forests and riverine grassland. It is the habitat of rhinos, tigers, crocodiles and several other animals and birds. Its buffer zone is comprised of forest patches, farm lands and settlements of over three hundred thousand people. A large part of the local residents, especially the indigenous and *dalits* (lower caste people based on Hindu caste system) are either poor or landless.

The CNP introduced a series of interventions to involve local people in conservation. These interventions include: allowing local people to collect thatch grass, organizing periodic public relations meetings with local leaders, implementing the parks and people programme, and finally the buffer zone management programme. Decentralised decisions and actions are being promoted in several aspects of ecosystem management, especially in the buffer zone. Moreover, local communities are increasingly involved in some decisions regarding the management of the core area. Several verifiable positive impacts have been observed from these initiatives. However, many of these initiatives are not codified in legal documents and are practiced only at an experimental level. This section synthesises some of the critical lessons out of these initiatives which are expected to inform the wider policy debate regarding PA governance in Nepal. Table 1 presents a brief description of the specific areas of decentralization, assesses the conservation outcomes of these initiatives and explains the links between the two.

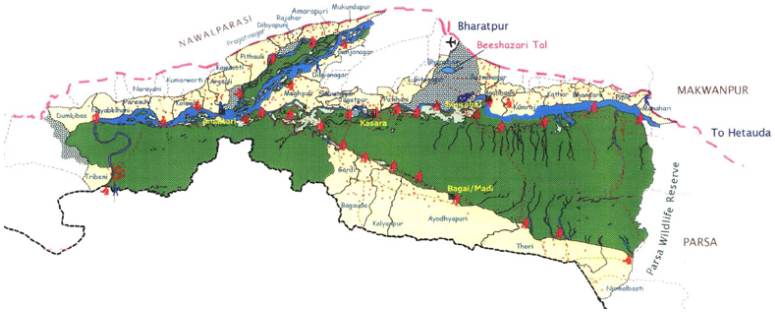

Figure 1. Chitwan National Park and its Buffer Zone

Table 1. Areas of Decentralization and their Impacts on Biodiversity Conservation in Chitwan National Park

Areas of decentralisation	Conservation outcomes	Ways decentralization has led to better conservation
Community forestry Local communities are authorised to manage buffer zone forests	Increased forest regeneration in buffer zone	Increased ownership, collective decisions, compliance with rules, regular monitoring, leading to planting, protection and sustainable use
Tourism management UCs are empowered to promote and manage tourism and enjoy its benefits	Improved ecosystem, increased wildlife movement in buffer zone	Tourism related benefits encouraged people to protect, conserve and regularly monitor the forests, illegal Extraction and poaching have been minimized.
Drift wood collection Communities are allowed to collect and distribute the drift wood from floods	Increased supply of forest products reduced pressure on the park	Collective management of drift wood from floods led to increased availability and equitable distribution of fuelwood.
Grassland management UCs are given authority to manage the thatch grass collection process.	Increased availability of green grass for ungulates and decreased illegal extraction of other forest products	UCs regulate the entry points, collect entry fees and monitor the collection process to ensure proper collection. Organised and systematic management of grass

Areas of decentralisation	Conservation outcomes	Ways decentralization has led to better conservation
		collection has minimized illegal extraction.
Rhino translocation Local communities are involved on decisions regarding rhino translocation from Chitwan to Bardia	Balanced population of rhinos across the park	Community decisions were more scientific than bureaucratic; rhinos were selected from areas with high density resulting in a balanced population across different areas of the park.
Wildlife protection Buffer zone UCs are allowed to form and mobilise local groups against poaching.	Rhino poaching was reduced in 2004-2006 in Nawalparasi (western sector of the park)	UCs have formed sub-committees for anti-poaching campaigns and mobilized youths and children, resulting in increased public support against rhino poaching.
Security arrangement Local communities are involved in reinstating security posts	Decreased illegal extraction including poaching	Local knowledge became useful in identifying strategic locations for security posts. Local people provided moral and physical support in anti-poaching activities including constructing security posts.
Sharing and mobilising funds UCs are allowed to plan and implement development activities by mobilising buffer zone funds	Buffer zone forests are conserved, illegal extraction decreased,	Decentralized management of buffer zone funds has led to increased participation in development and conservation activities. There are however several areas where the UCs have felt that they have not been given enough autonomy in mobilizing the funds.
Autonomy in fund management UCs are encouraged to seek and mobilize external funds	Improved management of wetland biodiversity	Some UCs have been able to mobilise external funds for conservation activities. For example, Mrigakunja UC received support form GEF Small Grant Programme for the management of Beeshajari Tal, a Ramsar Site.

Policy Conclusions

The following key conclusions can be made from the range of initiatives that are practiced in CNP:

- *Buffer zone community forestry contributes to biodiversity conservation*
- *Local people's involvement in the PA core zone leads to better decision regarding ecosystem management*
- *Collaboration between park authority, security forces,and local people improve protection of the Pas*
- *Local autonomy in mobilising funds enhances both conservation and livelihoods outcome*

Policy Recommendations

- **Explore more ways to involve local communities in managing the core zones.** The experiences from CNP demonstrate that local people can be effectively involved in various aspects of core zone

management in order to ensure ecologically sound decisions and practices. This suggests that PA authorities should explore additional areas where the local communities can better contribute towards effective ecosystem management.

- **The PA authorities and local communities should forge meaningful collaboration for effective protection.** In the CNP case, local people's involvement has enhanced protection of the PA, which challenged the conventional notion of PA security that used to rely solely on armed guards. The case shows that effective protection of the flora and fauna broadly rests on the functional collaboration among the PA authorities, armed forces and local communities. It also helps nurture a broader sense of ownership and responsibility in conserving biodiversity.
- **User committees should be given further autonomy to seek and mobilise funds.** Experience from the CNP demonstrates that local autonomy in mobilising buffer zone funds and seeking externally available funds enhances both conservation and livelihoods outcomes. Any legal constraints should be removed and the regulatory framework should be relaxed to provide the local people with adequate autonomy to mobilise buffer zone funds and seek external funds according to their own planning.
- **PA governance should be further decentralized to improve biodiversity conservation.** The decentralization initiatives in CNP have positive effects on enhancing local participation, mobilising local resources, increasing the sense of ownership among the local people and changing their behaviour towards conservation. However, there are a number of areas where the experimental level of decentralised decisions and actions can be promoted, coded into legal documents and institutionalised into practices. Further authority can be devolved to communities and their institutions not only in managing the buffer zone affairs but also in managing ecosystem in the core zone.

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5.26 Promoting Good Governance in Managing Danau Sentarum National Park through Adaptive Collaborative Management Approach

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The Context

Danau Sentarum National Park is located upstream of the Kapuas River, 700 km from Pontianak the provincial capital of West Kalimantan, only 4 km from the border with Malaysia's Sarawak. The Park, consists of a series of interconnected seasonal lakes, interspersed with swamp forest, peat swamp forest and dry land forest spread over 1,320 km^2. This unique wetlands fulfills an important hydrological function for the Kapuas watershed. During peak flood season, 25% of Kapuas river water is siphoned off into the wetlands thus preventing downstream flooding. In the dry season, 50% of Kapuas water comes from the wetlands maintaining water supply[3].

The Park is home to a rich biodiversity: 250 fish species including 12-26 endemics, 250 bird species including 12 endemics, 3 crocodile species, the largest *proboscis* and orangutan populations, dozens of endemic plant and animal species including many are still waiting to discover. The area supplies 60% of West Kalimantan's freshwater fish industry and more than 20 tons of wild-bee honey per year. In addition, it provides both timber and non-timber forest products[4].

Two ethnic groups, Malay and Iban Dayak, have lived here for generations, long before the area was declared a protected area. They manage natural resources using customary regulations and local knowledge. In 2007, total population reached 10,000 up from 6,500 in 1997.

The Park is managed centrally by the Ministry of Forestry, devolved to the National Park Authority. Since its declaration in 1999, the Park has been faced with lack of funding, few capable staff, a changed economic and political context driven by decentralization, and increasing population pressure. These factors have led to overexploitation as well as degradation of local values. The governments drive for modernization and development have exacerbated environmental problems. Some of these are:

- world's largest oil palm plantation along the border with Malaysia. The global climate change issues and increasing use of biofuel have intensified forests conversion into large scale oil palm plantation.
- plan to dam the wetlands
- intensive fisheries and agriculture schemes

Our Intervention

In late 2004[5], CIFOR in collaboration with Riak Bumi Foundation started an intervention aiming to promote transparent, accountable, equitable and participatory decision making; and to look for best practices and replicable mechanisms/approach/tools.

We applied Adaptive Collaborative Management (ACM) approach, and Participatory Action Research (PAR) as our main tool. The ACM approach is aimed to improve adaptive capacity of stakeholders to respond to uncertainty and rapid dynamics of natural resources management, through collaborative learning. In this context we took on dual functions: as facilitator of the multistakeholder process to ensure learning

[3] The hydrological model was developed by: Klepper, O. 1994. *A hydrological model of the Upper Kapuas river and the Kapuas lakes*. Consultancy report for Asian Wetland Bureau/PHPA, for the UK-Indonesia Tropical Forest Management Project, Sub-project 5 Conservation.

[4] The biophysical and social descriptions of DSNP, in particular between 1992-1997 (before our intervention), is described by various authors in *Borneo Research Bulletin*, Vol. 31 (2000), special edition on Danau Sentarum.

[5] Our work in Danau Sentarum National Park was funded by Ford Foundation and CIFOR core budget from late 2004 until end of 2006. From January 2007 and April 2008, we continue facilitating and researching the PAR learning cycles with funds from Gemconbio, SIDA and CIFOR core budget, each financing different focus of the learning cycle.

(joint and individual) takes place, and as researcher documenting and analyzing the process (described in the following diagram)[6].

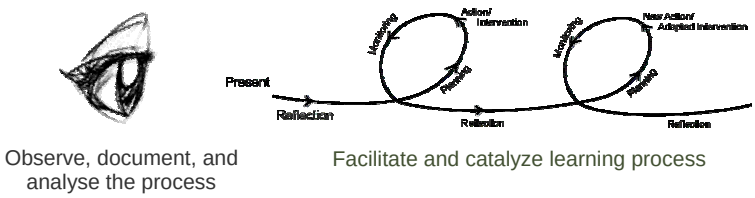

Figure 2. Our dual functions in the learning processes

Vision/goals on particular issues, plan, action and monitoring are jointly identified by representatives of key stakeholder groups: administrative leaders, customary leaders, youth, women's group, national park authority and relevant district government officials. The ACM approach through engagement of key stakeholders in a learning cycles helps ensure the adoption of research findings and local communities voice in decisions/policies. See Figure 2 for an example of learning cycles.

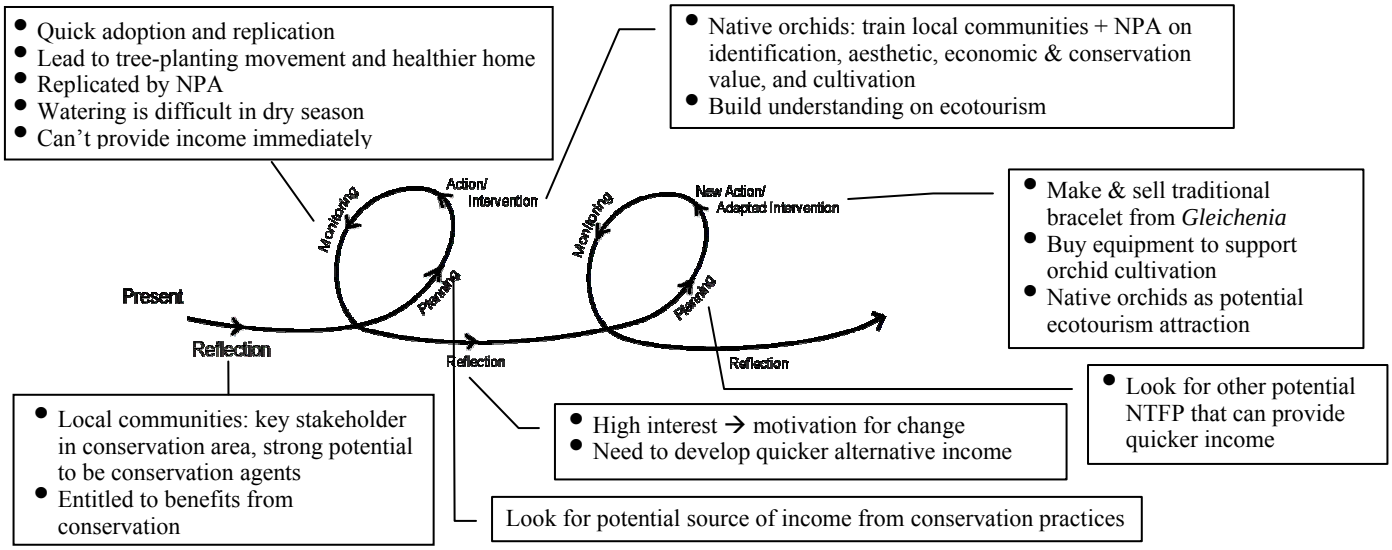

Figure 3. Learning cycles on balancing conservation and livelihoods

Results

The following changes have occurred as the results of our intervention:

1. Local communities and district government have better understanding on the importance of conservation and the links with people's livelihoods. As a result local communities support conservation efforts, especially in villages where the action research took place.
2. Improved capacity of local communities in particular:
   - Knowledge and technical skills to cultivate and use native orchids as an asset for ecotourism, identification of ecotourism potential, building and operating microhydro power, developing proposals and managing budgets accountably
   - Skills on conflict resolution, communication and negotiation
3. Improved collaborative action and learning, indicated by:

[6] For detail information and case studies on ACM approach, see for examples:
Colfer, C.J.P. (Ed.). 2005. *The Complex Forest*. RFF, CIFOR. Washington DC.;
Colfer, C.J.P. (Ed.). 2005. *The Equitable Forest*. RFF, CIFOR. Washington, DC.;
Fisher, R., Prabhu, McDougall. (Eds.). 2007. *Adaptive Collaborative Management of Community Forests in Asia*. CIFOR, Bogor, Indonesia.

- Collaborative development of a 25-year management plan with good representation of local communities' voice
- Establishment of five local working groups: honey bee farmers association, fisher group, community radio, women handycraft association, and customary rules; and an inter-ethnics forum called MIKE, consists of 4 ethnic groups (Malay, Iban, Kantu and Embaloh) to resolve horizontal conflicts caused by natural resources competition

4. The Provincial Conservation Agency and the National Park Authority have become more open, are willing to listen to local communities' and respect local knowledge. Existence and rights of local people's is better recognized.
5. Improved relations between the District Government and The National Park Authority
6. Improved knowledge of Park Authority staff on local context (social, biophysical and cultural)

Conclusions

CIFOR's research shows the followings:

- Simple green practices such as microhydro power and cultivation of native orchids for ecotourism are useful tools to promote conservation that benefits local communities. Local communities are able to enjoy the benefits and see the evidence directly, and become actively involved in conservation. The use of these tools is now being adopted and replicated in other locations by the NPA and district government.
- Many market-based instruments have been counter-productive, causing local communities' attitudes to change towards conservation. Local communities have a long history of using local knowledge and customary rules in managing and preserving their resources and forests/land wisely and sustainably, but they do not use the term 'conservation'. They are self-motivated and actively participate in the so called conservation when they understand its benefits for their own livelihoods. When community groups learned about market-based instruments such as payments to environmental services, they began to think that conservation is for others' benefits. As a consequence, their willingness to conserve becomes dependent on direct payments/incentives (*no conservation if they are unpaid*). There are also some indications that the market-based instrument is also politicized by policy makers.
- Failures of past conservation and development programs in some countries have created dependency of local communities on external aid and as such has reduced their ability to adapt to external pressures.

Recommendations to Donors

- Short term outcomes should be seen as equally important as the long term impacts. Local stakeholders are motivated to actively participate in the externally driven conservation efforts if they can see quick evidence/ examples of benefits for them in short term.
- International development banks should consider the environmental impact of investments and policies
- Conservation must be seen as part of the social system with park management to include environmentally friendly ways for local people to make a living.
- Procedures for funding mechanisms must be simplified to counter the rapid pace of biodiversity lost.

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CHAPTER 6. MAIN RESULTS – CONCLUSIONS OF GEMCONBIO

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6.1 Synthesis Report Of The Case Studies Summary

6.1.1 The Gem-Con-Bio Research Design

The overall strategic objective of the GEM-CON-BIO project is: "*to explore the interactions between governance modes and sustainable development objectives in view of identifying what governance processes and institutions can best contribute to the conservation of biodiversity*" (GEM-CON-BIO project, Annex 1, 2006)
The strategic research design adopted in GEM-CON-BIO to achieve the above objective has been that of identifying, from the very initial project phases, those factors related to governance and ecosystem management which are the most relevant for biodiversity conservation. The identification of these factors has been done by renowned international experts in the field. By integrating the revision of existing literature, the participative collaboration in international workshops, and the expertise of researchers, it has been possible to select, amongst all the possible aspects (ecological, economic, social, cultural, institutional, etc.) of governance and ecosystem management, those which are most important in explaining successes or failures in biodiversity conservation.
This work has resulted in the development of a very detailed GEM-CON-BIO analytical framework, integrating around 70 factors/variables addressing, by the use of research questions, very different aspects of governance, ecosystem management and biodiversity conservation.
The scope of developing the analytical framework is that of producing a flexible, manageable, interdisciplinary and holistic analysis tool to be applied to case studies investigating relationships between Governance, ecosystem management and their impacts on biodiversity conservation in very different situations at different spatial and temporal levels worldwide. (Galaz, Hahn, and Terry, 2006)
The objective of using such analytical framework to carry out case studies is that of providing a common research tool so to guaranteeing coherence in the analysis of information on governance, ecosystem management and biodiversity conservation. (Terry and Simoncini, 2007). More precisely the GEM-CON-BIO analytical framework has been developed also in order to enhance the opportunity to carry out synthesis of outcomes from case studies in order to draw conclusions on factors of governance and ecosystem management and their relationships with successes or failures in conservation of biodiversity.
This approach is thought to overcome the risks of the more reductionist approaches of losing contact with the whole picture of analysis by focusing on a too limited number of variables, and, at the same time, to avoid the risk of indeterminateness of research results for policy advice of the more holistic approaches. In facts this approach would allow to use as inputs for synthesis not just the values of different observations of few selected variables, but instead the outcomes of case studies made as much coherent as possible by the use of the GEMCONBIO analytical framework.
In order to achieve conclusions on the achievement of the above objective, it is necessary to test the validity of the analytical framework in two ways.
The first way is to test the feasibility of the analytical framework to carry out research and draw conclusions on what are the most relevant factors of governance and management impacting on biodiversity conservation by single case studies.

The second way is to test the feasibility of the analytical framework to allow comparison and integration of outcomes from case studies (i.e. to carry out synthesis of research results).
To do so outcomes from case studies have to be synthesized in a single document to understand what is the explanatory capacity of the analytical framework at its fullest both in carrying out single case studies and in facilitating the synthesis of case studies outcomes.
This double testing is done by applying the analytical framework in carrying out 29 case studies in very different ecological, social, economic, cultural, institutional, contexts, and at different spatial and temporal levels to study governance, management of ecosystem and their impacts on biodiversity conservation, and then by exploring what are the results of the synthesis and integration of outcomes of case studies.

6.1.2 The Gem-Con-Bio Synthesis Methodology

The synthesis of case studies has to be developed by starting from the structuring and integration of all case studies outcomes in a single document.
This means that the synthesis document will not create new knowledge, but it will re-organize and integrate information resulting from single case studies, in order to provide a suitable information background upon which to draw conclusions on most important factors of governance leading to success or failures for biodiversity conservation.
This structuring of the outcomes from case studies has to be functional both for assessing the usefulness of results in identifying governance and ecosystem management factors which have a relation with conservation of biodiversity at the single case study level and to facilitate the comparison and integration of outcomes from different case studies (i.e. to carry out synthesis).
Three considerations appear strategic in shaping the information structure according the two above functionalities:

Retaining the explanatory power of each case study while synthesising its result

Variables to be assessed by each case study are many and included in around 70 research questions. In order to reach meaningful information from the synthesis of outcomes by case studies the number of variables has to be reduced by clustering those which have being used to analyse the same factor in the analysis.

Allowing the integration and analysis of relevant information by making possible the application of tools such as statistical analysis to draw conclusions on different factors of governance and conservation of biodiversity

This task is particularly challenging given that the variables analysed have an interdisciplinary character requiring both qualitative and quantitative answers, (in some cases using also subjective valuations such as Best Professional Judgement). The possibly great variety of sources of information, data, methods of calculation and elaboration used may be different among case studies. This fact, together with the dynamic analyses carried out in case studies which have different temporal and scale dimensions, creates problems for the application of statistical analysis tools (see also point 3 below).

Increasing as far as possible the feasibility of application of the analytical framework to case studies not already included in the GEM-CON-BIO project, so to enlarge the sample of case studies.

The number of case studies in GEM-CON-BIO is not large enough to be considered as a statistically valid sample, particularly if this has to be seen in relation to the complex object of analysis, to the great number of variables used in the analysis, and the very different ecological, social and economic contexts within which case studies have been carried out.
The above three considerations lead the development of the methodology to synthesise outcomes from case studies towards some strategic choices regarding its possible structure and scope.

6.1.3 Conclusions on Synthesis of Outcomes from Case Studies in the EU and US

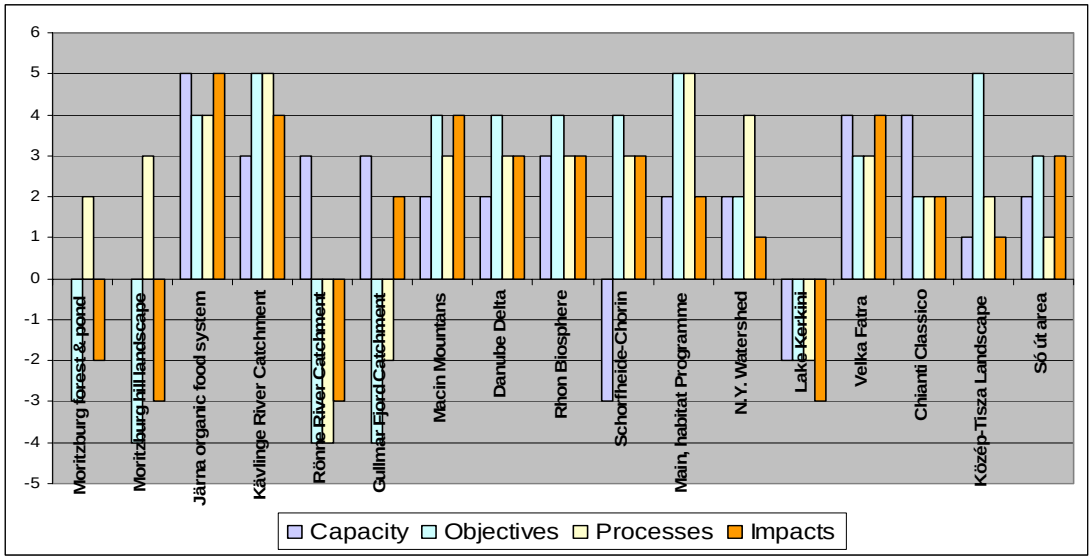
6.1.3.1 Introduction

The objectives of the synthesis of outcomes from case studies presented in this report were:
a) to test the validity of the analytical framework developed as a useful research tool to carry out case studies to identify the most important factors of governance and ecosystem management and their relationships with biodiversity conservation.
b) to see if the use of the analytical framework can facilitate the comparison and integration of outcomes among case studies results, so to enhance the possibility to identify existing relationships between factors of governance, ecosystem management and biodiversity conservation
The case studies analysed in GEM-CON-BIO have been distinguished in three groups: those carried out in a) EU and US; in b) by focusing the analysis more on a specific use of natural resources and biodiversity at international or EU level and in c) other non-western countries. It is clearly an added value of the GEM-CON-BIO analytical framework to be flexible enough to analyse these three categories of case studies.
The synthesis presented in this chapter focus only on EU and US 17 case studies carried out at local/ecosystem level. In order to carry out the synthesis and comparison of the 17 EU and US case studies the around 70 variables of the GEM-CON-BIO analytical framework have been structured into the 4 clusters of initial capacity, ecosystem management objectives and decision making systems, governance processes and governance impacts. This has allowed to keep the high number of research questions/variables analysed manageable for synhtesis. Here following conclusions on the achievement of the two objectives above are discussed in details.

6.1.3.2 Validity of the GEMCONBIO Analytical Framework as a Research Tool to carry out case studies in EU and US

By the analysis of 17 case studies carried out in EU or US countries at local/ecosystems levels and 2 case studies at international/European levels, it is possible to affirm that the GEM-CON-BIO analytical framework is a useful research tool to identify and analyse what are the most important factors of governance and ecosystem management which exert an impact on biodiversity conservation. In facts all 17 (+2) case studies have identified the most relevant initial capacities, ecosystem management objectives and decision making systems, governance processes and impacts which are responsible for successes or failures in biodiversity conservation in the respective study areas. 13 case studies out of 17 are showing **positive assessments** of the impacts of governance to biodiversity conservation. Among these in 11 case studies all the four clusters of variables analysed (Järna organic food system, Kävlinge river catchment, Macin mountains biosphere, Danube delta biosphere, Rhon biosphere, Maine habitat programme, N.Y. watershed, Velka Fatra, Chianti Classico, Közép-Tisza, and Só út area) are ranked positively, 1 case study presents positive assessments for three clusters of variables and only one negative for the cluster initial capacity (Schorfheide-Chorin biosphere), and another case study (Gullmar Fjord) despite two very negative assessment of the clusters of objectives and processes has been evaluated positively by authors. For what regards those 4 case studies showing **negative assessments** of the impacts of governance to biodiversity conservation, in two cases (Catchment, Moritzburg forest & pond and Moritzburg hill landscape) they show a very negative assessment of the cluster of ecosystem management objectives and decision making systems and a "neutral" assessment for the cluster initial capacity, another case (Rönne River Catchment) shows very negative assessments both for the cluster of "ecosystem management objectives and decision making systems" and for that of "governance processes", while the last case study (lake Kerkini) presents negative assessments for all the three initial capacity, objectives and processes clusters of variables.

Figure xxx – Visualisation of assessments of clusters of variables done by Authors for EU and US case studies at local/Ecosystem level



Coming to the implementation of the analytical framework by case studies, the executive summary tables filled in by authors show a situation of a very limited number of not answered research. From the situation described on not answered research questions, it appears that for the great majority of these researchers have been able to find data and information required. However the most worrisome aspects is the lack of data on impacts on biodiversity is a clear message to be passed on to policy makers and stakeholders.

6.1.3.3 Validity of the GEMCONBIO Analytical Framework as a Research Tool to compare and Synthesise outcomes from Case Studies in EU and US

From the analysis carried out, a strong correlation appears to exist between the evaluation of effectiveness of the clusters of **Objectives** and **Processes** (0,713) and even a better one between the clusters of **Objectives** and **Impacts** (0,796). While some correlation is detected also between the clusters of **Capacity** and **Impacts** (0,485) and between those of **Processes** and **Impacts** (0,572), no particular correlation appears to be between the clusters of **Capacity** and **Objectives** (0,212) and those of **Capacity** and **Processes** (0,132). A first possible indication resulting from the analysis of correlations could be that, for best or for worst, among case studies analyzed, ecosystems management objectives are exerting a great influence on the impacts on biodiversity resulting from governance. A second indication which could be envisaged from the results of the correlation analysis is that, in case study analyzed, there is a strong relationships between the degree of appropriateness of objectives for biodiversity conservation and the functioning of the processes implemented to achieve those objectives. The further division of each cluster into thematic sub-categories has proved to be very useful to analyze the relative importance of each sub-category of research questions/variables in shaping the assessments of the overall evaluation of contributions of governance effectiveness for biodiversity conservation made by authors for each main cluster. The results of this crosschecking analysis among the 17 case studies have shown:

- A not good correlation (or even a negative one) between the overall assessment of the cluster **initial capacity** made by authors and the ranked values of each of the relative sub-categories: natural (-0,422), economic/financial (0,416), institutional (0,361), regulatory (0,303) and social/cultural (0,360). For the negative correlation between natural initial capacity a possible explanation may be that high natural value initial conditions are hard to be improved or even to be maintained, while it is relatively easy to improve not good natural initial conditions. All the other sub-categories show a not very strong correlation with the overall assessment made by authors of case studies for this cluster of variables/research questions. This could be explained as a possible indication that all the economic/financial, institutional, regulatory, and social/cultural factors are to be considered equally necessary in creating the capacity for effectiveness of biodiversity governance. However this result is also probably largely due to the inclusion in the initial capacity cluster of factors such as external drivers and major threats which, for their relative importance (particularly at local level) could influence the overall evaluation of governance effectiveness for this cluster. Unfortunately the complexity of the

object of study, the relative low number of case studies and the subjective character of some aspects assessed by BPJ, all caution to go further in trying to find explanations for these results.

- A very strong correlation between the overall assessment of the cluster **Ecosystem management objectives and decision making systems** made by authors and the ranked values of each of the relative sub-categories: natural (0,866), economic/financial (0,864), and social/cultural (0,916). This result could be interpreted as an indication that generally in management or sectoral plans of case study areas, there are no differences among the qualities of natural, economic/financial and social/cultural objectives. In facts in 10 case studies management or sectoral plans are capable to identify the appropriate objectives for all the natural, economic/financial and social/cultural aspects, while in other 5 case studies all the objectives are not appropriate or not existing for all the sub-categories. Only the case studies of N.Y. Watershed and Chianti Classico seem out of this general rule by showing the first appropriate economic/financial and social/cultural objectives but not sufficiently appropriate natural ones, and the second not sufficiently appropriate natural and economic objectives but appropriate social ones. This result could therefore be interpreted as the fact that, for the case studies analyzed, usually objectives are either appropriate or not appropriate simultaneously for all the objectives of the three sub-categories. Another interesting information coming out by the synthesis of case study outcomes is the influence of protected area status on definition of natural objectives. 12 case study areas out of 17 are all or for a part situated in biosphere reserves or protected areas, or at least managed directly for conservation (at least for a minimum extension of 10%). These areas are Moritzburg forest & pond, Moritzburg hill & landscape, Järna organic food system, Macin Mountans, Danube Delta, Rhon Biosphere, Schorfheide-Chorin biosphere, New York city Watershed, Lake Kerkini, Velka Fatra, Közép-Tisza, and Só út area. From the analysis of natural objectives in these case study areas emerges that natural management objectives are fully appropriate or appropriate only for 8, while the remaining 4 have not sufficiently appropriate or existing/implemented natural objectives. This result, if supported by a higher number of observations, could be interpreted as the fact that the protected area status alone is not a sufficient condition for setting right management objectives for biodiversity conservation.
- A general strong correlation (except in the case of regulatory processes where correlation seems to do not exist) between the overall assessment of the cluster **Governance processes** made by authors and the ranked values of each of the relative sub-categories: economic/financial (0,653), institutional (0,556), regulatory (0,118) and social/cultural (0,748). By comparing the functioning of different processes from case study outcomes, it results that regulatory processes are the ones adopted in all case study areas and the most well functioning. This information is quite difficult to be explained given that among case studies regulatory processes are those showing almost no correlation with overall evaluations made by authors for this cluster. In facts two tentative interpretations could be proposed for this. A first tentative interpretation could be that the well functioning of regulatory processes is taken for granted by case studies Authors so not influencing the overall assessment of the cluster governance processes. A second interpretation, somehow going in the opposite direction, could be that despite the well functioning of regulatory processes, other economic/financial, institutional and social/cultural processes are identified as more influent processes for biodiversity governance. Economic/financial, social/cultural and institutional processes are widely used (14 case studies the first two and 16 the last) despite with different functioning (economic/financial and social/cultural scoring 9 well functioning, while institutional processes only 4).
- A quite strong correlation between the overall assessment of the cluster **Governance impacts** made by authors and the ranked values of each of the relative sub-categories: natural (0.840), economic/financial (0.732), and social/cultural (0.627). This fact, if supported by a greatest sample of case studies, could be an indication that impacts of governance usually are either good or bad but not neutral, for all the ecological, economic/financial and social/cultural aspects related to biodiversity conservation.

Unfortunately, because the very different methods of calculations possibly used by different research teams to assess the value of the same variables, the non homogeneity of the sources of information and data used, the very different spatial and temporal levels of analysis, very diverse social, ecological, economic, etc. conditions in case studies contexts, the subjective character of the evaluations of some qualitative parameters, and the limited number of GEM-CON-BIO case studies (i.e. observations), it is not possible to extrapolate overall conclusions on the governance factors that are resulting more important in biodiversity conservation to a wider universe. However the results achieved show that the GEM-CON-BIO analytical

framework is a useful research tool to synthesize and compare outcomes form case studies in order to draw conclusions on most important factors of governance impacting on biodiversity conservation. From the results achieved it can also be affirmed that the implementation of the GEM-CON-BIO analytical framework to carry out case studies in very different ecological, social, cultural, economic/financial, institutional, etc. situations has led authors to carry out case studies following common understanding of the research tasks so facilitating the synthesis of case studies outcomes and the enhancing of their comparability.

6.1.3.4 Aspects to be considered for improvement of the GEMCONBIO Analytical Framework

The analysis of case studies reports and the comparison of case studies outcomes provide some interesting feedbacks on what aspects of the analytical framework could be improved for achieving more meaningful results. Here following some important aspects are proposed to be considered by the GEM-CON-BIO research team for improvement of the analytical framework:

- The reduction of the around 70 research questions to a more manageable number of around 50. This reduction on the number of research questions should be thought carefully by the whole GEM-CON-BIO team. However a possible suggestion for case studies at local level could be also that all the questions referring to institutional features which have to be assessed at higher spatial levels would be substituted by one or two questions more fine tuned on local institutional functioning.
- The definition of a case study profile which is describing all that factors of case studies which are not be changed by governance and ecosystem management depending on the time frame analyzed.
- A better fine tuned clustering of variables/research questions into those already existing according to the research themes to be analysed. From the synthesis of case studies it has emerged that the inclusion of some research questions in some clusters raises doubts. Question on funding mechanisms for biodiversity conservation has been moved from the sub-category Regulatory to the sub-category Economic/financial, so highlighting more the financial role of funding mechanisms than that of being part or the result of regulation. Question on ownership structure has been moved from sub-category economic/financial to sub-category Institutional, given the institutional character of property rights. Questions on extension services and support to collaborative management respectively, have also been moved from the regulatory sub-category to that of Institutional initial capacity, interpreting these as services provided by existing institutions and organisations. Questions on management regimes which has been included in the case studies profile, and questions on licensing for use and natural resource use monitoring respectively, which are considered more governance processes and therefore moved from the cluster “Ecosystem management objectives and decision making systems” to the cluster “governance processes”.
- The creation of two distinct specific sub-categories for questions referring to the external direct and indirect drivers and to the major threats. This is recommended because, given the importance for the governance and management of ecosystems of these two factors and their prevalent socio-economic character, their inclusions in the sub-category natural initial capacity does not seem very much appropriate.
- The enhancement of the coherence between the clusters of variables/research questions. An example can be that of referring to some questions of the cluster “initial capacity” which have no correspondent research questions among those included into the cluster “governance impacts”, (or vice versa). This is the case for instance of the research questions on changes on monitored species and habitats, (moved in the corresponding subcategory of impacts) have no counterchecking variables/research questions in the subcategory initial natural capacity. The same can be said for question on funding mechanisms for conservation, in the cluster initial capacity, sub-category economic/financial, which has no counterchecking research question in the economic/financial sub-category in the impacts clusters but only in the cluster of evaluation of governance effectiveness.
- The possible definition of standardized indicators or ranking systems of possible answers to specific research questions whereas these are still missing. A further fine tuning and harmonization of the ranking assessments systems proposed for the evaluations of subcategories analyzed within each cluster of variables/research questions

- The inclusion of research questions/variables to assess the cultural level of populations such as an indicator on educational degrees.

6.1.4 Conclusions on Synthesis of outcomes from Case Studies in Third Countries

The Third Country (TC) studies have been carried out in Indonesia, Nepal, Bolivia, Argentina, Ethiopia, Mongolia, Niger, Turkey, Iran. In all studies we face a variety of situations where indigenous peoples and local communities struggle to gain recognition and support as governance actors. A few considerations should be highlighted for the TC case studies:

- they deal with evolving governance settings spanning longer periods of time compared to the EU/US ones
- the de jure and de facto governance often do not coincide
- scale adds to governance complexity

In most TC cases, customary community-based governance systems have been displaced by central state-based governance systems, with a more or less active involvement of the private sector. The move from community to state governance appears generally associated with negative results for both community livelihoods and conservation. This is also related to the fact that in place of well-functioning "state governance" one often gets messy and unsecured governance, with unscrupulous business extracting resources in destructive ways, local elites capturing most benefits, nepotism becoming rampant and the more traditional sectors of society becoming rapidly marginalized. As this proceeds, indigenous peoples and local communities become disaffected, disengaged and at times hostile. And yet, if the "community disempowerment" can be remedied before all relevant knowledge, skills and institutions are lost, and if some external support is available (usually through the efforts of NGOs), community governance can be restored/ salvaged at least in part.

Overall, the following **recommendations** can be drawn from the cases studies as a whole:

Recognize and respect customary institutions for natural resource management
Functioning community governance institutions with roots on local culture and traditions are incomparable assets for the sound management of natural resources and conservation of biodiversity. State governments should take advantage of the value and contributions of such customary governance institutions. Allowing indigenous peoples and local communities to decide how to manage their resources and how to share the benefits of that management through local institutions, with a fair amount of autonomy, appears to both sustain livelihoods and conservation of biodiversity.

Help such institutions to fend off and/or discipline destructive "development"
In all our cases, the most powerful forces at odd with conservation are the ones of business and so-called "development". Environmental degradation and pollution invariably relate to large scale infrastructures and urbanization, timber concessions, large plantations (e.g. oil palm plantations), intensive ranching and agribusiness (e.g., soy monocultures), legal and illegal trade and oil and gas industries and mining. Usually, business enterprises (and even large scale government projects) penetrate rural areas fast, without even attempting to properly study, prevent or mitigate their destructive social and environmental consequences. Beside direct impacts (e.g. because of habitat loss) a variety of indirect impacts (e.g., uncontrolled hunting related to new market demands) soon act to decimate wildlife. And the disruption of traditional livelihoods, migration fluxes and monetization of the economy fuel short-term, unsustainable uses of land and natural resources.

Foster alliances between governmental agencies in charge of conservation and indigenous/ community institutions
Governmental action that complements and supports the management and conservation efforts by indigenous peoples and local communities is a powerful, potentially unbeatable, combination for positive

change. Given the differences in perceptions and socio-political power of governmental agencies and communities, efforts are usually required to provide a neutral forum for negotiations and equitable process.

Adopt a landscape approach to natural resource management and conservation

A fundamental lesson to derive from all our TC cases is that sound natural resource management and conservation cannot do without a landscape view and approach. What does that mean? From afar, biodiversity conservation can be comfortably imagined as a practice confined to some limited pockets in the territory, so called protected areas. But wildlife, water, air, pollen, insects, animals and people move. They are quick to link the protected area and its surroundings in a myriad of ways. Pervasive phenomena, such as fire, rain or climate in general, can be even more powerful. And even large and well-managed protected areas need to fit within socio-political contexts in which they may be supported and well funded or undervalued and starved. In other words, there is no viable alternative to the harmonious fitting of protected areas into a supportive environment.

Support participatory action research, community-based analyses and learning by doing

On-going learning processes, for example facilitated through Participatory Action Research exercises and community-based analyses, are powerful tools to improve biodiversity governance and equity. The opportunities to learn can be optimized through a variety of direct exchanges, including field visits and workshops, community-to-community visits, links to on-going information and trainings/capacity building events. Particularly useful are also multi-stakeholder fora, where different groups (including the ones usually marginalized) can exchange ideas, discuss options to combine livelihoods and conservation initiatives, and identify the support needed for that at various levels. These processes of active social communication can be very powerful and bring various parties to understand each other and be willing to negotiate. All in all, the time invested in bringing people together and giving them the 'luxury' of discussing together on the basis of good information has proven itself in a variety of contexts, including the ones of our TC case studies. Noticeably, not only the local communities need to strengthen their capacity to interact with others. Government staff can also greatly benefit, provided a minimum of continuity is assured in their status and site of employment.

Promote fairness in sharing the costs and benefits of conservation

Local communities face a variety of struggles and constraints for survival but also for their positioning as actors and consumers in changing societies. Not surprisingly, the TC case studies show that communities appear to be more directly supportive and engaged in conservation whenever they experience direct benefits from their efforts. This includes financial benefits but also a variety of other cultural, spiritual, and livelihood-related benefits, which can be as, if not more, important than financial gains for the communities at stake. When the conserved biodiversity generates monetary benefits (e.g., entry fees for a protected area, local jobs, etc.), these should be fairly shared among and within the relevant communities, with due attention to the legitimacy and credibility of the organizations representing them.

Ensure both sound local governance and a supportive policy environment, including the respect of basic rights

Sound local governance is a necessary but not sufficient condition for equity and the conservation of biodiversity. The viability of these goals is also depending on a firm and consistent political will and the commitment to supportive policies on the part of governmental authorities. Conversely, however, good policies and laws do not necessarily correlate with conservation of biodiversity and equity. Without effective implementation of those laws and sound governance at the local level, they are not enough. Good governance at municipal and sub-national levels is also crucial, as the positive potential of laws and policies can be lost through corruption, short-term interests, clientelism, and lack of capacity (including technical capacity) to implement the policies and monitor their functioning and results. At best, local governance and broader policies fit and are mutually supportive (many coercive mechanisms established through laws are simply rejected by local people). The constitutional/ regulatory framework of countries appears to require particular attention. Tenure systems, environmental impact assessment regulations, water rights, pasture rights, forest-related rights, but also basic socio-political rights, including the right to participate in political life, freely organize and demand transparency, performance and accountability from agency staff and

elected officials, appear to make up for the supportive environment that allows local governance to deliver its promises.

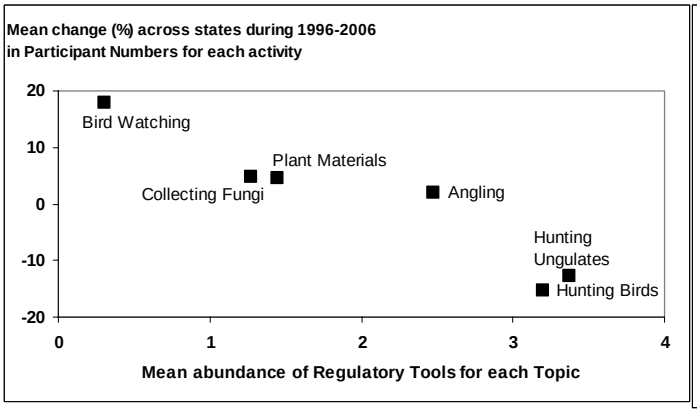
6.1.5 Conclusions on Synthesis of outcomes from Case Studies - UNWIRE

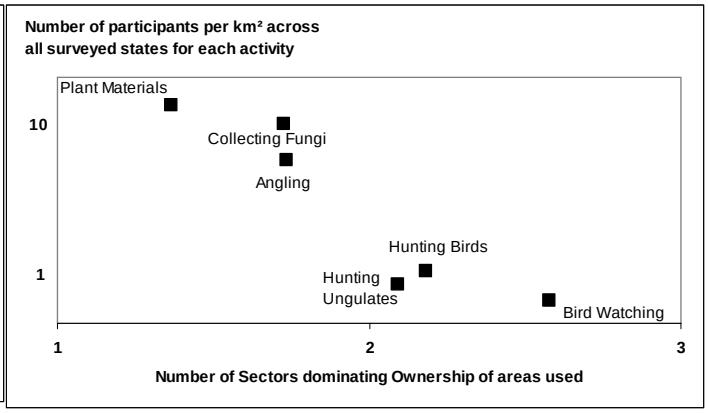
UNWIRE covered 6 uses of wild resources (hunting birds, hunting ungulates, angling, collecting fungi, collecting wild plant products and bird-watching) in all 27 states of the European Union. In chapter 5 we investigated how capacity, objective and process variables associated with (a) numbers and trends (during 1996-2006) in users of the resources (as indices of ecosystem service provision), (b) in resources (indicating ecological sustainability) and (c) in biotopes of the resources (hence biodiversity). Table 1 summarises the results of regression analyses in which capacity, objective or trend variable, in central columns, associated significantly (P<0.02) with number and trend variables in the left-hand column.

TABLE xxx	Initial capacity	Objectives	Processes & tools	*P*
increase in number of:				
Bird-Hunters	- Community ownership		+ Knowledge generation	<0.001
Ungulate-Hunters	+ Horizontal integration		+ Benefit of limited-access	0.001
Anglers	- Community ownership - Vertical integration			0.002
Bird-Watchers			+ Perceived benefit hunting	0.001
increase in stocks for:				
Bird-hunting	+ % hunters in population		+ Regulation awareness	0.003
Ungulate-hunting			+ Benefit of economics + State-payment awareness	<0.001
Angling	+ Vertical integration			0.005
Bird-watching			+ Benefit of regional laws	0.013
improved biotopes for:				
Bird-hunting	- % Population urbanised		- Adaptive management	0.003
Ungulate-hunting	- Population density		+ Using local knowledge	0.001
			-Benefit of licences +local knowledge	<0.001
Angling			+ Number of constraints	0.003
Fungi	- Mixed management + Knowledge leadership			<0.001
Bird-watching			+ Non-conservation laws + Volunteers in management	0.001
numbers per km² of:				
Bird-Hunters	+ Mixed management	+Social objectives		<0.001
Ungulate-Hunters			+ Regional regulation benefit + Local economic benefit	<0.001
Anglers	- State ownership - Vertical trust			<0.001
	- State ownership + % Population urbanised			<0.001
Bird-Watchers	- State management + WB Governance quality			<0.001

Broad findings were: (i) there were17 significant associations with capacity variables, 16 with process variables but only 1 with objectives; (ii) numbers of participants, and trends in numbers, associated more with capacity variables than did trends in resource populations and biotopes; (iii) activities differed in the variables associated with trends in participants, resources and biotopes. To investigate differences across activities, mean values of variables for all countries were correlated across activities. Two of the strongest (*P*<0.002) were for association between regulations and decline in participation (Fig. 1, left).

Figure xxx Trends in participant numbers, averaged across states for each activity, in relation to abundance of regulatory tools (left) and number of ownership categories of land used for the activity (right)





Thus, although a beneficial perception of regulations by both hunters and bird-watchers was associated with improving bird populations and abundance of ungulate hunters (Table 1), across activities both the number of regulations and perception of hindrance for conservation from complying with them were associated with decline in numbers of participants. Also, although a mixture of management types associated positively with participant density in all six activities, with strong significance for game birds (Table 1), participant density across activities was least for activities most dependent on mixed ownership (Fig. 1, right).

Across activities, there were also marked differences in perception of benefit for regulatory and economic measures implemented at local or higher levels. Benefits of regulation were perceived to be greatest if implemented at national level (sign-rank test with N=12, P<0.05), whereas factors affecting incomes were deemed most beneficial if implemented locally (N=11, P=0.015). Benefits perceived from social factors, and costs of compliance with regulations, were not significantly dependent on scale (Fig.1).

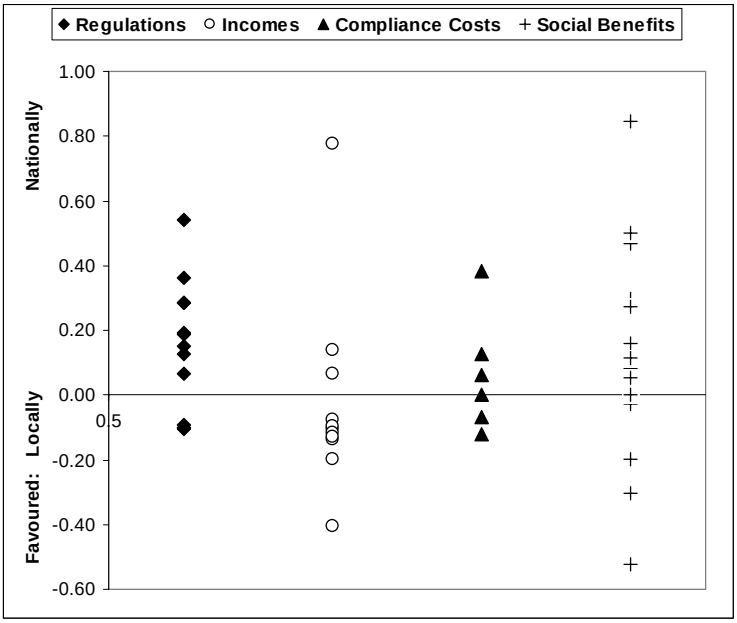
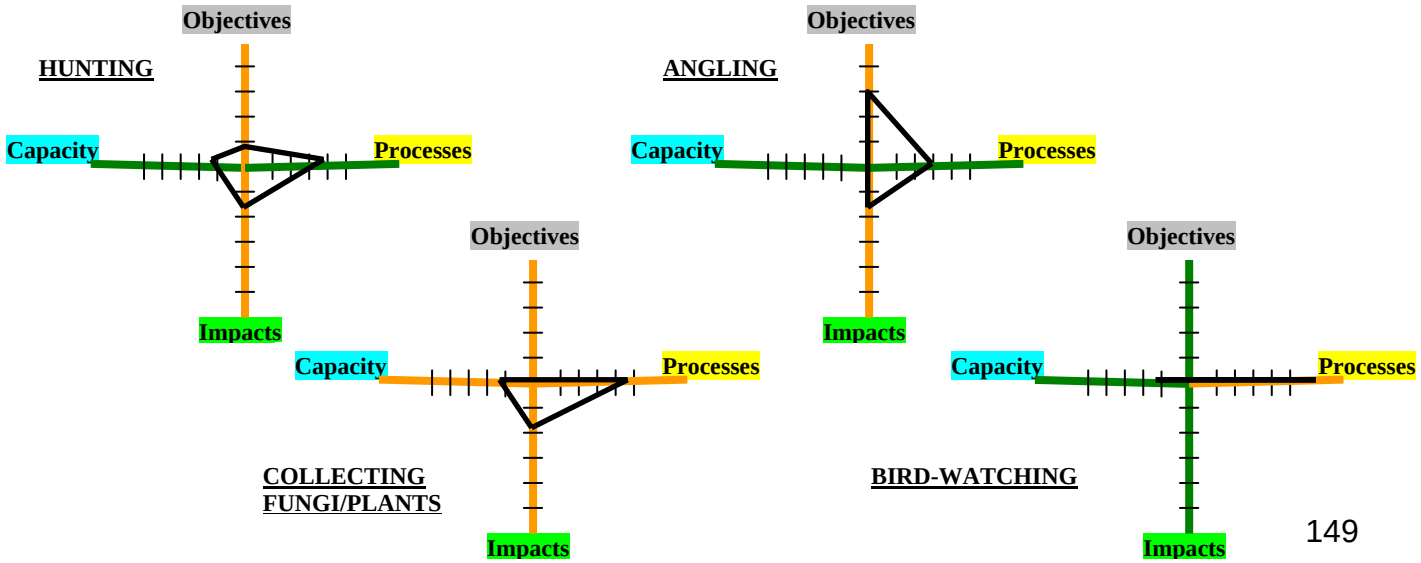


Figure xxx. Each point represents the difference in value of a conservation benefit score at national and at local level for one activity, for two categories of regulation (laws, other constraints) and income factors (markets, state payment), compliance costs and social benefits (benefits of fashion, participation and trust). Values are positive (above the line) where benefit scores were larger at national than at local level.

For each cluster of variables, scores were derived for capacity, objective, process and impact variables from mean values across states (Table 2) for use in Chapter 7 and averaged within colour-codes to create diagrams below. Interpretation is less clear-cut than with a regression-based approach illustrated in Table 1.

TABLE 2 Medians, % or score in 5-cats: (5=++,4=+,3=neutral,2=-,1=--)	Value range	VALUES (means) Bird-Hunting	Ungulate-Hunting	Angling	Fungi	Plants	Watch Birds	Scoring -2	-1	0	1	2	SCORES Bird-Hunting	Ungulate-Hunting	Angling	Fungi	Plants	Watch Birds
Vertical-Integration	1-5	3.44	3.45	3.41	3.32	3.15	3.47	<1.8	1.8-2.6	2.6-3.4	3.5-4.2	>4.2	0	1	0	0	0	1
Horizontal-Integration	1-5	3.50	3.62	3.35	2.52	3.17	3.68	<1.8	1.8-2.6	2.6-3.4	3.5-4.2	>4.2	1	1	0	1	0	1
Local-Role	1-5	2.95	2.82	2.81	2.30	2.61	3.16	<1.8	1.8-2.6	2.6-3.4	3.5-4.2	>4.2	0	0	0	-1	0	0
Instruments Multi-Level	1-7	3.45	3.34	2.74				<1.8	1.8-2.6	2.6-3.4	3.5-4.2	>4.2	1	0	0			
Leadership	0-5	1.76	1.96	1.74	0.94	0.73	1.39	<.8	.8-1.59	1.6-2.39	2.4-3.19	>3.19	0	0	0	-1	-2	-1
Objective-Ecological	0-1	0.76	0.84	0.64				<.15	.16-.35	.36-.55	.56-.70	>.70	2	2	1			
Objective-Economic	0-1	0.17	0.23	0.26				<.15	.16-.35	.36-.55	.56-.70	>.70	-1	-1	-1			
Objective-Social	0-1	0.16	0.12	0.11				<.15	.16-.35	.36-.55	.56-.70	>.70	-1	-2	-2			
Knowledge-Generation	1-5	3.24	3.53	3.47	2.53	2.73	2.84	<1.8	1.8-2.6	2.6-3.4	3.5-4.2	>4.2	0	1	1			
AdaptiveManagement	0-5	2.86	3.20	2.26	0.89	0.73	1.39	<.8	.8-1.59	1.6-2.39	2.4-3.19	>3.19	1	2	0	-1	-2	-1
Tools-Market	0-7	2.42	2.41	2.75				<.8	.8-1.59	1.6-2.39	2.4-3.19	>3.19	1	1	1			
Tools-Regulatory	0-6	3.20	3.37	2.47	1.44	1.27	0.30	<.8	.8-1.59	1.6-2.39	2.4-3.19	>3.19	2	2	1	-1	-1	-2
Tools-Social	0-5	1.32	1.71	1.63				<.8	.8-1.59	1.6-2.39	2.4-3.19	>3.19	-1	0	0			
Benefits-Local	0-1	0.46	0.55	0.58	0.28	0.27	0.13	>.70	.56-.70	.36-.55	.16-.35	<.15	0	1	1	-1	-1	-2
Cost-Local	0-1	0.63	0.82	0.79	0.89	1.00	0.74	<.15	.16-.35	.36-.55	.56-.70	>.70	1	2	2	2	2	2
Participant-Ch/Services	-100-+100	-15.35	-12.79	2.03	4.51	4.81	18.00	<-14.9	-14.9,-5	-4.9,+4.9	+5,+14.9	>+14.9	-2	-1	0	0	0	2
Resource-Ch/Sustainabilit	-100-+100	-2.50	17.39	-5.63	-6.88	-2.22	-9.05	<-14.9	-14.9,-5	-4.9,+4.9	+5,+14.9	>+14.9	0	2	-1	-1	0	-1
Biotope-Change/Biodiversity	-1-+1	-0.23	-0.04	-0.18	-0.43	-0.24	-0.29	<-.49	-.2,-.49	-.19,+.19	+.2,+.49	>+.49	-1	0	0	-1	-1	-1



6.2 Governance Matrix Summary

6.2.1 Introduction

One of the outcomes of the GEM-CON-BIO project is the building up of a Governance matrix linking "governance types and critical ecosystem management characteristics".
The term "Governance" may have different meanings in different contexts. In this report the definition used in the GEM-CON-BIO report on Ecosystem Governance in Europe (Galaz, Hahn and Terry, 2006), and revised by Terry (2007), is adopted. According to this definition "biodiversity governance" is interpreted *"as the way society at all scales manages its political, economic and social affairs with the aim to use and conserve biodiversity"*. Galaz, Hahn and Terry (2006), identified six main "ideal types" of governance, which have then been expanded to seven by Terry (2007) in the document "Governance types in GEM-CON-BIO: their identification, application and integration with the analytical framework".
The term "Critical ecosystem management characteristics" in this GEM-CON-BIO report is referring to *"The main critical features of the managing natural resources in both protected areas and economic sector in order to achieve biodiversity conservation and sustainable use"*.
GEM-CON-BIO Partners developed an analytical framework integrating around 70 factors/variables addressing very different aspects of governance, ecosystem management and biodiversity conservation. The objective of using the analytical framework to carry out case studies was that of providing a common research tool to identify what are the most significant governance and management characteristics which may or may not lead to conservation and sustainable use of biodiversity.
The Governance matrix developed by Terry (2007) is revised in this report by integrating governance "ideal types" and key factors/variables of management characteristics of the analytical framework, identified by the GEM-CON-BIO research team.
Part A of this chapter, after having introduced the Governance matrix, presents the results of the analysis of outcomes of Governance matrices filled in by 27 GEM-CON-BIO case studies research teams in order to test the validity of the governance matrix to achieve the following two objectives:

- To assess the effectiveness of different governance types on biodiversity conservation
- To draw conclusions on impacts of characteristics of governance types on biodiversity conservation

Part B of this chapter presents separately the UNWIRE case study report because of both its specific structure based on the survey results and the approach used to analyse six different uses of wild species at Pan-European level in the 27 Member States of the EU.

6.2.2 Part A

6.2.2.1 Structure of the Governance Matrix to analyse Case Studies results

The analysis is carried out by clustering 27 GEM-CON-BIO case studies into the three groups, to achieve comparability between case studies: a) EU and US case studies at local/ecosystem level, b) EU case studies at regional, international level, and c) non-western case studies.

The governance types for EU and US Countries, as identified by the GEM-CON-BIO research team (Galaz, Hahn and Terry, 2006; Terry, 2007), are the following:

5) State Controlled: a) National/Federal; b) Decentralised; c) Delegated; d) Corporatist
6) Community based
7) Policy Network Group
8) Market based

For each of the above governance types Terry (2007) provides summary descriptions as in Box 1 below.

Box 1 – EU and US Governance types descriptions according to Terry (2007)

1a) State Controlled: National/Federal: This governance type is typified by strong centralised control with policy being implemented and the area managed by the appropriate state authority. The main objectives of this approach to management are to meet regulatory and policy requirements and economic development. These systems have a strong vertical control and coordination with the relevant Ministry, but are unlikely to work with local communities or a broad stakeholder base. Generally the management practices are constrained and less able to respond adaptively to changing conditions. The use and value of resources is controlled centrally and therefore little value is experienced by local communities. This approach would not be applied to Federal countries where Environmental responsibility is delegated to the regional level. This distinction is made, because already between the federal and regional authority there is often considerable difference in priorities and implementation. Examples of this approach include nationally designated protected areas such as National Parks in non-federal countries and state controlled forests.

1b) State Controlled Decentralised: An appropriate action to make governance more effective is to put the control and management of an issue at the most appropriate administrative level. Different countries in Europe are going through either different processes of centralisation or decentralisation. Denmark for example in 2006 went through a process of decentralisation where environmental management is now the responsibility of the Communes (NUTS3) and not the regions (NUTS2). This has had significant implications for the management of resources and conservation of biodiversity, including reduced capacity and knowledge at the Commune level and smaller budgets. However a decentralised approach should increase the adaptability of management plans and the integration with local stakeholders.

1c) State Controlled Delegated: In this model, the state authority delegates management to an external body. This may be an NGO, private sector actor or academic institution. Invariably this happens on a local site level, but in some countries much of the management of protected areas for example has been delegated to NGOs due to a lack of state capacity. Similar to a decentralised approach, there is a more local focus to management here leading to greater adaptability and integration with local communities. Delegated control tends to have great freedom to implement innovative approaches and therefore also greater use of societal mechanisms.

1d) State Controlled Corporatist: Corporatism (or what is now called neo-corporatism) can be described as the interactions between government, labour unions, and the private sector in deciding and implementing policies. Popularly it has come to be viewed as a means of big business influencing government policy to the detriment of the public. Corporatism has been widely used in the affluent open economies of European countries, especially Finland, Netherlands and Sweden. In natural resources, corporatism refers to decisions and management being negotiated or even consigned to 'interest' organisations. Although this could include environmental organisations it invariable refers to industrial companies. Therefore this process has been identified as placing barriers between those trying to ensure that environmental requirements are fulfilled and those organisations using the resources. However it does also have the potential to place greater impetus on sectoral partners to manage resources sustainably and meet environmental standards. Corporatist structures tend to have low community participation and stakeholder integration and are also less adaptive to changing conditions. There are usually several management objectives. An example of this is the implementation of the Water Framework Directive in Sweden.

2) Community-based: The defining feature of this approach is that the objectives and processes of management are set by the communities that are dependent on the resource. This is very different from a state controlled approach. Although state controlled approaches dominate in Europe, there are numerous examples of community based conservation approaches. For example the Verderers of the New Forest in the UK, are members of the local community who manage ponies that graze parts of the New Forest. They are responsible for managing numbers and regimes. This process has existed for centuries and now cooperates with the recently established National Park Authority in the area. Community based approaches tend to place the resilience and long term survival of the resource at the centre of their efforts and are based around informal institutions. Here there is a strong leadership role for key stakeholders and there can be extensive local participation. With a strong integration of local knowledge, it is possible for the model to be highly adaptive.

3) Policy Network based: Policy network based governance types involve the negotiation of objectives and activities between State actors and a range of stakeholders which could come from interest groups and the private sector. This approach represents a collaborative effort between parties with a vested interest in a resource and although usually driven by governing policy or legislative requirements can embody many different types of activity (Imperial 2005). Watershed management in Europe provides a good example of this approach. The Water Framework Directive of the EU and the Ramsar convention (and other MEAs such as the Rhine Convention) focus on a broad watershed area for the management of wetlands. Immediately this means that a diverse range of stakeholders are affected by any actions taken within the frame of these legally binding agreements. Implementation can be through various approaches, such as the establishment of management boards through memoranda of understanding between stakeholders or via financial support mechanisms such as the Interreg Programme. Features of policy network approaches include broad stakeholder participation, with a strong potential for adaptive approaches (although not necessarily the case). Here there is a strong role for multi-level governance and leadership from key stakeholders.

4) Market based: Market based approaches to management can still be driven by policy objectives and usually provide stakeholders with economic incentives to implement actions in compliance with policy or regulatory requirements. An example of this approach is the agri-environmental scheme run within the Common Agricultural Policy. Here farmers are eligible to receive funds for environmentally friendly management activities on their land. This approach is highly variable in the level of stakeholder participation and integration it can achieve. Generally speaking societal tools are less important for these mechanisms, as payments are made for specific actions. Adaptability can be high when linked to the economic incentives, but if the feedback with these incentives is broken, then response will be slow.

For what regards non western Countries, the Governance types are those proposed by Borrini-Feyerabend and Lassen, (2007), as follows:

6) Government-based
7) Shared governance
8) Community governance
9) Private governance
10) Open Access

For each of the above ideal governance types the definitions given by are provided in Box 2 below.

Box 2 – Non-western Countries types of governance according to Borrini-Feyerabend and Lassen (2007)

1) Government-based: Authority, responsibility and accountability for management of natural resources is with a government agency that may or may not consult with other stakeholders prior to making decisions. The responsible order of government may be at the national or provincial (in a federal state) level, or at the local or municipal level. Management, however, may be *delegated* by government to a designated organization (e.g. a local government body, indigenous peoples' organization, private corporation, environmental NGO or a multi-stakeholder group). In this case some management decisions may be taken by the delegated organisation but within the mandated direction and objectives.

2) Shared governance: Authority, responsibility and accountability for management are shared in various ways among a number of parties, e.g. government agencies, local communities, NGOs, private landowners, industry representatives. In *collaborative management (co-management),* formal authority for decisions rests with one party (often a governmental agency) but the agency is required to collaborate with other stakeholders. In *joint management*, accountability for management rests jointly with various actors who sit on a management body with decision-making authority (e.g. this has been suggested as an approach for high seas marine areas beyond the jurisdiction of any one country).

3) Community governance: Authority, responsibility and accountability for management is with local communities and/or indigenous peoples who collectively own or claim rights to the lands based on traditional use and occupancy. The term local community is used to mean a socially and geographically networked group of people, not necessarily homogeneous, who live close to or care for the same natural and cultural resources. Local communities may include individuals or groups with tenure and customary rights of use or ownership in an area, and those who have a direct dependency on the area. Members of local communities who do not have tenure rights may also be active contributors to areas governance along with the relevant landowner(s). Governance is practiced through a locally agreed form of decision making, which may have roots in traditional, customary or ethnic practices. Negotiations with government may result in recognition of specific rights, definition of broader accountabilities to society and possibly a shared governance arrangement. Challenges for local community governance include empowerment, clarifying legal issues and establishing vertical links for institutional and financial support.

4) Private governance: Authority, responsibility and accountability for management are with the private (non-government) owner (or owners) of the lands and natural resources. The owners can be individuals, corporations or NGOs. They may govern the natural resources for-profit or a not-for-profit.

5) Open access: Authority, responsibility and accountability are *de facto* and possibly *de jure* with no one, leaving the natural resources at the mercy of exploitative forces of various types.

Both the above EU and US (see box 1) and non-western Countries (see box 2) "governance types" have been analytically described by some critical characteristics for ecosystem management proposed by Terry (2007) on the basis of the GEM-CON-BIO analytical framework. In this report these characteristics are structured in the four clusters of Case study profile, Institutional aspects, Objectives and instruments, and Governance impacts as follows:

Case study profile: This cluster of critical ecosystem management characteristics was added to that proposed by Terry (2007), because when theoretical ideal governance types have to be studied in real case study areas, factors such as area extension, population density, ecosystem types present in studied areas, are all critical aspects to be considered for assessing the effectiveness of governance types. These characteristics can highlight, for instance, the case of eventual differences in governance types between those adopted to manage a protected area with a very low population density compared to governance types used to manage a protected area including towns and economic activities within its boundaries. Characteristics of the study area profile to be accounted for in the governance matrix are:

- Case study analysis level to be specified according one of the following categories: Ecosystem/local, Regional, National, European, Global
- Area extension (Km²)
- Population density (Inhabitants/ Km²)

- Ownership structure referring to the common recognition of the rights of someone over the propriety and use of some natural resources.
- Ecosystems present in the study area (EUNIS Habitats types)

Institutional aspects: This cluster of critical ecosystem management characteristics is grouping some factors of governance which are inherently linked to the capacity and functioning of institutions. These are the following:

- **Main Governance types:** Authors by following the definition given in the document "Governance types in GEM-CON-BIO" (Terry 2007), were asked to specify the main governance type for their study area. In case of a mix of governance types their relative importance should have been pointed out by percentages indicating the part of the study area extension under each governance type.
- **Level of vertical integration:** This refers to the level of collaboration between different layers within each organisation involved in governance.
- **Level of horizontal integration:** This refers to the cooperation between different stakeholders or departments within the same layer of an organisation involved in governance.
- **Local community participation:** This refers to the degree of involvement of local community in governance.
- **Multi-level governance:** As defined by Terry (2007) this refers to a **"***situation where the governance of natural resource use develops beyond the simple transmission of central government policy to the local level. Governance in this case can be complex involving differing degrees of autonomy and collaboration between different types of actor (i.e. state, NGO or private sector) at different organisational levels. These relationships can be fluid and non-hierarchical, but equally could be rigidly defined and strongly hierarchical*".
- **Leadership role:** this refers to a situation where governance is based on the leadership of an organisation or of an individual. Often, but not exclusively, this may be the case where there is the lack of good functioning of institutions, community based approaches, policy networks or markets.

Objectives & instruments: This clusters of critical ecosystem management characteristics is grouping some factors which are identifying the goals and tools used in managing natural resources. These are:

- **Main Ecosystem services** prioritised in management can be considered the overall objective of governance strategies
- **Main Management Objectives** which can results in ecological, economic and social goals to be achieved by management of ecosystems.
- **Adaptive management** referring to approaches based on dynamic management which adapt to changing conditions of ecosystems.
- **Key policy instruments** are those tools put in place to implement policies and management use of natural resources. These can range from regulatory based instruments such as laws and regulation, to economic/financial based instruments, such as markets, incentives, compensation payments, from social tools, such as education and cultural programmes, participative tools, etc. to information and communication strategies.

Impacts: These clusters of characteristics are grouping some of the conclusions on the effectiveness of different governance types in relation to biodiversity conservation and sustainability of natural resources uses. The following characteristics are therefore to be considered the outputs from the analysis of governance types in GEM-CON-BIO case studies:

- **State of Biodiversity:** Ultimately this project is concerned with the impacts of different governance types for natural resource use on biodiversity. Therefore this defining characteristic aims to typify the impact each of the governance types has on biodiversity.
- **Maintenance of ecosystem services:** Successful management needs to look beyond the production of specific resources such as timber or crops, to the delivery of ecosystem services. This is one of the fundamental tenets of the Ecosystem Approach. Several of the defining characteristics identified refer to the ecosystems approach and this identifies the outcome of governance types for the delivery of ecosystem services.

- **Sustainability of resource use:** The sustainability of resource use identifies how sustainable is the use of natural resources in reference to biodiversity conservation, as it is resulting by the governance and ecosystem management analyzed**.**
- **Generation of Knowledge** which can be a goal in itself or results of managing natural resources as it happens in learning by doing or experimental studies approaches.
- **Who benefits and who loses from analyzed management:** This is clearly an important outcome from case studies to formulate ecosystem management policy. In facts in both the cases of successes or failures in biodiversity conservation to know who is to going to gain benefits or bear the costs of provision or loss of biodiversity is valuable information upon which to develop and implement ecosystem management policy.

The crosschecking of the governance ideal types with the critical ecosystem management characteristics has resulted in the governance matrix based on that proposed by Terry (2007).

6.2.2.2 Assessing the effectiveness of different Governance Types on Biodiversity Conservation

The situation amongst the 17 ***EU and US case studies at local/ecosystem level*** in relation to the governance types is the following (see also Fig.1):

- 3 case studies with a governance of 100% State Controlled National/Federal
- 2 case studies with a governance of 100% State Controlled Decentralized
- 1 case study with a governance of 100% State Controlled Delegated
- 1 case study with a governance of 100% State Controlled Corporatist
- 2 case studies with a governance of 100% Market based
- 4 case studies with a mix of a predominant State controlled National/Federal (at least for 50-60%) and different minor percentages of other forms of governance
- 3 case studies with a mix of a predominant market based (at least for 50-60%) and different percentages of other forms of governance
- 1 case study with a mix of Policy network based (75%) and Market based (25%) forms of governance

This situation has not allowed using of statistical analysis tools to achieve scientific meaningful results also because of the qualitative character of some variable analyzed. However some interesting information has been drawn out from case studies governance matrices, by looking at the improvements or deteriorations of the state of biodiversity associated to a particular type of governance and to critical ecosystem management characteristics.

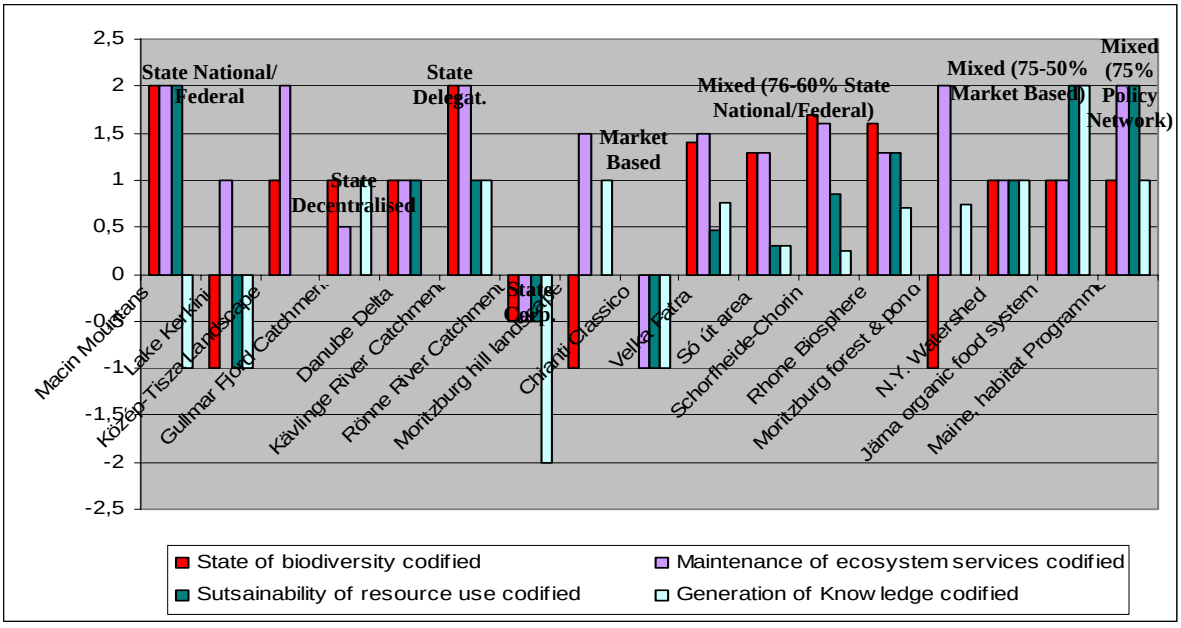


Figure xxx - EU and US GEM-CON-BIO case studies: governance types impacts on state of biodiversity, maintenance of ecosystem services, sustainability of resource use and generation of knowledge

It has to be stressed the fact that all the following information should be confirmed by the analysis carried out on a greater number of case studies to be considered as valid indications of what are the governance types and critical ecosystem management characteristics more effective for biodiversity conservation. From the analysis emerges that in GEM-CON-BIO study areas, mix of governance types are performing better than single governance types for what concerns **state of biodiversity**. In facts 7 out of 8 study areas with mixed governance types are showing an improvement of the state of biodiversity and only one deterioration. Instead, among those study areas with only one type of governance, 5 out of 9 show an improvement in the state of biodiversity, 3 a deterioration and one no change (see fig. 1). Also for the impacts of different governance types on maintenance of ecosystems, sustainability of resource use and generation of knowledge, it appears that among GEM-CON-BIO EU and US case studies, mixed types of governance are performing better than single types. This result, if confirmed by an analysis carried out on a greater number of case studies, could be an indication that to achieve effectiveness on biodiversity conservation it is advisable to adopt, also at local level, a mix of different types of governance to manage at best ecosystems for biodiversity conservation. In other words, to achieve ecological, economic and social sustainability of resource uses in reference to the complex objective of biodiversity conservation, it may be necessary also at local level to develop and implement simultaneously different types of governance, as for instance often it happens within protected areas for core and for buffer zones.
The situation amongst the 9 ***non-western case studies*** in relation to the governance types is the following (see also Fig.2 below):

- 3 case studies showing de jure a government based type of governance but de facto a community based governance
- 1 case study showing de jure a shared governance but de facto a predominant community based with to some extent government based and shared governance
- 2 case studies showing a shared governance type
- 1 case study showing a government based and shared governance (co-management)
- 2 case studies carried out at ecosystem/regional level, showing a mixed of all types of governance overlapping

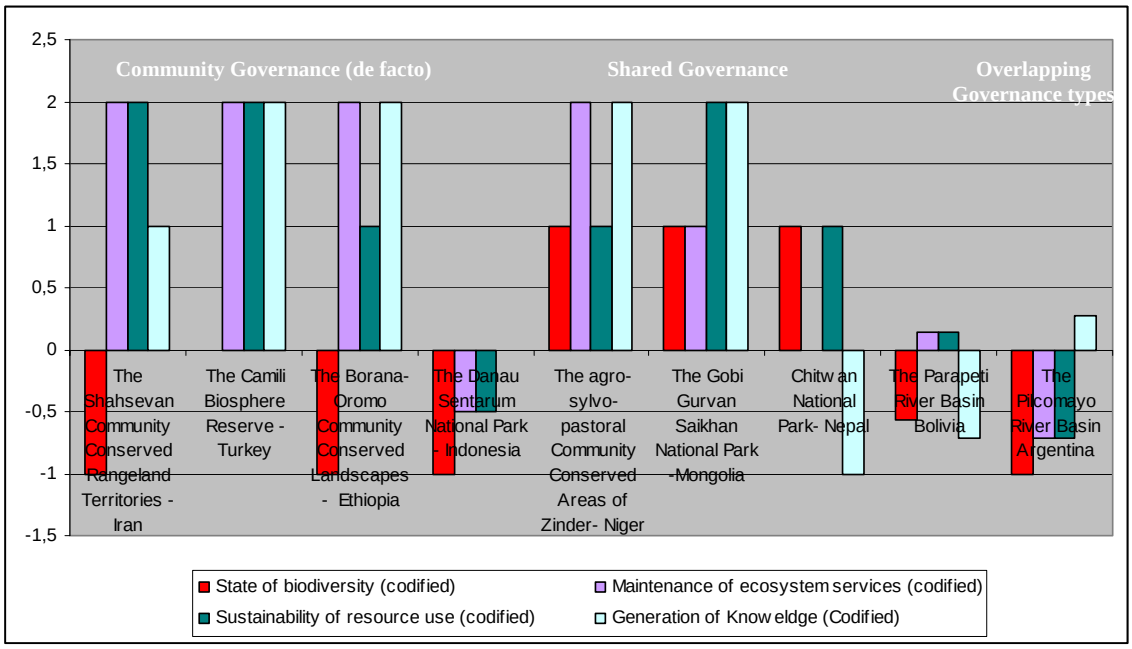


Figure xxx – GEM-CON-BIO Non-western case studies governance types impacts on state of biodiversity, maintenance of ecosystem services, sustainability of resource use and generation of knowledge

First information that emerges from the analysis of the outcomes of the 9 non-western case studies is that the type of governance performing better in terms of conserving biodiversity is **shared governance**. The situation is not so good for what regards the impacts on biodiversity of the four study areas showing (de facto) **community governance**. However for two of these case studies the reason for negative impacts on biodiversity is attributed by the authors not to the community governance type per se but to intervening

disturbance factors and lack of recognition of customary governance system. Moreover, it is interesting to note that in three case studies out of four showing de facto a community governance, maintenance of ecosystem services is considered high, sustainability of resource use is assessed as sustainable in one case and sustainable and actively contributing to conservation in the other two, while generation of knowledge results high in two cases and good in the other one. This information allows to look at community governance in these three case studies with some optimism for the real chances that also biodiversity conservation would show improvements in the future. Finally the two case studies carried out at ecosystem/regional level and showing a **mix of all types of governance** overlapping with each other but not integrating, are reporting the worst impacts for all the variables analyzed.

6.2.2.3 Critical Ecosystem Management Characteristics of Governance Types and Biodiversity Conservation

Some more information on relevant factors for governance effectiveness for biodiversity conservation can be achieved by looking at critical ecosystem management characteristics.
To investigate among ***EU and US case studies at local/ecosystem level*** what critical ecosystem management characteristics are those exerting the higher impacts on effectiveness of governance types it has been necessary to investigate at first some features of study areas, to understand if these already may influence the effectiveness of governance types. From the analysis carried out it emerges that, while both area extensions and population densities below 100-150 inhabitants/Km² seem do not have correlation with governance effectiveness for biodiversity conservation, ownership structure and typology of ecosystem managed appear to have a certain influence on resulting state of biodiversity.
For what regards the ownership structure, the 8 GEM-CON-BIO EU and US study areas with a predominance of state ownership for at least 55% of their extensions show 7 positive impacts and only one negative on state of biodiversity, while the 9 study areas with a predominance of private ownership for at least 55% of their extension show 5 positive impacts, one neutral and 3 negative. This result was largely expected given that protected areas are usually state-owned in the EU and this was also the case for the protected areas analyzed by GEM-CON-BIO case studies.
For what concerns the facilitation of governance effectiveness by specific main ecosystem typologies, from the analysis carried out on GEM-CON-BIO EU and US case studies at ecosystem/local levels, it appears that woodland, forest and other wooded land are those more "easy" to be managed for biodiversity conservation (8 positive impacts, one neutral and only one negative) compared to agricultural land (3 positive and 2 negative impacts) and inland surface water (1 positive and one negative impact). On this regards the case of Chianti study area is quite exemplificative because the great extensions of woods and forests somehow counterbalance the negative impacts on biodiversity exerted by highly intensive vineyards cultivations.
The analysis of critical ecosystem management characteristics of GEM-CON-BIO EU and US case studies at ecosystem/local levels, show that, among the institutional aspects considered, the leadership role results the more influencing factor. In facts, contrary to level of vertical and horizontal integration, community participation and multi level governance, leadership role shows a very good correlation (0.83) with the state of biodiversity. This result if confirmed by an analysis carried out on a greater number of case studies could be interpreted as the fact that actually in institutional functioning, it is the willingness, capacity and determination, of single individuals or organisations which make a difference for biodiversity conservation. This could be an indication to reform institutions and their functioning (i.e. level of vertical and horizontal integration, community participation and multi level governance) in order to make them more apt to deal with biodiversity conservation.
For what concerns objectives and instruments of governance, among those analyzed in EU and US GEM-CON-BIO case studies at ecosystem/local levels, main ecosystem goods and services prioritized in management of case study areas and appropriateness of management objectives appear to have an influence on the effectiveness of governance for biodiversity conservation.
In the case of ecosystem goods and services prioritised in management, this result if confirmed by the analysis of a greater number of case studies, could point out the fact that when governance of ecosystems is prioritising only the production of goods and services which have the character of private goods (commodities) usually resulting from provisioning and cultural services, without considering also the

production of public goods (non-commodities) usually resulting from supporting and regulating services, then there is a real risk of impacting biodiversity negatively.
In the case of management objectives, among 15 EU and US case studies at ecosystem/local levels (i.e. if the two Moritzburg case studies are left out of the analysis), a correlation appears to be between state of biodiversity and the average appropriateness of all objectives (0.61), the appropriateness of ecological objectives (0.70), and also for economic ones (0.53). If the results of the analysis carried out on 15 case studies would be validated also by a greater number of case studies, then this could be an indication that the appropriateness of management objectives is a very important factor for the resulting state of biodiversity. This is also on line with the information given by authors in their case studies synthesis and reported in the synthesis of GEM-CON-BIO EU and US case studies.
Coming to key policy instruments, the analysis carried out shows that among EU and US GEM-CON-BIO case studies at ecosystem/local levels, the types of governance associated to key policy instruments which are performing better in terms of impacts on the state of biodiversity, maintenance of ecosystem services and sustainability of resource use are governance types mainly using regulatory tools (i.e. state controlled centralized/decentralized) and those preferring to adopt some participative processes such as state controlled delegated, Community participation and Policy network governance types. The performance of market based governance types is showing both positive and negative impacts on state of biodiversity, maintenance of ecosystem services and sustainability of resource use.
Finally, among GEM-CON-BIO case studies, for adaptive management not an evident correlation seems to be present with state of biodiversity (0.44) and maintenance of ecosystem services (0.43) but a possible one with sustainability of resource use (0.64).
Coming to critical ecosystem management characteristics of ***non-western case studies***, while no relevant information is offered by case study profiles, some indications for what regards institutional aspects and key policy instruments emerge from the results of the analysis carried out. From the analysis of governance matrix outcomes it emerges that also for institutional characteristics the best performances have to be ascribed to the 3 case studies showing a **shared governance type**, while the four case studies showing (de facto) a **community type of governance** are obviously recording high/good scores for local community participation, 3 high and one basic scores for leadership role.
For what regards the analysis of objectives and instruments it is interesting to note that, contrary to EU and US case studies, within GEM-CON-BIO non-western case studies there seem not to be any relationships between the appropriateness of management objectives (average of all types of objective) and the positive biodiversity conservation. A possible explanation for this could be that the appropriateness of management objectives for conservation risks to remain wishful thinking in cases where means to achieve these are not sufficient. Also for adaptive management no evident relationship is recorded with positive biodiversity conservation. However it is interesting to note that among the four case studies showing (de facto) community governance types, 2 are scoring high and one good levels of adaptive management. In this case a possible explanation could be simply that adaptive management can be implemented also where biodiversity conservation is not in a positive state. Finally coming to the key policy instruments used for managing ecosystems it is important to point out that, with the exception of two cases using also social tools, regulatory instruments are those by far predominantly used in all case studies being these showing positive or negative biodiversity conservation.

6.2.2.4 Conclusions

The analysis of effectiveness on biodiversity conservation of different governance types has been constrained by the limited number of GEM-CON-BIO case studies. This is evident particularly when the total 27 case studies are sub-divided, for reasons of comparability, in EU and US case studies carried out at ecosystem/local level (17), EU case studies at national/international level (2), and non-western case studies (9). Beside this, among the 17 EU and US case studies at ecosystem/local level, the great variety of different governance types, together with the presence of mixed types in 8, has further constrained the possibility to reach meaningful results from statistical analysis.
Said that, it has however to be highlighted that the overall scope of analysing the application of the developed Governance Matrix to GEM-CON-BIO case studies, was testing its validity in pointing out what could be the governance types and critical ecosystem management characteristics more effective in reaching

biodiversity conservation. Seen in this perspective, from the analysis carried out on GEM-CON-BIO case studies, it is possible to say that the Governance matrix can be an useful tool to identify those Governance types and critical ecosystem management characteristics leading to more effectiveness in biodiversity conservation. To support this affirmation, the conclusions reached for the case studies analysed are presented here. Once again it has to be pointed out that the findings of the governance matrix applied to GEM-CON-BIO case studies should be eventually validated by the analysis of a greater number of case studies, before results achieved could be considered an indication of what are the most effective governance types and critical ecosystem management characteristics for biodiversity conservation.

The results of the analysis of governance types of GEM-CON-BIO ***EU and US case studies at ecosystem/local level***, offers some points of explorative discussion for the formulation of policy guidelines in order to enhance the effectiveness of governance for biodiversity conservation.

In synthesis the results achieved, if confirmed by an analysis carried out on a greater number of case studies, could offer the opportunity to explore more in depth the chances that an area, with a predominance of state ownership structure, (for at least 55% of its extension), and a predominance of woodland, forest and other wooded land, is likely to facilitate the effectiveness of governance for biodiversity conservation.

For what regards governance types, if the outcomes of the analysis carried out on EU and US GEM-CON-BIO case studies at ecosystem/local level would be validated by a greater number of case studies, it could be worthwhile to investigate the possibility of the improvement of effectiveness on biodiversity conservation by a mix of different governance types. This could be done by focusing in particular on studying the possibilities of improving the effectiveness of biodiversity conservation by a mix of governance types with strong leadership role played by some individuals or organisations, a good management plan prioritising all ecosystem's goods and services (provisioning, cultural, regulating and supporting) and setting the appropriate ecological, economic and social objectives, to be achieved by using mainly regulatory, participatory tools and where needed economic incentives.

Unfortunately the only two ***EU case studies at national/international levels*** did not allow the comparison of results for drawing out of explorative indications. This instead was possible in the case of UNWIRE whose conclusions are reported below in Part B.

For what regards non-western case studies, the GEM-CON-BIO results confirm that indigenous people and local communities can be most effective actors in the conservation of biodiversity either alone (as in Community Conserved Areas) or in shared governance settings (e.g. in partnerships with governments at local and national levels). Yet, some conditions need to be in place fro this to happen, as stressed in the specific recommendations collected as part of the GEM-CON-BIO Aid Policy Guidelines.

6.2.3 Part B: GEM-CON-BIO Case Study Matrix Report Use Nationally Of Wild Resources Across Europe (UNWIRE)

To enable comparison of results from UNWIRE with western and non-western case studies (Table 1), all state categories for management and ownership were combined into one, and co-management was treated as an equal mix of public, private and community involvement. The UNWIRE trend in participants was used as a proxy for status of ecosystem services, trend in resources for sustainability of resources status and biotope quality for status of biodiversity. Other UNWIRE scoring shown table 2 of chapter 6.1.

Associations of management and ownership variables were weaker than for other capacity, objective and process variables. However, across study categories, community management was always positive whereas communal ownership was negative; there were stronger positive associations with having a local role in management, knowledge leadership, clear objectives, using adaptive management and tools. As in UNWIRE, a focus on regulatory tools associated negatively with ecosystem services and positively with biodiversity. Sustainability of ecosystem services tended to correlate strongly with biodiversity status across western studies, and importance of objective setting was greatest locally. Regression analyses were then used to identify the dominant associations, with and without the strong effects of objective-setting (Table 2).

Table xxx Significance of correlations for governance and other socio-economic variables (in columns) with E=Ecosystem Services, S=Sustainability, B=Biodiversity (in rows), for UNWIRE, international, local and combined case studies levels, *P*<0.1 (+,- alone), *P*<0.05 (pale gray), *P*<0.01 (dark grey) and P<0.001 (black).

TABLE 1		INITIAL INSTITUTIONAL CAPACITY														OBJECTIVES			PROCESS+TOOLS					IMPACTS		
		Management				Ownership					Integration		Local	Multi	Leader				Adapt.	Tools			Knowl	Ecosys	Sustain	Biodiv
		state	private	comm.	mixed	state	private	comm.	free	mixed	Vertic.	Horiz.	role	level	-ship	Ecol.	Econ.	Social	mgmt.	market	regulate	social	gener	service	-ability	-ersity
UNWIRE	E																				-					
	S																									+
	B			+																			+		+	
Inter-national (*n*=8)	E													-							-					
	S		+				+												+							
	B													-												
West, local (*n*=17)	E														+	+	+	+	+						+	
	S	-		+											+		+		+			+	+	+		+
	B						-								+				+		+				+	
NonWest local (*n*=9)	E							-					+		+		+	+	+		-	+	+		+	
	S							-		-			+		+		+		+		-	+	+	+		
	B	+	-	+	-											+											
Local	E							-					+		+	+	+	+	+		-		+		+	
	S	-						-					+		+		+	+	+			+	+	+		+
	B												+	+	+	+			+		+				+	
Combine	E												+		+		+	+	+		-	+	+		+	+
	S			+				-					+		+		+	+	+			+	+	+		+
	B							-			+		+	+	+	+			+		+			+	+	

Table 2. Regression analyses of ecosystem variables (in columns) on governance variables and case-study categories, showing Student's *t* (with * for P<0.05, ** for P<0.01 and * for P<0.001) for each governance variable or factor, and the % of variation in the ecosystem variable that was associated with each regression.**

TABLE 2	Ecosystem-services	Sustainability	Biodiversity
Local, including objectives (n=25)			
Variable 1	+ Leadership (t=3.6**)	+ Leadership (t=5.2***)	+ Leadership (t=5.6***)
Variable 2	+ Objective economic (t=3.0**)	+ Objective economic (t=2.5*)	+ Regulations (t=4.8***)
Variable 3		+ Community mgmt. (t=2.3*)	+ Objective ecological (t=4.5***)
R^2 (*% variation explained*)	*60%*	*75%*	*84%*
Local, excluding objectives (n=25)			
Variable 1	+ Leadership (t=5.4***)	+ Leadership (t=7.3***)	+ Leadership (t=7.2***)
Variable 2	- Regulations (t=3.6**)	+ Community mgmt. (t=3.8***)	+ Regulations (t=5.6***)
Variable 3	+ Western local sites (t=2.6*)	- Mixed ownership (t=3.2**)	+ Horizontal integration (t=3.4**)
R^2 (*% variation explained*)	*67%*	*78%*	*80%*
Combined, including objectives (n=30)			
Variable 1	+ Leadership (t=4.6***)	+ Adaptive mgmt. (t=4.3***)	+ Leadership (t=4.4***)
Variable 2	+ Objective economic (t=2.6*)	+ Leadership (t=2.6*)	+ Objective ecological (t=3.4**)
Variable 3	- Regulations (t=2.1*)		
R^2 (*% variation explained*)	*74%*	62%	*52%*
Combined, ex objectives (n=33)			
Variable 1	- Regulations (t=6.52***)	+ Adaptive mgmt. (t=3.9***)	+ Leadership (t=5.6***)
Variable 2	+ Leadership (t=6.51***)	+ Leadership (t=2.2*)	- Community mgmt. (t=2.6*)
Variable 3	+ Western local sites (t=2.6*)		
R^2 (*% variation explained*)	*73%*	61%	*52%*

With different scores justifying separation of six UNWIRE activities, the resulting total of 34 case studies (33 with data on regulations) gave some highly significant results. Differences between study types had little effect: these factors either exited regressions or did not displace other variables if forced in. However, there were too few studies at national level for effective comparison with local studies, so it remains unclear why studies lacked associations for objective-setting at international level. Also, were negative effects of state roles strong in UNWIRE, but not in local studies, because many of the other studies were state reserves?

The governance variables that associated consistently with ecosystem variables were knowledge leadership, emphasis on objectives and adaptive management, with horizontal integration also good for biodiversity conservation. Such governance is typical of policy networks and community-based management. However, weak associations in Tables 1 and 2 with assignation of community management, and negative links in UNWIRE with such management, suggest that focussing analysis on specific capabilities and processes may be better than trying to define management holistically. An even more important consideration is causation of the associations. For example, to what extent were associations of regulations with ecosystem service provision negative because high compliance costs were a disincentive to maintain the services, or because strict regulations were imposed to improve poor services?

This concluding integration of UNWIRE with the other western and non-western case studies provides a basis for policy considerations based on statistically robust evidence, from UNWIRE and across all studies:

1. UNWIRE estimated 6.6 million hunters in the EU, about 6 million bird-watchers and 24 million anglers, with annual spending likely to exceed €40 billion. The ecosystem service provided by wild resource use (with larger but poorly defined numbers of people collecting plants and fungi) is worth systematic recording (as in North America) because it represents valuable natural resource use decoupled from adverse impacts.
2. Thus, declines in wild resources or biotopes were unrelated to increasing use of the resource (as indicated by increasing participation). Ungulate populations were stable or increasing across the EU, game-bird stocks had increased in countries with high hunter density and awareness of regulations, and two eastern states recorded more than 80 people/km^2 collecting fungi without declines in resources. Can human interest that spends >€100/ha annually, be better coupled positively to restore biodiversity lost from cultivated land?
3. A 12-15% decline in numbers of hunters during 1996-2006, and high variation between states in density of those using vegetal resources and watching birds, indicates scope for growth in participation. Supporting such human resources for conservation may be especially important in countries with a dominance of state ownership or management, which also had low densities of hunters, anglers and bird-watchers. Trends in participation were linked to social cohesion, such that hunter numbers declined least and bird-watching increased most where their representatives recorded mutual trust and respect for conservation management. Strengthening and broadening DG Environment's Sustainable Hunting Initiative would seem appropriate.
4. Favourable associations with regulations were recorded by hunters, anglers and bird-watchers, though participation in the six activities declined most for those with highest costs of complying with regulations. Economic associations were strongest for ungulates; state officials perceived high costs from wildlife where ungulate-hunting was in decline, with countries that recorded increase in ungulate stocks also noting decline in quality of ungulate biotopes. Biotope decline was also perceived where there was least horizontal social integration, low use of local knowledge for managing ungulates and few local volunteers for birds. Overall, implementation of regulations was favoured at national level but financial measures locally: "national sticks but local carrots". How can the EU best adjust regulatory, economic and social measures for conservation?
5. Ecosystem services correlated with economic objectives and negatively with regulation across all studies, whereas biodiversity associated with ecological objectives and positively with regulations. This supports the concept of a dual approach for conservation. It also raises a need to know more about possible perverse effects of regulations where biodiversity conservation is to be promoted through use of ecosystem services.
6. Strong findings on adaptive management and devolved governance are an endorsement for recent CBD recommendations for sustainable use of biodiversity. Encouragement of strong objectives features in current European conservation. However, there is probably much scope to exploit the strength of benefit from institutional leadership, especially for guiding decisions made locally because these actions summate to change environments. Objective measures of leadership, adaptive management, objectives and regulatory tools will be important for future studies to maximize conservation benefit from these governance measures.
7. If appropriate data could be collected systematically, through a unified system for ecological monitoring, recording resource use and collecting governance measures, it would be possible not only to answer many of the questions raised by this analysis, but also to initiate adaptive governance for the environment.

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CHAPTER 7. POLICY GUIDELINES

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7.1 Introduction

In Europe, human societies have affected their landscapes and the other species living there possibly more than anywhere else in the world. The change has been so pervasive that many of our biodiversity rich areas can only be maintained and conserved through some form of human intervention and management. As a matter of fact, biodiversity and human wellbeing have become so closely intertwined that it is nearly impossible to separate them.

Today, our capacity and willingness to extract natural resources or modify our ecosystems has increased exponentially and even the landscapes we protect for their value in sustaining biodiversity are surrounded by intensively used areas. Overall, the effect on biodiversity and our future wellbeing is not positive. Despite protecting more of the European continent than ever before (some 18% of the European Union is protected under Natura 2000 alone), we are still witnessing strong rates of species decline (for instance 42% of native mammals, 43% of birds, 45% of butterflies, 30% of amphibians, 45% of reptiles and 52% of freshwater fish are said to be declining in numbers throughout Europe[7]). Political targets have been established to implement the policies that will address this decline. Much of their focus is not on nature protection legislation or activities, but rather on those sectors of natural resource use and economic development that have the greatest impact.

It is against this background that the GEM-CON-BIO project was developed with the tenet that only through the equitable and sustainable governance and management of natural resources it will be possible to conserve biodiversity in Europe and elsewhere. In agreement with the prevailing view of the global community, it was also taken on board that conservation work should be carried out at the ecosystem level and that ecosystem functions should be fully valued (in all senses of the term) in order to achieve some form of sustainable development. As biodiversity underpins much of the ability of ecosystems to provide life-sustaining functions, we ought to warrant special attention to it. Thus, throughout this project we studied the interaction between the institutions and processes that govern our ecosystems and their impacts on biodiversity.

The overall objective of the GEM-CON-BIO project was: "to explore the interactions between governance modes and sustainable development objectives in view of identifying what governance processes and institutions can best contribute to the conservation of biodiversity" (GEM-CON-BIO project, Annex 1, 2006). "Governance"[8] is a relatively new and powerful concept that conservationists should understand and clearly distinguish from 'management'. While 'management' addresses what is done about a given site or ecosystem, 'governance' addresses who makes those decisions and how. Governance is about power, relationships, responsibility and accountability. It is about who has influence, who decides, and how decision-makers are held accountable. Graham *et al*. (2003, p. 2–3) define governance as:

> *"the interactions among structures, processes and traditions that determine how power is exercised, how decisions are taken on issues of public concern, and how citizens or other stakeholders have their say."*

'Government' and 'governance' have similar roots, but 'government' generally refers only to bodies and processes that are largely separate from citizens, the private sector and civil society. Governments are key

[7] European Commission, (2006), Annex to the Communication from the Commission: Halting the loss of biodiversity by 2010 and beyond, Sustaining ecosystem services for human well–being: Impact assessment, Commission Staff working document, COM(2006)216 final, Brussels.

[8] The following 3 paragraphs draw from Borrini-Feyerabend, G., J. Johnston and D. Pansky, "Governance of protected areas", pages 116-145 in Lockwood, M., A. Kothari and G. Worboys (eds.), *Managing Protected Areas: a Global Guide*, Earthscan, London, 2006.

players in governance but are only one among the many possible players. As affirmed by the UNDP (1997):

> *"Governance includes the state, but transcends it by taking in the private sector and civil society. All three are critical for sustaining human development. The state creates a conducive political and legal environment. The private sector generates jobs and income. And civil society facilitates political and social interaction - mobilising groups to participate in economic, social and political activities. Because each has weaknesses and strengths, a major objective of our support for good governance is to promote constructive interaction among all three."*

Governance settings depend in large part on formal mandates, institutions, processes and relevant legal and customary rights. But they are more complex and nuanced phenomena than one may imagine, not easy to circumscribe. Regardless of formal authority, decisions may be influenced by history and culture, access to information, basic economic outlook and many other factors. Any simple governance typology is necessarily crude. In this document we adopt the following definition: "biodiversity governance" is interpreted "as the way society at all scales manages its political, economic and social affairs with the aim to **use and conserve** biodiversity".[9] In order to assess how **governance** and management of ecosystems relate to the complex issue of biodiversity conservation, there is the need to understand how governance changes affect biodiversity changes through time. More specifically it is important to understand how governance affects management and how management, in turn, impacts upon biodiversity

With this objective in mind, GEM-CON-BIO researchers have analysed 29 case studies at different spatial levels and time frames. The case studies analysed in GEM-CON-BIO can be distinguished in three groups. Those carried out:

d) in EU and USA at ecosystem/local level;
e) in Third Countries other than USA, adopting a slightly different analytical framework; and
f) focussing the analysis on one or more specific uses of natural resources and biodiversity at international/European level.

The analysis of the 29 case studies showed many differences amongst case studies for what regards:

- ecological, social, economic, cultural, and institutional contexts,
- spatial level (e.g. ecosystem/local or national/international levels)
- temporal dimension (e.g. the time span analysed).

It is clearly an added value of the GEM-CON-BIO analytical framework the fact of being flexible enough be applicable to three categories of case studies. This value could be further manifested in a possible future analysis of case studies, which will enable further comparisons and analysis of more detail. However it has to be pointed out that for the time being, the analysis has been partially constrained by the limited number of GEM-CON-BIO case studies. This is evident particularly when the total 29 case studies are sub-divided, for reasons of comparability, in EU and US case studies carried out at ecosystem/local level (17), EU case studies at national/international level (3), and "non-western" Third Country case studies (9). In this sense, the findings of the analysis applied to GEM-CON-BIO case studies need to be confirmed by carrying out the analysis on a greater number of case studies.

Despite the above-mentioned limitations, we believe the project allowed to draw some interesting qualitative results and, from those results, to develop policy recommendations on ways to improve governance for biodiversity conservation. The recommendations for guiding policies addressing governance and biodiversity conservation are developed on the basis of the project's main findings according to the respective level of analysis. For each of the groups of GEM-CON-BIO case studies, recommendations referring to the governance of biodiversity in EU countries are reported in Part A and recommendations referring to EU development policy for collaboration with Third Countries are reported in Part B.

7.2 Policy guidelines for improving governance for biodiversity conservation in the EU

[9] This is the definition used in the GEM-CON-BIO report on Ecosystem Governance in Europe (Galaz, Hahn and Terry, 2006), and revised by Terry (2007).

7.2.1 Considerations for improving governance for biodiversity conservation at local/ecosystem level in EU

A first result emerging from the analysis is that impacts of governance usually are either good or bad but not neutral, for all the ecological, economic/financial and social/cultural aspects related to biodiversity conservation. Among the 17 GEM-CON-BIO EU and US case studies, 13 are showing positive assessments of the impacts of governance to biodiversity conservation, and 4 are showing negative impacts. Considerations for improving governance that emerged from the analysis, are:

- ***Employing and co-ordinating as many as possible natural, social, cultural, economic and institutional resources and capacities contributes to improving governance and conserving biodiversity***
- ***Adopting a mix of different types of governance to manage ecosystems according to site-specific ecological, social and economic needs also promotes biodiversity conservation***

From the analysis emerges that in study areas, a mix of governance types[10] appears to perform better than single governance types for what concerns **state of biodiversity**. In fact 7 out of 8 study areas with mixed governance types are showing an improvement of the state of biodiversity and only one a deterioration. Instead, among those study areas with only one type of governance, 5 out of 9 show an improvement in the state of biodiversity, 3 a deterioration and 1 no changes. Also for the impacts of different governance types on ecosystem conservation, on sustainability of resource use and on the generation of knowledge, it results that among GEM-CON-BIO EU and US case studies, **mixed types of governance are performing better than single types**. In the 8 case studies showing a mix of governance types, these 3 critical ecosystem management characteristics are all valued positively in 7 case studies while only in one case resource use is considered not yet sustainable but improving. On the contrary, among the 9 case studies adopting one type of governance, only in 1 case study maintenance of ecosystems, sustainability of resource use and generation of knowledge are all showing positive evaluations. This can be interpreted as an indication that to achieve ecological, economic and social sustainability of resource uses in reference to the complex objective of biodiversity conservation, it may be necessary also at local level to develop and implement simultaneously different types of governance, as for instance often it happens within protected areas for core and for buffer zones. This would allow to better shape different governance types qualities to site specific ecological, social and economic conditions to enhance biodiversity conservation

- ***Positive conservation results are more likely to occur in areas where there is a predominance of state (or regional/federal) ownerships and a large proportion of land is covered by woodland, forest and other wooded land ecosystems.***

To investigate what critical ecosystem management characteristics exert higher impacts on biodiversity conservation it has been necessary to investigate at first some features of study areas,. From the analysis carried out it emerges that both **area extension** and **population density**[11] below 100-150 inhabitants/Km² seem not to correlate with governance effectiveness for biodiversity conservation. Positive conservation results are more likely to occur in areas where there is a predominance of state (or regional/federal) ownership and a large proportion of land is covered by woodland, forest and other wooded land ecosystems
For what regards the **ownership structure**, the 8 GEM-CON-BIO EU and US study areas with a predominance of state ownership for at least 55% of their extensions show 7 positive impacts and only one negative on state of biodiversity, while the 9 study areas with a predominance of private ownership for at least 55% of their extension show 5 positive impacts, one neutral and 3 negative. This result was largely expected given that some Protected Areas under strict management regimes are usually under state ownerships in EU and this was indeed the case for the protected areas analysed by GEM-CON-BIO case

[10] These are: 4 case studies with a mix of a predominant State controlled National/Federal (at least for 50-60%) and different minor percentages of other forms of governance, 3 case studies with a mix of a predominant market based (at least for 50-60%) and different percentages of other forms of governance and 1 case study with a mix of Policy network based (75%) and Market based (25%) forms of governance.

[11] However it has to be noticed that within 16 GEM-CON-BIO case studies population densities are quite low. In facts the average is around 50 inhab./Km². This analysis result alone therefore does not contradict the plausible argument that the greater the population density living in an area, the greater will be the impact on the environment.

studies. For what concerns the relationship between conservation results and **main ecosystem typologies**, from the analysis carried out on GEM-CON-BIO EU and US case studies at ecosystem/local levels, it appears that woodland, forest and other wooded land are those more easily managed for biodiversity conservation (8 positive impacts, one neutral and only one negative) compared to agricultural land (3 positive and 2 negative impacts) and inland surface water (1 positive and one negative impact).

- ***Strong leadership role by individuals and/or organisations can improve governance.***

Biodiversity conservation benefits from strong commitment by institutions and by high levels of vertical and horizontal integration amongst and within these institutions. The analysis of critical ecosystem management characteristics of GEM-CON-BIO EU and US case studies at ecosystem/local levels, shows that, among the institutional aspects considered, the **leadership role** is the most influencing factor. In facts, contrary to other parameters, such as "levels of vertical and horizontal integration", "community participation" and "multi level governance", leadership role shows, among case studies analysed, a very good correlation with the state of biodiversity. This result if confirmed by an analysis carried out on a greater number of case studies could be interpreted as the fact that actually in institutional functioning, it is the willingness, capacity and determination, of single individuals or organisations which make a difference for biodiversity conservation. This could be an indication to reform institutions and their functioning in order to make them more apt to deal with biodiversity conservation.

- ***When developing and implementing management plans, all the environmental functions provided by ecosystems should be taken into account***

For what concerns the management objectives analysed in EU and US GEM-CON-BIO case studies at ecosystem/local levels, **all environmental functions provided by ecosystems ((i.e. "supporting", "regulating", "provisioning", and "cultural goods and services")** when prioritised in management appears to have **an evident influence on the biodiversity conservation**. Our case studies show that when ecosystem management prioritises only the production of goods and services which have the character of private goods (commodities) usually resulting from provisioning and cultural services, without considering also the production of public goods (non-commodities) usually resulting from supporting and regulating services, there is a serious risk of negatively impacting biodiversity. For instance in agri-ecosystems this attitude towards objectives and management of ecosystems heavily unbalanced toward production, can be imputed to the functioning of the market mechanism which is a very good tool to value commodities, but poor capable to value appropriately public goods and services such as those deriving from ecosystems regulating services (i.e. non-commodities). This means that farmers cannot reap the benefits of managing ecosystems for the supplying of public goods such as biodiversity conservation unless some agri-environmental payments are envisaged for the delivering of these ecosystems services.

- ***Biodiversity conservation objectives need to be explicitly set and integrated with social and economic objectives in management and sectoral plans***

Among case studies analysed, ecosystems management objectives are exerting a great influence on the impacts on biodiversity.. In the case of management objectives, 15 out of 17 EU and US case studies at ecosystem/local levels, show a good correlation between state of biodiversity and the clarity of management objectives according to the ecological, social and economic local situation. This is also in line with the information given by authors in their case studies synthesis and reported in the synthesis of GEM-CON-BIO EU and US case studies. In the 17 EU and US case studies analysed objectives are either "appropriate" or "not appropriate" simultaneously for all the natural, economic/financial and social/cultural objectives in management or sectoral plans. In facts in 10 case studies, the management or sectoral plans identify the appropriate objectives for all the natural, economic/financial and social/cultural aspects, while in other 5 case studies all the objectives are unclear or lacking. If the results of the analysis carried out on 15 case studies would be validated also by a greater number of case studies, then this could be an indication that **appropriateness of management objectives** is a very important factor for the resulting state of biodiversity. A further indication which could be envisaged from the results of the analysis, is that, in case study analysed, there is a strong relationships between the degree of appropriateness of objectives for biodiversity conservation and the well functioning of the processes implemented to achieve those objectives.

Another interesting information coming out by the synthesis of case study outcomes is the influence of protected area status on definition of natural objectives. 12 case study areas out of 17 are all or for a part situated in biosphere reserves or protected areas, or at least managed directly for conservation (at least for a minimum extension of 10%). From the analysis of natural objectives in these case study areas emerges that natural management objectives are fully appropriate or appropriate only for 8, while the remaining 4 have not sufficiently appropriate or existing/implemented natural objectives. This result, if supported by a higher number of observations, could be interpreted as the fact that the protected area status alone is not a sufficient condition for setting right management objectives for biodiversity conservation.

- ***To achieve biodiversity conservation both participatory processes and regulatory tools are necessary. Market tools and/or quasi-market measures (e.g. agri-environmental payments) may also have to be used particularly where conservation measures pose real or opportunity costs for competing economic activities.***

Coming to key policy instruments, the analysis carried out shows that, among EU and US GEM-CON-BIO case studies at ecosystem/local levels, the types of governance associated to key policy instruments which are performing better in terms of impacts on the state of biodiversity, maintenance of ecosystem services and sustainability of resource use are governance types mainly using **regulatory tools** (i.e. state controlled centralised/ decentralised governance types) and those preferring to adopt some **participatory processes** (i.e. state controlled delegated, community governance and policy network governance types). The performance of **market based** governance types show both positive and negative impacts on state of biodiversity, maintenance of ecosystem services and sustainability of resource use. In fact comparing the functioning of different processes from case study outcomes shows that regulatory processes are the ones adopted in all case study areas and the best functioning. Also economic/financial, social/cultural and institutional processes are widely used (14 case studies the first two and 16 the last) despite with different functioning (economic/financial and social/cultural scoring 9 well functioning, while institutional processes only 4).
In order to identifying more sustainable governance and ecosystems management, there is the need to develop a multifaceted strategy to be implemented by different instruments of governance to promote more benefits for farmers supplying biodiversity's goods and services. These for instance can be based on regulatory instruments and site specific agri-environmental or forestry measures proposing payments more focused on the delivering of ecosystems regulating services (i.e. public goods) than on commodities production. Agri-environmental measures supporting organic or integrated cultivation methods need to take into account also conservation of natural and semi-natural habitats. The 2003 CAP Reform introducing payments for NATURA 2000 sites in going on the right direction. However, in order to be effective in biodiversity conservation, natural and semi-natural habitat conservation measures have to be more widely adopted in the whole European countryside to build ecological corridors linking different Natura 2000 sites

- ***Any type of governance needs good monitoring of biodiversity to set in place adaptive management strategies, which allow offsetting negative impacts and enhancing positive impacts.***

Finally, among EU and US GEM-CON-BIO case studies at ecosystem/local level, for adaptive management not an evident correlation seems to be present with state of biodiversity. This fact can be interpreted as an indication that there is a need for better and more organized monitoring of how biodiversity responds to changes in management. Such information allows developing and implementing strategies that at least attempt to offset negative impacts and to enhance positive ones.

7.2.2 Considerations for improving governance for biodiversity conservation at national/international level in EU

The three GEM-CON-BIO case studies addressing governance at national/international levels in EU have analysed the management of different ecosystems by focusing on 2 economic activities and 6 recreational uses of wild resources (see attached list of GEM-CON-BIO case studies) and the resulting impacts on biodiversity conservation. The types of governance analysed by these case studies are complex and include mix of different forms of state control and market based governance. Despite both the limited number of case studies and the complex types of governance analysed, some interesting information is pointed out by

the outcomes of case studies. This information can offer some points for discussion and it is presented in the following:

- ***Governance of ecosystem management at EU level needs to take into consideration the diversity of ecological, social, economic, cultural, historical and institutional aspects among and within countries***

From the ecological and socio-economic points of view, Europe is very diverse. Diversity is probably the most identifying character and richness of Europe together with the capacity and willingness of European citizens to be unified under the respect of such diversity. Diversity amongst and *within* European Countries shall be taken into account and respected while developing governance and ecosystem management for biodiversity conservation. Failure to do so will mean to define something which will not be sustainable. Beside the above it is a well-accepted fact that governance of biodiversity and landscapes is the more successful when it is site specific, covering complex systems of biotic, abiotic and aesthetic components within the ecological dimension. Adding considerations of social and economic characters to the picture only enhances the specificity of each situation.

- ***Decisions on governance and ecosystem management taken at national and international levels need to be better communicated to achieve the collaboration of local stakeholders towards conservation goals***

Better vertical and horizontal integration of multi level governance institutions has to be achieved in biodiversity conservation. In facts often the lack of stakeholder involvement in the decision making affects the level of compliance and enforcement with the conservation measures adopted. Involvement of both institutions operating at different hierarchical levels and between institutions and populations is a key process in increasing integration and effectiveness of policy implementation. For instance from the case study on North Sea fisheries has emerged that there is a long history of conflict between fishermen and the CFP/representative institutions/scientists that is often manifested as illegal landings. The control/enforcement of regulation is considered quite low but Member States have now agreed on stronger control measures in the North Sea. Politically, stakeholders did not feel sufficiently involved in the management process. This lack of involvement had undermined support for and compliance with the conservation measures adopted in the past. The North Sea Regional Advisory Council (NSRAC) was established in 2004 to facilitate this process by involving local stakeholders into the decision-making process.

- ***Governance needs to pay greater attention to all ecosystem services and associated cultural values***

Conservation of biodiversity requires a holistic approach capable of integrating commodities extraction/production and the maintenance of ecosystems services (i.e production of non-commodity goods) that are fundamental to human welfare. At Community level this has been prioritized by the policy framework to halt biodiversity loss in the EU. Biodiversity objectives are, for example, integrated in the Sustainable Development Strategy (SDS) (COM (2001) 264 final), the Lisbon partnership for growth and jobs, and in a wide range of environmental and sectoral policies. An EC Biodiversity Strategy (COM (1998) 42 final) was adopted and related Action Plans (COM (2001) 162 final). Biodiversity conservation also is a key target of the 6th EAP (Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002 laying down the Sixth Community Environment Action Programme). As emerged from the North Sea fisheries case study, implementation of the ecosystem approach has still to be fully achieved. The main threats for biodiversity in the North Sea can be easily linked to the narrow focus of management plans on objectives such as the growth of industrial fishery and the exploitation of oil and gas reserves (e.g., via accidental mortality of non-targeted fish species, extensive damage to the benthic habitats, pollution, intensive marine transport, etc.). Given this overexploitation of the provisioning services in the North Sea, the most important management tool, the Common Fisheries Policy (CFP) initiated in 1983 by the EU, was reformed in 2002 to enhance the ecosystem-based approach in fisheries management. In addition, a recent European Marine Strategy (EMS) promises to bring new measures to protect and conserve the environment. While it is too early to say whether the reformed CFP in 2002 and the recent establishment of the NSRAC will decrease the factors that threaten the sustainability of the fisheries in North Sea, it can be stressed that environmental and biodiversity aspects should be taken into consideration when developing

multi-annual management plans. Established evidence of the benefits of adopting a ecosystem approach in economic activities can be found in a comparison of organic agriculture versus intensive agricultural practices (which have negative impacts on biodiversity). Organic farming has beneficial impacts on the three tenets of sustainable development and both within and outside the agricultural landscape. Organic farms have higher biodiversity and habitat heterogeneity, and nutrient leaching is less abundant. The threat to water and land pollution are reduced due to lower pesticides and chemical fertilises used, a greater care about closing the nutrient cycle and a greater care to reduce erosion. Economically, organic farming helps small farms to stay alive. Landscape with high rate of organic farms can display greater aesthetic value, which in turn influence the recreation and tourist opportunities (e.g. Bed and Breakfast operations, restaurant, shops, bike trails). Furthermore, organic farming offers a wider range of products that are sought after by tourists. These products can also be processed locally, providing different incomes. The main social impact is that organic farming maintains the viability of small farms and also diversifies the rural economy. This decreases local unemployment rates and rural exodus.

- ***There is a need to raise awareness on the value of biodiversity for socio-economic activities and on its impact on the quality of life for the European citizen***

From a recent survey of the Eurobarometer (Flash Eurobarometer 2007, Series #219, Attitudes of Europeans towards the Issue of Biodiversity, survey conducted by the Gallup Organization) results that only 35% of European citizens know what biodiversity means. To achieve consensus on biodiversity conservation policies, besides explaining what biodiversity is, the next step is to raise awareness on the role of biodiversity in allowing ecosystems to provide environmental goods and services and therefore contributing to human welfare. From the North Sea fisheries case study, for instance, it resulted that, despite the evidence that good management of fisheries benefits mostly fishermen and the fishing sector, fishermen do not fully understand the benefits of biodiversity conservation as they seek to satisfy their economic demands in a short-term period. They simply cannot accept that fishing practices cause environmental destruction. On the other hand, fishermen receive advantages from the conservation of mammals that "compete" with them over fish stocks. As has emerged from the case study on North Fisheries, the message to be passed on is that greater numbers of species make an ecosystem more robust. In areas of high biodiversity, there are more species performing a certain function. If one is lost, there will be others that can fulfill the same role. For ecosystems to continue to provide environmental goods and services, richness in biodiversity is a fundamental component. Tangible examples of economic sustainability while conserving biodiversity shall also be proposed such as organic production, with its benefits for environment, health and the local economy (see the case study on organic agriculture in countries surrounding the Baltic Sea).

- ***Regulatory, economic and social/cultural tools are all necessary to achieve biodiversity conservation***

Where there are negative pressures on ecosystems and ecological functioning and in case of serious risks and emergencies (e.g. biotopes and species at risk of extinction), there is a need for regulations and environmental standards (e.g., Water Framework Directive, Natura 2000, etc.). Where markets can be exploited for conservation of biodiversity (organic agriculture, recreational activities) or quasi-markets can be created for exchanging a public good between entrepreneurs and States (e.g. site specific agri-environmental measures) then market tools will be also effective. From the case study on use of wild resources in the EU, it emerged that across recreational activities, decline in biotope quality was observed in countries with little generation of knowledge or appreciation of financial opportunities. The presence of many regulations and costs of complying with them was correlated with declining participation. Across recreational activities there was preference for regulations at national level accompanied by financial incentives at the local level ("national sticks but local carrots"). The analysis of recreational activities indicates that local implementation of economic measures and other use of local knowledge, as well as simple and non-burdensome regulations, are likely to result in effective conservation of wild species and the ecosystems that support them. The results provide quantitative support for recent commitments of parties to the Convention on Biological Diversity.[12] From the case study on North Sea fisheries it resulted that while

[12] *Malawi Principles for the Ecosystem Approach* (CBD V/6, CBD VII/11)
http://www.biodiv.org/doc/meetings/cop/cop-04/information/cop-04-inf-09-en.pdf
Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity (CBD VII/12)
http://www.biodiv.org/doc/publications/addis-gdl-en.pdf

fishermen are required to reduce their income by reducing catches to obtain future benefits, few incentives are offered within the CFP: the policy is mostly based on restriction of activities. There are no market tools, in fact, and only a few independent eco-label schemes. In this case, overexploitation seems more profitable for the individual fisherman, leading to depletion of fish stocks. The case of organic agriculture around the Baltic Sea showed that social tools such as participative processes are very important to achieve biodiversity conservation. There is a need for discussion, collaboration and coordination to increase both vertical and horizontal trust.

- ***Effective monitoring of biodiversity may require developing and adopting new monitoring tools also for governance***

Developing appropriate governance indicators [for instance "type" and quality-related variables to assess participation, perceived legitimacy, performance, accountability, etc.)] can allow to take on an "adaptive governance" mode and improve governance on the basis of related biodiversity impact. In order to halt the loss of biodiversity, along the identification of driving forces, pressures and impacts, it is also necessary to monitor the promptness and effectiveness of policy response. A clear message coming out from the case study on use of wild resources is that it is highly advisable to promote adaptive governance as well as adaptive ecological management, and perhaps Governance Impact Assessment and Strategic Governance Assessment mechanisms to complement the one existing for Environmental Impact Assessment and Strategic Environmental Assessment.

7.3 Policy Guidelines for EU development policy affecting governance of biodiversity in non-western third countries

The nine "non-western" Third Country case studies comprised in the GEM CON BIO project have been analysed qualitatively on the basis of an adapted questionnaire,[13] which emphasized considerations of particular relevance for conservation by indigenous peoples and local communities. The studies focused on how the type and quality of governance of natural resources, and their changes through time in the last fifty years or so, impacted upon local biodiversity. These studies are by no means unique and actually add to the extensive accumulated knowledge and experience of conservationists, development experts, indigenous peoples and community members who— for decades— analysed the benefits and limitations of processes of participation, devolution, co-management and outright community–run natural resource management and conservation.[14] The results we obtained broadly confirmed prior analyses while adding relatively new important considerations, in particular regarding "Community Conserved Areas". We will briefly describe these results below, focusing on those that appear the most crucial for conservation and/or open up new and promising areas of inquiry.

7.3.1 Background

For millennia, indigenous people and local communities have played a critical governance role regarding natural environments and species. They did so for obvious sustenance reasons but also for a variety of other purposes— economic as well as cultural, spiritual and aesthetic. Communities cared for territories and resources that embed valuable biodiversity, ecological functions and socio-cultural meaning, including forests, wetlands, species and landscapes, village lakes and catchment forests, rivers and springs, coastal stretches and marine areas. The history of conservation and sustainable use by communities is much, much older than the one by state governments. Starting several centuries ago and progressively accelerating in the last two, **major changes in natural resource governance took place all over the world.** Prompted by technological innovations and the enclosure of the commons, these changes proceeded through colonisation, the establishment of nation states and colonial enterprises, and are now peaking with the

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[13] Borrini-Feyerabend, G. and B. Lassen, 2007, *GEM-CON-BIO Guidance Manual for Third Country Case Studies,* Adaptation of Terry and Simoncini GEM-CON-BIO Guidance Manual to Third Countries, on the basis of advice from field-based colleagues in Third Countries.

[14] A small selected bibliography is added in Annex 2.

globalisation of the world economy and the coming to dominance of a few superpowers and associated multinationals. In parallel, cultivated and urban land expanded at the expense of forests, rangelands, wetlands and wildlife habitats, market/ monetary values replaced use values, and the "science-based" decisions of experts, bureaucrats and merchants attempted to substitute the experience-based, culture-embedded production systems of communities and communal governance systems. A progressively smaller percentage of the population of given countries remained employed and/or in control of agricultural, fishery and livestock production. The energy and transportation sectors boomed and so did the financial and military sectors. In the last fifty years, tourism, telecommunication and information have also grown exponentially. As part of the change described above, peasant communities have been progressively involved in cash crop production controlled by far-away decisions, nomadic pastoralists have been forced to sedentarise, hunters-gatherers have been constrained to become farmers and indigenous peoples' and community governance of natural resources, in general, has been overlooked, diminished or simply crushed in the name of modernisation and development. What consequences did this governance change bear for biological diversity? The "taming of nature" obtained spectacular results for the demographic expansion and development of the human species but it also left behind degraded soil and water, polluted air, resources depleted by excessive extraction (in particular in the seas, forests and rangelands) and **a sustained loss in biological diversity** (habitats, species, and genetic variety). Why then, still engaging resources to study the relationship between governance and biological diversity? For two main reasons. The first reason is that **major forces exert their influence in the world of conservation and natural resource use by focusing precisely on governance issues.** Such forces have interests in depicting the world as "doomed" to widespread degradation to satisfy the world hunger for petroleum, gas, minerals, timber, fisheries, cattle, agricultural crops— and now biofuels. They have interests to confine nature within "protected areas" governed by professional agencies only. They have interests to commodify biological diversity through patenting, tourism enterprises and a purely economic "valuation" of ecosystem functions. And they have interests to eliminate the resistance of indigenous peoples and local communities by disaggregating them (e.g., through manipulative "education", advertisements, and corruption) and denying their role in governing natural resources. The tendency towards privatising land and natural resources throughout the world, limiting the scope of government regulations and relegating communal tenure to the realm of folklore belongs to one worldview and one class of interests that have little in common with conservation and equity. The second reason is that, if we observe closely throughout the world (in particular, but not exclusively in "non-western" countries) the governance systems of contemporary indigenous and local communities are syncretic[15] constructions of old and new knowledge, practices, tools and values of different cultural origin.[16] Such puzzles of hardly compatible elements are communities' attempts to cope with new environmental conditions, market requirements, and tenure regulations imposed by the state. Building upon the characteristics of diverse political and economic contexts, unique combinations of indigenous and modern elements lead to diverse outcomes. Some indigenous system may be *de jure* completely replaced by state governance but de facto remain alive and effective (as in our Turkey case study) or change can be ruthless and powerful enough to affect the community's capability to manage the local resources in a sustainable way (as in our Ethiopia case study), or apparently overpowering but unable to destroy the heart of the community livelihood system (as in our Iran case study). Eventually, innovative and more complex systems can develop by combining indigenous and modern elements (as in Niger and Mongolia and, to a certain extent, also in Indonesia and Iran, and partially even in Nepal). Large scale situations, such as the watershed landscapes of our case studies in Bolivia and Argentina, present elements of all the above. Thus, on the overall background of many interlocked phenomena that negatively affect biodiversity, much can still be understood about the governance role of indigenous peoples and local communities and their possible cooperation with other actors and powers in society. Studies as ours have a chance to understand how indigenous peoples and local communities can play a role in caring for biodiversity and what should be done to recognise and support them in appropriate ways, as shown in our case studies of Community Conserved Areas.

[15] The term "syncretic" is used in religious and philosophical contexts to signify the merging of rather opposite positions, at times bordering on heresy.

[16] See, for instance: Scott, J.C., *Weapons of the Weak. Everyday forms of peasant resistance*, Yale University Press, New Haven, Connecticut (USA) and London, 1985; and Scott, J. C., *Seeing Like a State. How certain schemes to improve the human condition have failed*, Yale University Press, New Haven, Connecticut (USA) and London, 1998.

7.3.2 Governance of biodiversity

One of the main messages coming from the 2003 World Parks Congress and the 7th Conference of the Parties of the Convention on Biological Diversity is that the interests and concerns of indigenous peoples and local communities are likely to be compatible with the conservation of biodiversity if and when fair, effective and participatory governance mechanisms are in place. Two main aspect of PA governance: 1. type and 2. quality (the so-called "good governance" principles) have been examined in the literature and at the Durban Congress.[17] In line with such understandings and defined on the basis of "*who holds de facto management authority and responsibility and can be held accountable according to legal, customary or otherwise legitimate rights*", five main types of governance[18] have been discussed as part of the GEMCONBIO case studies in non western Third country, as follows:

- Government-based
- Shared governance
- Community governance
- Private governance
- Open Access

Community Conserved Areas (CCAs) is a broad term used internationally covers one such governance type, characterized by local collective de facto (and possibly *de jure*) authority, responsibility and accountability for the key decisions affecting biodiversity conservation and the use of natural resources. [19] On the ground, CCAs comprise natural and/or modified ecosystems containing significant biodiversity, ecological services and cultural values, voluntarily conserved by (sedentary or mobile) indigenous peoples and local communities through customary laws or other effective means. CCAs can include ecosystems with minimum to substantial human influence as well as cases of continuation, revival or modification of traditional practices or new initiatives taken up by communities in the face of new threats or opportunities. Several of them are inviolate zones ranging from very small to large stretches of land and waterscapes. Three features are important:

- One or more communities closely relate to the ecosystems and species culturally and/or because of survival and dependence for livelihood;
- The communities are the major players in decision-making and implementation regarding the management of the site, implying that community institutions have *de facto* capacity to enforce regulations (in many situations there may be other stakeholders in collaboration or partnership, but primary decision-making is with the communities).
- The community decisions and management efforts lead to conservation of habitats, species, ecological services and associated cultural values (though the conscious objective of management may be livelihood, water security, safeguarding of cultural and spiritual places).

The GEMCONBIO case studies in non western Third Countries comprise six cases where fifty to one hundred years ago well functioning CCAs were undoubtedly in place. These include Turkey, Iran, Ethiopia, Niger, Mongolia and Indonesia. Regarding Nepal the situation was a bit more complex, with several indigenous communities' lands co-existing in the case study area with a private hunting reserve of the king. The Bolivia and Argentina cases are at a larger scale, but surely also included, fifty to one hundred years ago, examples of well-functioning CCAs. Since then, as mentioned in the introduction, the governance changes that took place acted mostly to diminish the role of indigenous peoples and local communities in all our case study areas. In the name of modernisation and development, governments appropriated communally held lands and either distributed them through processes of privatisation or established protected areas under their direct control. Overall, the results upon biodiversity are negative. And yet, if we strive to eliminate the complex influences of many other factors which exerted their influence side by side the governance changes, if we look at the details of individual cases and if we take into consideration some

[17] The first attempts at establishing a governance typology for protected areas were made by Borrini-Feyerabend *et al.* (2002) and Graham *et al*. (2003) in preparation for the Vth World Parks Congress (Section 3.1). These attempts were discussed and refined at the Congress, where delegates settled on a set of protected area governance categories based on answers to the following questions (Borrini-Feyerabend, 2003): Who holds main decision-making authority for the protected area? Who is responsible and can be held accountable for it?

[18] For the definition of "governance", please refer to pages 4 and 5 of this document.

[19] Borrini-Feyerabend, Kothari and Oviedo, 2004a.

recent tendencies at arresting if not inverting the process of community loss of authority and responsibility on natural resources, we discover some interesting finer results. These will be summarised below.

7.3.3 Our results as recommendations for action

This note is dedicated to policy makers and decision makers. For that, we expressed the results of our case studies and overall analysis as directly and simply as possible. In particular, we extracted "lessons learned" and we transformed those, to the best of our ability, into recommendations for action.

- ***Recognise and respect customary institutions for natural resource management***

Functioning community governance institutions with roots on local culture and traditions are incomparable assets for the sound management of natural resources and conservation of biodiversity. State governments should take advantage of the value and contributions of such customary governance institutions. Allowing indigenous peoples and local communities to decide how to manage their resources and how to share the benefits of that management through local institutions, with a fair amount of autonomy, appears to both sustain livelihoods and conservation of biodiversity. Traditional governance institutions include local knowledge, skills, organizations, rules, values and worldviews tailored through time to fit the local context. A major characteristic of such institutions is that they typically relate to collective rights and communal tenure. If a government decides to recognize such institutions, two options are possible: supporting them and leaving them a fair amount of autonomy regarding the management of their territories and resources (this would amount to recognizing and promoting Community Conservation Areas - CCAs) or engaging them in developing and implementing natural resource management agreements and setting up joint decision-making bodies (this would promote shared governance settings, such as they exist for so-called co-managed protected areas). It is important that governments recognize customary governance institutions without trying to mould them into some blueprint institutional shape and form, including by imposing democratic practices such as "electing" local leaders to "run" CCAs. What they may wish to promote—although with great attention and care and not as part of imposed packages – are self-reflection exercises, including analyses of issues of transparency, equity and accountability.

- ***Help such institutions to fend off and/or discipline destructive "development"***

In all the case studies we examined, the most powerful forces at odd with conservation are the ones of business and so-called "development". Environmental degradation and pollution invariably relate to large scale infrastructures and urbanisation, timber concessions, large plantations (e.g. oil palm plantations), intensive ranching and agribusiness (e.g., soy monocultures), legal and illegal trade, oil and gas industries and mining.[20] Usually, business enterprises (and even large scale government projects) penetrate rural areas fast, without even attempting to properly study, prevent or mitigate their destructive social and environmental consequences. Beside direct impacts (e.g. because of habitat loss) a variety of indirect impacts (e.g., uncontrolled hunting related to new market demands) soon act to decimate wildlife. And the disruption of traditional livelihoods, migration fluxes and monetization of the economy fuel short-term, unsustainable uses of land and natural resources. These forces appear to be overpowering even when the state manages to set aside some "protected areas" to salvage at least part of the natural resources. Many such protected areas do not fend off exploitations and, when they do, they still need to face transformed, crowded, conflict-ridden and much less benign societies all around them. Traditional institutions and civil society in general are poorly organized to deal with such "development" forces in tandem with the politico-military might of the state. If they can form alliances with the governmental agencies with responsibility for conservation, however, they can become more effective in demanding safeguards and rules.

- ***Foster alliances between local, traditional institutions governing natural resources and the governmental agencies in charge of conservation***

Governmental action that complements and supports the governance efforts by indigenous peoples and local communities is a powerful, potentially unbeatable combination for positive change. Given the differences in perceptions and socio-political power of governmental agencies and communities, efforts are usually required to provide a neutral forum for negotiation and equitable process. For that, all actors, including

[20] At the time of this writing, biofuel plantations are increasing posing major biodiversity risks worldwide.

state agencies, can benefit from capacity building and third parties, such as NGOs, can provide invaluable help through trainers, facilitators and mediators. Negotiating management solutions is a permanent on-going process that grows with the sense of confidence and trust among the parties involved. Trust, in turn, takes time to build and investments in social communication activities from the outset and through time. Flexibility and the initial investment of time and resources are thus central to community engagement in natural resource governance. But it is crucial to recognize that ***governmental agencies and communities can*** combine their mutual strengths, compensate their mutual weaknesses, and ***develop effective and resilient shared governance systems***. The Mongolia site appears a particularly good example of this, but Niger. Indonesia and to a certain extent also Iran, are cases in point. In general, wherever historical processes add layers of complexity to local socio-cultural realities and wherever many and diverse actors find themselves claiming rights and/or having major interests on the same natural resources, shared governance settings offer an option of choice for biodiversity conservation.

- ***Adopt a landscape approach to natural resource management and conservation***

A fundamental lesson to derive from all our TC cases is that sound natural resource management and conservation cannot do without a landscape view and approach.[21] What does that mean? From afar, biodiversity conservation can be comfortably imagined as a practice confined to some limited pockets in the territory, so called protected areas. But wildlife, water, air, pollen, insects, animals and people move. They are quick to link the protected area and its surroundings in a myriad of ways. Pervasive phenomena, such as fire, rain or climate in general, can be even more powerful. And even large and well-managed protected areas need to fit within socio-political contexts in which they may be supported and well funded or undervalued and starved.[22] In other words, there is no viable alternative to the harmonious fitting of protected areas into a supportive environment (in French this begins to be called "ecological solidarity"). This is true for what concerns ***biological connectivity and the maintenance of ecosystem functions*** (e.g. water flows, wildlife corridors, protection of microclimates) but also for what concerns ***excellent communication, support and functional linkages among governance structures at various levels***. All TC studies fit this recommendation, but in particular Ethiopia, Argentina and Bolivia, and to a large extent also Iran, Nepal, and Indonesia.

- ***Support participatory action research, community-based analyses and learning by doing***

On-going learning processes, for example facilitated through Participatory Action Research exercises and community-based analyses, are powerful tools to improve biodiversity governance and equity. The opportunities to learn can be optimized through a variety of direct exchanges, including field visits and workshops, community-to-community visits, links to on-going information and trainings/capacity building events. Particularly useful are also multi-stakeholder fora, where different groups (including the ones usually marginalized) can exchange ideas, discuss options to combine livelihoods and conservation initiatives, and identify the support needed for that at various levels. These processes of active social communication can be very powerful and bring various parties to understand each other and be willing to negotiate. All in all, the time invested in bringing people together and giving them ***the 'luxury' of discussing together on the basis of good information*** has proven itself in a variety of contexts, including the ones of our TC case studies (see Niger, Mongolia, Indonesia, Iran, Argentina and Bolivia). Noticeably, not only the local communities need to strengthen their capacity to interact with others. Government staff can also greatly benefit, provided a minimum of continuity is assured in their status and site of employment.

- ***Promote fairness in sharing the costs and benefits of conservation***

Local communities face a variety of struggles and constraints for survival but also for their positioning as actors and consumers in changing societies. Not surprisingly, the TC case studies show that communities appear to be more directly supportive and engaged in conservation whenever they experience direct benefits

21 Beresford, M. and A. Phillips, "Protected Landscapes: A Conservation Model for the 21st Century", The George Wright Forum 17(1): 15–26, 2000; Brown, J., N. Mitchell and M. Beresford, The Protected Landscape Approach, IUCN, Gland (Switzerland) and Cambridge (UK), 2005.

22 For instance, promoting cotton plantations up to the border of a protected area may undermine its sustainability in a variety of interlocked ways (e.g., pumping of underground water, discharging of toxic effluents, engineering of local societies for outside needs, local penetration of usurers and market forces, creation of pockets of extreme poverty, exhaustion of local soil after just a few years of cotton cultivation, creation of sure future demands for lands two steps from land left under uses perceived as unproductive, etc.).

from their efforts. This includes financial benefits but also a variety of other cultural, spiritual, and livelihood-related benefits, which can be as, if not more, important than financial gains for the communities at stake. When the conserved biodiversity generates monetary benefits (e.g., entry fees for a protected area, local jobs, compensations for maintaining ecosystem services, etc.), these should be fairly shared among and within the relevant communities, with due attention to the legitimacy and credibility of the organizations representing them. New organizations, which poorly fit the local socio-cultural reality, can lead to elite capture and enhanced equity problems through the marginalization of weaker components of society (such as indigenous peoples, the poor, or women). This can lead to negative consequences for conservation, as marginalized groups become angry and frustrated. Non monetary benefits from direct conservation engagement include increased food and livelihood security, sustainable water availability, access to training, the possibility to participate in exchange visits, social recognition, pride, enhanced sense of community identify and solidarity, and the like. These benefits are very important, as they contribute to develop ***social cohesion behind conservation activities and results***.

- ***Ensure both sound local governance and a supportive policy environment, including the respect of basic human rights***

Sound local governance is a necessary but not sufficient condition for equity and the conservation of biodiversity. The viability of these goals is also depending on a firm and consistent political will and the commitment to supportive policies on the part of governmental authorities. Conversely, however, good policies and laws do not necessarily correlate with conservation of biodiversity and equity. Without effective implementation of those laws and sound governance at the local level, they are not enough. Good governance at municipal and sub-national levels is also crucial, as the positive potential of laws and policies can be lost through corruption, short-term interests, clientelism, and lack of capacity (including technical capacity) to implement the policies and monitor their functioning and results. At best, local governance and broader policies fit and are mutually supportive (many coercive mechanisms established through laws are simply rejected by local people). The constitutional/ regulatory framework of countries appears to require particular attention. Tenure systems, environmental impact assessment regulations, water rights, pasture rights, forest-related rights, but also basic socio-political rights, including the right to participate in political life, freely organize and demand transparency, performance and accountability from agency staff and elected officials, appear to make up for ***the supportive environment that allows local governance to deliver its promises***. As shown by the case studies in Bolivia, Argentina and Iran, effective institutions from the local up and cross-scale communication and collaboration are necessary for large management units (e.g., a watershed landscape, a transhumance territory) to flourish.

7.4 Specific recommendations for EU Development Policy

The Third Countries represented in this study are all recipients of EU Development Aid. As a major donor, the EU has significant influence on the governance of biodiversity in partner countries. It can even be argued that— through its projects and programmes and its general development policy— the EU is a governance actor in the complex settings affecting the conservation of biodiversity and the management of natural resources in aid recipient countries. This is especially true in countries where governments lack sufficient resources and capacity to conserve biodiversity on their own, and are strongly influenced by aid flows in shaping and implementing their own policies. The recommendations below are tailored around the specific mechanisms of EU Development Policy and designed to reflect and support the lessons summarised above.

- ***Aid programming: take full consideration of indigenous and local institutions for the governance of biodiversity in Country Environment Profiles and Country Strategy Papers***

Aid programming at the country level should take full consideration of customary forms of biodiversity governance, such as Community Conserved Areas, in Country Environment Profiles (CEPs). The overall governance settings of conservation should be assessed, including community governance and its interaction with other, state-based governance forms. One of the purposes of CEPs is to link environmental issues to social and economic aspects. They should therefore explicitly explore the cultural and livelihoods significance of biodiversity and the traditional links of local communities and indigenous peoples to natural

resources, together with the equity aspects of biodiversity conservation. The very writing of CEPs should be a participatory process, with the requirement of involving civil society. Similarly, participatory processes are essential in drawing up and reviewing Country Strategy Papers (CSPs). If "environment" is there determined as a priority sector, the implementation strategy should be based on the findings of the CEP and take into account local realities, including cultural and equity aspects.

- ***Aid delivery: engage community institutions in detailed planning as soon as political engagements have been taken, aid objectives set and financial envelopes assigned***

Our case studies have shown the value of local institutions, practices and resources for the governance of biodiversity and the conservation successes of indigenous peoples and local communities. In general, as soon as the parties prescribed by existing legislation and procedures have taken political engagements, set broad aid objectives and assigned financial envelopes, it is recommended that the relevant strategies, activities, detailed budgets and action plans of programmes and projects are fully developed at the local level through participatory processes that engage all the actors expected to take an active role in the implementation of the activities and plans. It is at this moment that the traditional institutions that govern natural resources at the community level become extremely important and should be actively engaged. For that, sufficient time and resources should be budgeted, and qualified staff should be available to promote and facilitate participatory processes, ensure cultural sensitivity, promote equity in participation and help the parties evaluate the feasibility of their plans. This is likely the single most important recommendation for the success of any conservation and development initiative and it is surprising that, at this day and age, after so many conservation and development disasters and squandered resources, it is still necessary to stress this point. A significant way in which the EU can follow the above and promote community governance of natural resources is by supporting processes of participatory action research and community-based analyses. Action should be upon the specific demand of communities, and support should remain community-driven, but even in cases when the EU negotiated an aid package on a given broad objective at national level, it should foresee time and resources to finalise the planning at the local level. In general, capacity-building initiatives can make a significant contribution, targeted at local communities but also at government institutions, which often lack experience in collaboration with indigenous peoples and local communities. Multiple advantages can be expected, including local ownership and engagement and the better use of traditional knowledge. Local communities often have a sophisticated understanding of the ecosystem dynamics around them, which are still not sufficiently valued. For example, when environmental baseline studies are performed, these should be carried out jointly between local communities and outside researchers. In general, genuine and transparent participation processes should be sought throughout the project cycle. Far too often, however, participation is still understood as a token "consultation" exercise at the beginning. The EU should simply not approve projects that have not undergone local analysis and assessment and that do not foresee the ongoing role of key local actors, such as customary governance institutions, through culturally appropriate forms of dialogue and decision-making. In case of governance settings that need to engage a multitude of actors, the EU as an "outside" actor could even venture to provide professional facilitators and neutral fora for dialogue, smoothing out power disparities among stakeholders. Negotiation for successful shared governance is a necessary, long term dynamic process based on the confidence among the parties. From the point of view of the facilitator, this means ensuring transparent, flexible and legitimate decision-making processes and structures (as opposed to preconceived "models" of collaboration) and being able to invest time and resources to the task.

- ***Aid delivery: provide direct support to community efforts to conserve biodiversity, including through small funds and rapid application, disbursement and accounting procedures***

Aid structures should be diversified to include more widespread forms of direct support to communities and community-based organizations. When supporting community governance of biodiversity it is crucial to respect existing customary institutions and to implement projects in partnership with those institutions instead of imposing new organizational models (such as "management committees") designed by non-local project managers. Whatever their merits, organizational forms alien to the local context tend to perform poorly and may even lead to the destruction of customary institutions and damage the natural resources meant to be conserved. Local governance of biodiversity and phenomena such as Community Conserved Areas are rarely perceived as "projects" by the relevant communities. They are rather seen as part of their own livelihoods, life plans and social identity, and they are grounded in local history, language and meaning. A focus on inclusive processes is crucial. Again, time should be invested so that the relevant

communities can assess their own situations and needs in an ongoing manner. Direct support means that aid delivery mechanisms must be made accessible and adapted to communities as direct recipients: small funds and rapid disbursement procedures should be used for this, and application and accounting procedures simplified. Moreover, a process-oriented approach in aid delivery should be adopted in place of bureaucratic, result-oriented and schedule-driven approaches. This may imply accepting process oriented plans, and refraining from tight schedules and overly constraining blueprints. In general, short term, restrictive and overly precise project frameworks should open up to longer-term partnerships and flexible mechanisms, where learning and achieved the desired impacts are emphasized in place of accomplished activities and delivered outputs regardless of quality or local demand.

- ***Enabling policy environment: ensure the free, prior and informed consent of affected communities***

The EU can promote supportive policy environments to enable biodiversity conservation and equity in many direct and indirect ways. This is not the place to discuss the how, however, but rather the "what". First and foremost, the free, prior and informed consent of affected communities should be an essential condition for the implementation of any development programme or project of the EU. Besides the need to recognise this on the ground of basic rights of self-determination of indigenous peoples and local communities, free, prior and informed consent is on line the principles established by the Aarhus Convention. Other key policies can comfort the results of our case studies and promote the local governance useful to support the conservation of biodiversity. Recognising communal property, securing land rights, recognising customary institutions, devolving decision-making and promoting transparent, open spaces for civil society to shape new laws and policies are all elements of a supportive and enabling policy environment for local governance. "Good governance" should also be supported, and at all levels. Indeed, good governance criteria could be made conditional to the financing of projects. Issues such as the lack of secure land rights in a project area have to be solved, as they are the basic conditions for successful governance of natural resources. For instance, transparency and accountability in hiring personnel and using resources could be included through several mechanisms, including the appointment of ombudspersons to deal with sensitive complaints related to programmes and projects.

- ***Environmental mainstreaming: engage local institutions in Environmental Impacts Assessment and Strategic Environmental Assessment processes***

Long-standing local conservation efforts may be threatened by externally-driven development initiatives, such as large-scale infrastructure, extractive industries, or the expansion of commercial agriculture. As the conservation successes of local communities still lack recognition, they are often not taken into account in planning processes. It is therefore crucial that local indigenous and community institutions are engaged in all the phases of Environmental Impact Assessment studies. The EU can ensure that Environmental Impacts Assessments and Strategic Environmental Assessments are systematically undertaken with the full participation of concerned indigenous peoples and local communities. These assessments should be as participatory as possible, and should include the analysis of impacts on biodiversity and associated cultural, spiritual and livelihoods values. This includes paying attention to policy reforms and how these impact biocultural diversity and local livelihoods. As apparent in our case studies, a significant threat to customary institutions and community governance of biodiversity stems from forced integration into "modern", large-scale economies.

7.5 Further research needs identified

The case studies analysed in GEM-CON-BIO have been distinguished in three groups: a) those carried out in the EU and US; b) those focusing the analysis on a specific use of natural resources and biodiversity at national/international levels in the EU and in c) those carried out in non-western Third Countries. The use of the GEM-CON-BIO analytical framework to carry out case studies in different ecological, social, cultural, economic/financial and institutional situations led authors to a common understanding of the research tasks, facilitating consistent outcomes and enhancing their comparability. As the number of case studies analysed was limited, we cannot safely extrapolate the results of the synthesis of case studies outcomes to a wider universe. It can be stressed; however, that **governance for sustainable development**

is a crucial theme for research and policy making, which should prominently feature in future research initiatives. The analysis of case studies reports provides some indications on what aspects should be addressed by future research linking governance and biodiversity:

- The GEM-CON-BIO analytical framework initiated the process of developing and selecting a set of ecological, economic/financial, social, cultural, and institutional indicators and relative value ranking systems for understanding how governance type affect the conservation of biodiversity. This set of indicators should be further refined, agreed upon and adopted to assess that relationship at different levels and under a variety of settings and overall conditions. In particular, specific indicators of **governance quality** should be identified and assessed, with a preference for participatory assessment by the actors most directly concerned.
- Research should focus on ways to improve governance, including case studies where this has been attempted, to generate lessons, tools and recommendations for action in various settings.
- The influence of scale of drivers and governance levels needs also to be better assessed, e.g. through a) the impacts on biodiversity by drivers originated at higher spatial levels (e.g. global environmental changes like climate change) b) the impact of international/European policy (e.g. Common Agricultural Policy), c) the interactions between local and national/global governance levels and their effect on ecosystem management practices and biodiversity conservation.
- Especially for the interactions between local and national/global governance levels, the need for complex decision support is apparent. Policy makers need support to integrate knowledge that exists at the regional and local levels (e.g. numbers of species, biotopes quality, etc) into the decision making process, while local people need expert guidance to collectively maintain and restore these ecosystem services that are required at the national/global scale. Systems that link these two levels for the benefit of biodiversity should be examined.
- There is a need for further analysis on the impact of external drivers (direct and indirect) on biodiversity (e.g. the relationships between CAP and CFP and biodiversity conservation at local level).
- There is a need to identify and monitor economic indicators to understand how thriving or declining biodiversity impacts upon the European economy. Such indicators could be promoted through a vehicle such as Eurostat, documenting how the contribution of biodiversity to the EU economy changes through time.
- There is a need to raise awareness among all levels (local, national, international) on the economic value of biodiversity and ecosystem services. Such value is provided by ecosystems in monetary terms (direct income), in life supporting services, in cultural / aesthetic / recreational services (e.g. tourism, bird-watching, hunting, etc). Such awareness could also be raised through the Eurostat survey suggested above.
- Further research on the status of biodiversity and the functioning of ecosystems should focus on ecological critical thresholds that ensure the sustainability of socio-economic activities.
- In-depth analyses are necessary about traditional, customary forms of biodiversity governance, their interaction with "modern" institutions, the factors for resilience of these institutions in the face of socio-economic change and the factors that affect their capacity to deliver decisions towards sustainability.
- Development of scenario analysis on the relationship between governance structures and conservation of biodiversity would facilitate communication of governance effects to the general public, and communication of problems and opportunities related to the management of ecosystems to the policy makers.
- The identification and documentation of best practices for conservation and sustainable use of biodiversity under different governance types and processes could enable the transfer of these best practices to wider contexts and areas. The linkage of such practices to Natura 2000 areas should be explored.
- Finally, given the very critical state of biodiversity at places worldwide, forthcoming major threats such as climate change and widespread introduction of invasive species, and the so far too slow reaction in policy development and implementation, it is highly advisable to promote research on governance and management of environmental, social and economic emergencies and on development of adaptation strategies.

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CHAPTER 8. Epilogue

8.1 A Review of Dissemination Activities in the Duration of the project

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GEM-CON-BIO is a research project with the aim of developing policy relevant conclusions; core aim of our dissemination strategy for the GEM-CON-BIO project therefore was to tailor the dissemination activities to each phase of the project in terms of target group and dissemination means. For the purpose of reviewing the dissemination activities we will distinguish the following three phases:

1. **Conceptualisation:** In the first phase of the project we worked on conceptualizing the project by developing an analytical framework. In this phase dissemination activities focused on raising attention to the project as well as presenting and discussing the analytical framework. Accordingly, poster presentations, presentations at seminars and workshops as well as producing project information material (project brochure, website, corporate design) were the most important dissemination activities.
2. **Empirical Work:** In the second phase we worked on the case studies where empirical work and analysis dominated. In this phase dissemination activities focused on presenting and discussing the case studies and getting information relevant for the case studies.
3. **Results:** In the third phase we synthesized the results of the case studies and developed the policy guidelines. Dissemination activities in this phase were directed towards communicating the results of the project to the relevant audience.

The GEM-CON-BIO dissemination activities were co-coordinated and documented by Ecologic but mainly undertaken by the project partners. The following sections summarise the main elements of our dissemination activities according to the type of dissemination, the dissemination means, the target groups, and the content of dissemination.

8.1.1 Type of Dissemination and Dissemination Means

For studying the types of dissemination we have distinguished the following categories: Conference, Workshop, Meeting, Abstract submission, Survey, Publication, Newsletter and Exhibition. When analyzing the different dissemination types it is striking that conferences and workshops are the most prominent dissemination types. So, it shows that using oral dissemination types have been used more frequently than dissemination in writing (see Figure 1). The same shows in Figure 2.

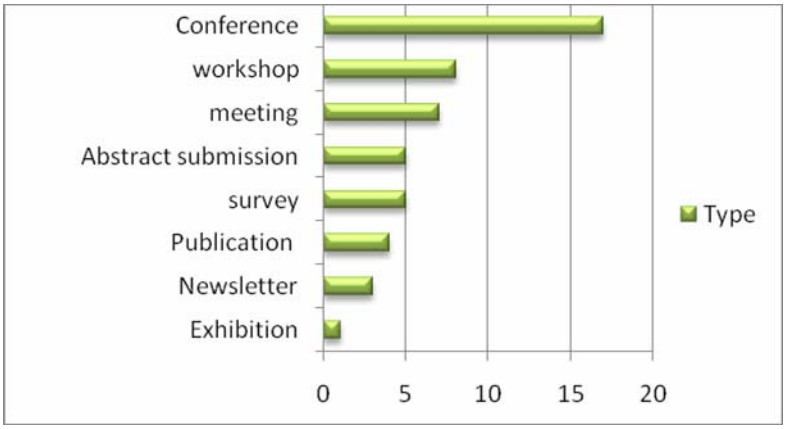

Figure 1: Dissemination Types

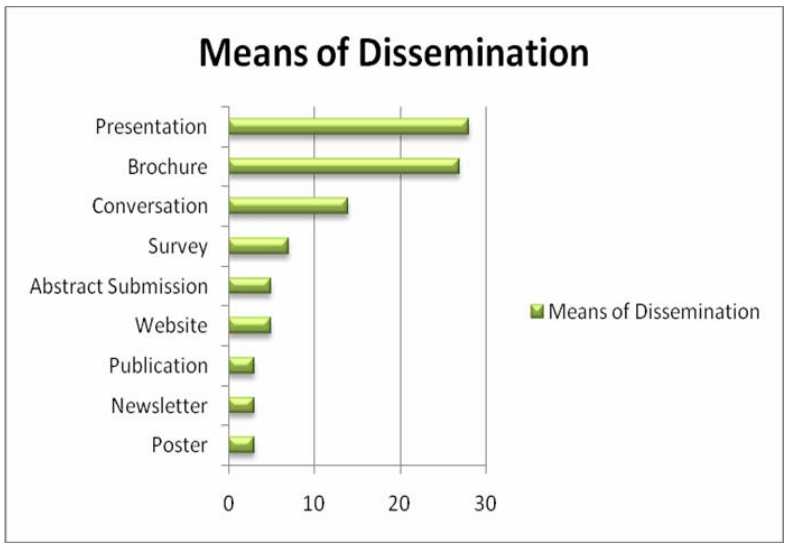

Figure 2 Dissemination Means

8.1.2 Target Group

In terms of the Target Group we have distinguished the following groups: Researchers, Government, NGO, Practitioners, EU, Business, Stakeholders, Citizens, Consultancies, Students and Press. Analysing the target groups reached it shows that the target groups we reached correspond to the aims of the project, i.e. formulating scientific results and disseminating them to policy makers (see Figure 3).

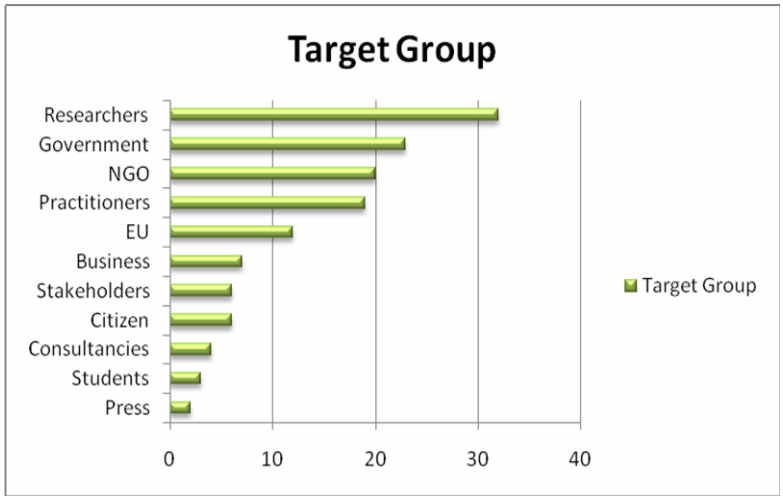

Figure 3 Target Groups

8.1.3 Content of Dissemination

For the purpose of capturing the content of dissemination we distinguished information on the project in general, information on the case studies and GEM-CON-BIO Conferences. In line with the different phases of the project as described in the introduction to this Article next to the project in general which includes the framework, most of the information distributed referred to the case studies (see Figure 4).

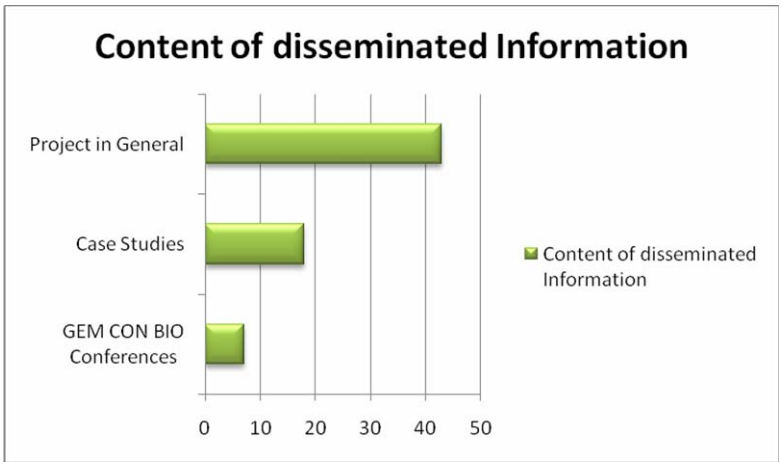

Figure 4 Content of dissemination

This overview shows that the dissemination activities undertaken by the partners of the project were tailored to each phase of the project and reached the target groups most prominent for the purpose of the project.

8.2 Future of Conservation of Biodiversity in the EU

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In Europe, human societies have affected their landscapes and the other species living there possibly more than anywhere else in the world. The change has been so pervasive that many of our biodiversity rich areas can only be maintained and conserved through some form of human intervention and management. As a matter of fact, biodiversity and human wellbeing have become so closely intertwined that it is nearly impossible to separate them.

Today, our capacity and willingness to extract natural resources or modify our ecosystems has increased exponentially and even the landscapes we protect for their value in sustaining biodiversity are surrounded by intensively used areas. Overall, the effect on biodiversity and our future wellbeing is not positive. Despite protecting more of the European continent than ever before (some 18% of the European Union is protected under Natura 2000 alone), we are still witnessing strong rates of species decline (for instance 42% of native mammals, 43% of birds, 45% of butterflies, 30% of amphibians, 45% of reptiles and 52% of freshwater fish are said to be declining in numbers throughout Europe). Political targets have been established to implement the policies that will address this decline. Much of their focus is not on nature protection legislation or activities, but rather on those sectors of natural resource use and economic development that have the greatest impact.

It is against this background that the GEM-CON-BIO project was developed with the tenet that only through the equitable and sustainable governance and management of natural resources it will be possible to conserve biodiversity in Europe and elsewhere. In agreement with the prevailing view of the global community, it was also taken on board that conservation work should be carried out at the ecosystem level and that ecosystem functions should be fully valued (in all senses of the term) in order to achieve some form of sustainable development. As biodiversity underpins much of the ability of ecosystems to provide life-sustaining functions, we ought to warrant special attention to it. Ecosystems perform environmental functions such as supporting, regulating, cultural and provisioning delivers goods and services which may have the character of private or public goods. Ecosystem's goods and services such as food and fibre, fresh water, ornamental resources, wood, recreation and educational services, etc. can be easily exchanged through markets and treated as commodities. On the contrary other ecosystems goods and services such as spiritual, aesthetic, artistic, etc. inspiration, cultural and historical identity, habitats for wild species, air & water purification, climate regulation, erosion control, etc., for their characteristic of being public goods can not be exchanged automatically through markets so often resulting in externalities.

The acknowledgment of the importance of delivering public goods such as those resulting form ecosystems supporting and regulating functions, has resulted in the development, for instance by EU's agri-environmental policy, of instruments and tools to achieve provision of these goods and services by using markets, quasi-markets or regulatory tools. This is what is done for instance when the costs of maintaining the aesthetic qualities of the landscape are internalised in the price of staying in the holiday farms (e.g. agri-tourism), or when the costs of biotopes conservation is compensated by the payments of agri-environmental programmes, or when the cost of not using chemical pesticide (e.g. reduced yields) is internalised by a higher price of organic products.

The need for the adoption of different policy instruments for the management of ecosystems is further enhanced by both territorial and time considerations. In fact soil erosion and water run off control, landscape and biodiversity conservation, etc., impacted by socio-economic activities have an indisputable territorial specificity. This territorial characteristic of ecosystems goods and services has to be considered in relation to different scale of analysis. For instance soil erosion and water run-off control have an evident importance at the level of the single field but also at the level of water catchments because of the impacts of transported sediments, whereas the conservation of biodiversity of some local species can represent a global interest as much as the greenhouse gases sequestration, etc. These examples are important because show

how to eventual costs incurred at local level to supply environmental goods and services could correspond benefits at higher spatial scales (i.e. at local, regional but also at national and global levels). Furthermore drivers of change originated at higher spatial level than local, such as CAP, CFP, climate change policy, are exerting a great impacts the effectiveness of governance and ecosystem management for biodiversity conservation locally. This fact has obvious consequences on matching the supply with demand of these goods and services and on problems of equity in distributing related costs and benefits, making the existence of positive and/or negative externalities very likely.

Following this reasoning, it has to be pointed out that also the temporal dimension plays an important role when dealing with ecosystems goods and services. In facts very often positive and negative impacts exerted by socio-economic activities on the supply of environmental goods and services are detected not just at different spatial levels but also at different times. For instance the effects of a reduction of a natural habitat's extension by conversion to agricultural use, or the loss of biodiversity because of excessive use of pesticides, may not be detected immediately but showing the seriousness of the negative impacts on the survival of some species only after some years. By the same token, the environmental benefits coming from a reduction of chemical fertilizers polluting the water table and soil can result only after a certain time span often of years. Also in the case of time lag of impacts on the capacity of ecosystems to deliver environmental goods and services, it is reasonable to foresee the presence of positive and/or negative externalities creating problems of equity in the distribution of costs and benefits in some cases even of intergenerational character.

The GEM-CON-BIO analysis is indicating that governance and ecosystem management in order to be effective for biodiversity conservation have to adopt and implement the ecosystem approach. This means that all the supporting, regulating, cultural and provisioning functions of ecosystems have to be taken into account by governance and ecosystem management, not just those resulting in the delivering of goods and services which can be exploited and exchanged trough markets in the short term locally. Another outcome of the GEMCONBIO analysis is that setting the right management objectives is very important for biodiversity conservation. These have to be identified in relation both to the site specific ecological, economic and social characteristics and to regional, national and international levels so to select what are realistic biodiversity objectives to be set and integrated into sectoral and management plans locally. In facts to conserve biodiversity, it is not enough to try to reduce the pressure exerted by socio-economic activities on the environment and conserve biodiversity in protected areas. What is needed is that also socio-economics activities carried out at all levels will be rearranged around biodiversity conservation objectives. In other words there is the need to create a nature conservation sector with precise and measurable biodiversity conservation objectives to be achieved, involving populations and the development of socioeconomic activities based on innovative/traditional practices and technologies operating at different hierarchical levels.

The analysis of GEM-CON-BIO case studies indicates that an appropriate mix of public administration, community participation and market based governance, is supposed to work better for managing ecosystems for biodiversity conservation than single type of governance. The same can be said for the mix of regulatory, participative and economic/financial instruments to be implemented. The realization of ecological corridors linking Natura 2000 sites for instance, could be based on mixed types of governance capable of developing long term strategies and management plans taking into account biodiversity objectives, appropriate instruments to be used to achieve those objectives. Among these, adaptive management could certainly be more useful than as it is now, if good monitoring and control of impacts of ecosystem management on biodiversity conservation would be carried out more effectively around Europe.

8.3 Concluding Remarks

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The principal aim of the GEM-CON-BIO project was "to explore the interactions between governance modes and sustainable development objectives in view of identifying what governance processes and institutions can best contribute to the conservation of biodiversity". GEM-CON-BIO has fulfilled this aim in a highly successful way and has opened the way for further research on the crucial issues of biodiversity's conservation.

The research conducted by the partners on a series of case studies across the globe, which are managed in different ways (e.g. private ownership, public authority, community management etc.), has contributed to the comparison of different biodiversity conservation approaches, either "success" or "failure". Each partner's input to the case studies was very important, while of major significance was the experience of the United States and third countries as well as of the Pan-European case study, in terms of both the governance initial capacity and the evaluation of governance performance.

All this research has led firstly, to the identification of the critical governance and ecosystem management characteristics for the sustainable use of biodiversity and secondly, to the development of specific recommendations and model approaches for sustainable biodiversity management. The synthesis of the case studies outcomes contributed to this direction and in particular to the development of the policy guidelines.

The policy guidelines may act as guidance tool for biodiversity conservation in the EU as well as for the design of EU policies in third countries. The improvement of governance for biodiversity conservation is of high importance for the EU, which has several times declared its aim to halt biodiversity loss in the next few years (see for instance, Article 6 of the 6th Environmental Action Programme). It is also important for the EU to involve as many stakeholders as possible, such as the citizens, the government, the private sector and the civil society in the whole process.

As far as the main value of the GEM-CON-BIO project is concerned, we could refer to the three most important outcomes of the project, which are:

a) the development of the analytical framework for the conduction of the case studies,
b) the elaboration of the case studies and the synthesis of the results and
c) the development of the governance matrix and the policy guidelines.

The analytical framework may be applied on more case studies in a further future analysis. Its application on all the case studies the partners have conducted, including the US and the third countries, is the best evidence for its flexibility and applicability in various cases at all levels.

In addition, the results of the elaborated case studies may be used for further comparisons and estimations. One may draw significant conclusions from the synthesis of the results and make estimations on possible results on biodiversity conservation regarding a certain area.

Last but not least, the policy guidelines could be used as a guide for policy makers at every spatial level in the design, development and implementation of policies and regulatory frameworks for the conservation of biodiversity. They can help policy makers adapt and implement most suitable to their particular circumstances approaches.

In conclusion, GEM-CON-BIO has developed a methodology for the achievement of sustainable management of our natural resources by understanding what constitutes "good governance" and by identifying the critical management characteristics and threshold factors. Their interrelations have

generated a governance matrix linking governance types and critical ecosystem management characteristics that are used in the research on a great range of case studies and have presented "success" and "failure" scenarios of different approaches in Europe, USA and third countries. The project's scope to demonstrate whether good governance practices lead to better outcomes and to disseminate the results to those involved in the formulation, implementation, monitoring and evaluation of policies - at the European, national, regional and local level, involving public authorities, legislators and citizens and their organisations has been achieved. The elaboration of further research could enrich GEM-CON-BIO's outcomes and contribute to the identification of new approaches for the conservation of biodiversity across Europe.

GLOSSARY

Term	Definition
Adaptive management	The structuring of policy or management actions as a set of testable hypotheses to promote learning from policy implementation, and to allow for greater adaptability when change does inevitably occur within the system (Lamont 2006).
Addis Ababa Principles	A set of 14 principles and guidelines that assist stakeholders to ensure that their use of the components of biodiversity is sustainable (CBD Decision VII/12)..
Afforestation	Planting of new forests on lands that historically have not contained forests
Alien Species	A species (or lower taxon) occurring outside its historical range and its potential dispersal range. It can be introduced intentionally or unintentionally. Synonyms include: exotic, non- native, non-indigenous, foreign species.
Biodiversity	The variability among living organisms from all sources [...] this includes diversity within species, between species and of ecosystems" (Article 2, CBD).
Biodiversity governance	The way society at all scales manages its social, economic, and regulatory affairs with the aim to conserve ecosystem function and biodiversity.
Climate change	A statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). The UNFCCC in its Article 1 makes the distinction between climate change which it identifies as anthropocentric in origin and climate variability which is attributable to natural causes.
Collaborative governance	The integration of values (economic and social as well as environmental) through a collaborative, multi-partner decision making process (Lamont 2006)
Ecosystem	a "dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit" (UN 1992)
Ecosystem Approach	A strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way (CBD Decision V/6). The CBD developed a set of 12 principles for the Ecosystem approach (CBD Decision VII/11).
Ecosystem processes	The interactions between the components of an ecosystem
Ecosystem function	The capacity of natural processes and components to provide goods and services that satisfy human needs, directly or indirectly (De Groot 1992)
Ecosystem goods and services	The set of ecosystem functions which have observable benefits to human society
Ecosystem management	Analogous to the ecosystem approach.
Ecosystem structure	The organisation and composition of an ecosystem's components
Externalities	Externalities are spillovers that occur in the production and consumption of goods and services and increase or decrease other people's welfare. They are not themselves the object of market transactions for the gains or losses generated. Although externalities do not appear in the revenue and cost accounts of the producer or industry that is the source of the externality, they represent changes in welfare (costs and benefits) to those affected. (OECD, 2001,

	Improving the environmental performance of agriculture: Policy options and market approaches. OECD, Paris)
Habitat fragmentation	The reduction and isolation of patches of natural environment.
Governance	The way society as a whole manages the full array of its political, economic, and social affairs.
Good governance	Good governance features of governance that promote, among other things, participatory, transparent, equitable and accountable methods. Good governance promotes the rule of law and ensures that political, social and economic priorities are based on broad consensus in society.
Governability	The ability of social actors at various scales to steer the development of social and ecological systems
Integrated Coastal Zone Management (ICZM)	An ecosystem based approach to the integrative management of coasts to ensure the sustainable development of coastal communities and the preservation of ecosystems.
Integrative planning	The establishment of clearly stated long-term goals and objectives, the implementation of a wide range of policy tools to achieve these objectives, and the continuous monitoring of the ecosystem (Lamont 2006).
Invasive alien species	An alien species that becomes established in natural or semi-natural ecosystems and acts as an agent of change, threatening local biodiversity.
Natural resources	A general term to cover the extractable biotic components of an ecosystem. The European Commissions uses a very broad definition that includes raw materials such as minerals, biomass and biological resources; environmental media such as air, water and soil; flow resources such as wind, geothermal, tidal and solar energy; and space (land area).
Public goods	Public goods are products or services for which consumption and provision cannot be limited to one individual or group of individuals. Two features make public goods different from private traded goods: non-*rivalry* — the benefit from consuming a product or service does not reduce its beneficial consumption by others; and *non-excludability* — users or potential consumers cannot be prevented from benefiting from the public good in question once it has been supplied. Also, it is impossible to require an individual to pay for the good according to the benefit derived, which would be necessary to avoid *free rider behaviour.* There can also be *local public goods.* (OECD, 2001, Improving the environmental performance of agriculture: Policy options and market approaches. OECD, Paris)
Resilience	The capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks (Walker et al 2004).
Sustainable use	The use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biodiversity (CBD)

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