

# “GREEN MOUNTAIN”

## A Sustainable Development Model for Green Mountain Areas

**Working Group 2**

**Final Report**

**28/05/2012**



**GREEN MOUNTAIN**

A SUSTAINABLE DEVELOPMENT MODEL FOR GREEN MOUNTAIN AREAS

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## Identification Sheet

<b>Project acronym</b>	<b>GREEN MOUNTAIN</b>
<b>Project full title</b>	<b>A SUSTAINABLE DEVELOPMENT MODEL FOR GREEN MOUNTAIN AREAS</b>
<b>Work Package</b>	WP3 – Joint development of a common Sustainable Development & Management Model
<b>Activity</b>	3.2 – Working group 2 - Methods and strategies for coordinated management policies and plans
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## Introduction

### **Working Group 2 (WG2) - Methods and strategies for coordinated management policies and plans**

The transnational thematic WG2 was established with the aim to develop methods and strategies to support coordinated actions and decisions among the different institutions/actors responsible for the management of the mountain territory including its natural assets. A management strategy based on a coordinated approach among all the relevant actors (multi-actor approach) and consideration to various aspects and economic sectors (multi-sector approach) will result in a better use and synergies of territorial and financial resources, more focused/efficient interventions; consistent policies and stronger territorial impact.

### **PROBLEM**

Often there is a lack of a global vision of environmental problems, threats and opportunities. This results in decisions and actions which are not consistent, impeding a sound and coordinated management of economic and natural resources which in the end obstructs a sustainable and balanced socio-economic and environmental development of the mountain area. A strategic and political coordination involving different actors is necessary in order to take consistent decisions and to develop appropriate actions having concrete and sustainable effects.

### **WG2 members:**

- 1) Lucia Vačoková (WG2-leader) – Slovak Environmental Agency (SK)
- 2) Andrea Catorci - Province of Macerata (IT)
- 3) Ekaterina Gadjeva – Region of Smolyan (BG)
- 4) Evangelos Tsiaras - Region of Epirus (GR)
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- 9) Volkhard Maier - Soelktaeler Nature Park (AT)
- 10) Maria Filippa Plotino – Monti Sibillini National Park (IT)
- 11) Wilhelm Graiss – Agricultural Research and Education Centre Raumberg - Gumpenstein (AT)

### **ACTIVITIES**

WG2 developed a common methodology and concrete guidelines for local authorities/mountain territories to enable the drawing up of management plans/policies based on an integrated and coordinated approach.

#### WG2 activities:

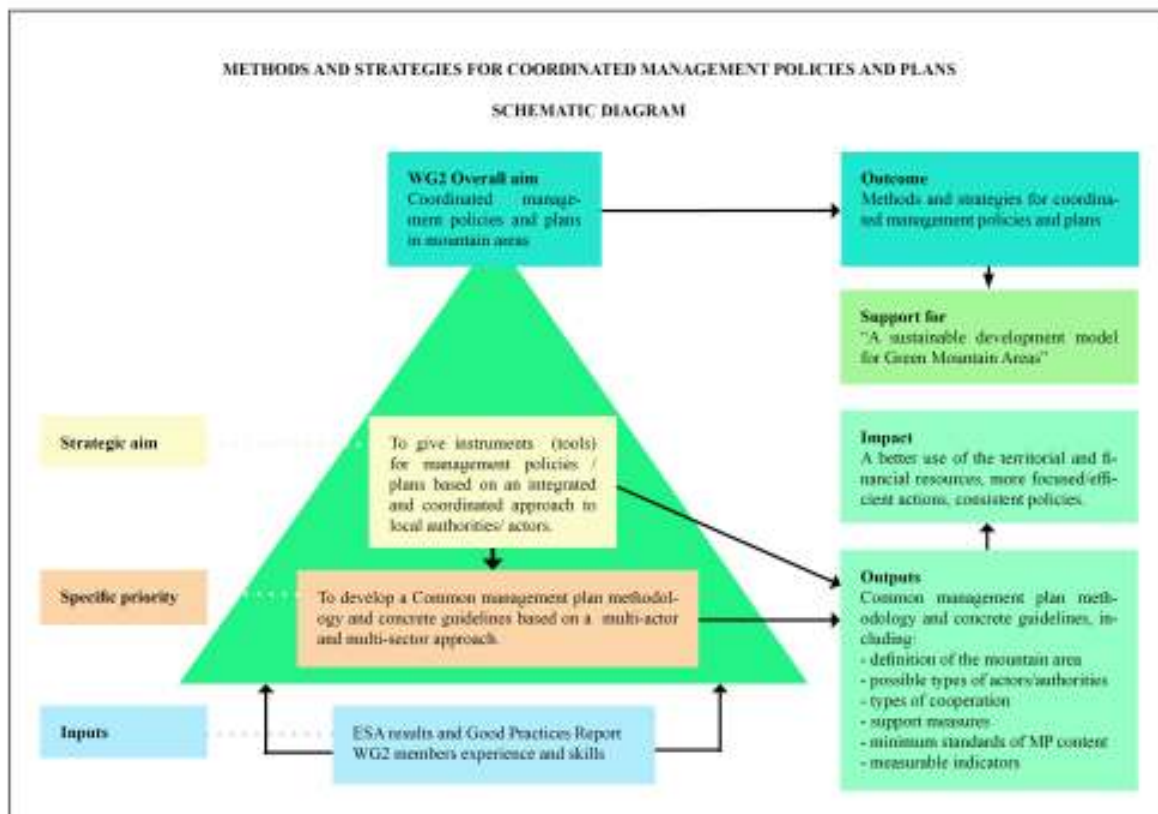
1. Methodology to define the area covered by the coordinated management approach. What criteria should be considered when identifying the area to be involved (characteristics of the area, extension of the area, administrative borders, shall the area cover both protected and non protected areas, etc.).
2. Methodology/criteria to identify the types of actors/authorities to be involved. Which actors/authorities should be involved and why? What contributions shall the involved actors/authorities be able to give (e.g. in terms of natural/environmental protection, technical competencies, financial instruments available, competencies in economic development, legislative power/capacity, etc.).
3. Which are the different and possible types of cooperation (incl. the intensity of cooperation) and what is the methodology for how to select the most appropriate one How can the cooperation

be concretized (e.g. through a simple partnership agreement, or consortium, or public-private company, etc.); What are the advantages/disadvantages of the different cooperation types, and what are the elements that should be analyzed to choose the most appropriate one.

4. Identify possible “Support Measures” and actions/activities that can concretely support the “cooperative approach”. e.g. setting up specific communication activities to favour /promote the “cooperative approach”, organization of round tables, the development of innovative activities/instruments that can support active involvement/cooperation, etc.
5. Identification of minimum standards that can be used as concrete guidelines for the development of integrated and coordinated Management Plans
6. Definition/identification of indicators for evaluation/monitoring of the impact/efficiency of interventions realized in the mountain areas in order to ensure the sustainability of actions and the efficient use of financial instruments. In general and if possible also with specific focus on indicators that can assess and evaluate the advantage of an “integrated approach”, also from financial point of view.

The activities of the WG2 were also supported by the ESA results made by the territorial partners as well as by the Good Practice Report made by AREC, or any other existing Good Practices examples that can be found e.g. among or beyond partners. WG2 activities should take into consideration also eventual national or international documents/reports/studies concerning coordinated management policies and plans. The examination/exchange/discussion on concrete examples, good practices of successful cooperation based on a coordinated and integrated approach will help WG2 members to verify the different strategies/most valid strategies and modalities to know how to facilitate cooperation among all the key actors as well as to identify what solutions and common method could be applied.

Figure 1: WG2 Schematic diagram (by Monti Sibillini National Park and Slovak Environmental Agency)



## 1. General references

### 1.1 Basic definitions

#### Mountain areas

Mountain Areas in Europe are defined in the European Mountain Charter (A) and in the Mountain Areas in Europe: Analysis of mountain areas in EU Member States, acceding and other European countries (B) as well. These definitions do not include concrete environmental, spatial, social and economy criteria for its delineation.

#### A. European Charter of Mountain Regions

Mountain areas are defined by the European Charter of Mountain Regions as areas with particular environmental characteristics, like altitude, slope, climate conditions, creating special living conditions, which was adopted by the European Conference Euromontana, Krakow, 1995. In the European Charter of Mountain Regions, there is no defined concrete altitude and any other concrete specific conditions. In general, European mountains settlements are defined like municipalities with altitude more or equal 400 m above s.l..

#### B. Mountain Areas in Europe: Analysis of mountain areas in EU Member States, acceding and other European countries (approved by European Commission in 2004)

Mountain areas are economically handicapped in two interconnected ways, due to their difficult topography and climate conditions. The method chosen to identify these regions was a refinement of the global approach developed by the UNEP-World Conservation Monitoring Centre, using a digital elevation model which records the elevation of every square kilometer of the Earth's land surface. Following the principle that the threshold for rough topography increases as the altitude decreases, the chosen criteria for altitude and slope were as shown in the following table:

Class (elevation in m)	Additional criteria
> 2500	
1500-2499	> 2° slope within 3 km radius
1000-1499	>5° slope within 3 km radius and/or local elevation range and local elevation range >300 m within 7 km radius
300-999	local elevation range >300 m within 7 km radius
0 – 299	standard deviation > 50 m for cardinal points

**Table 1: Criteria for definition of mountain area in Project Member States**

Member State	Minimum elevation	Other criteria
Austria	700 m	also above 500 m if slope >20%
Greece	800 m	also 600 m if slope >16%; below 600 m if slope >20%
Italy	600 m	altitudinal difference > 600 m
Bulgaria	600m	also >200m altitudinal difference/km <sup>2</sup> ; or slope >12°
Hungary	600 m	also above 400 m if average slope >10%; or average slope 20%
Romania	600 m	also on slopes >20°
Slovakia	600 m	also above 500 m on slopes >7°; or average slope >12°

Source: Mountain Areas in Europe: Analysis of mountain areas in EU member states, acceding and other European countries

Besides these two criteria, the climate conditions can also be taken into consideration.

Others criteria and their explainatations:

#### Land cover and land use structure

The topography of Europe's mountains varies greatly, from the high mountains to the lower 'middle mountains' that are far greater in extent. There is great climatic variation, with major north-south and west-east trends.

There is also a great diversity of land covers.

From this point of view, criteria of land cover / land use will be not relevant by the identification of a certain mountain area. A kind of land cover and land use is not reason for excluding the individuation of a mountain area.

### **Territory size and coherence of territory**

The territorial scope is irrelevant. For the future implementation of the strategy and management plan the properly defined vision, objectives and priorities are more important than the size of the territory.

The coherence of the territory is not necessary, one mountain area can consist of more incoherent territories with no common administrative boundaries.

### **Settlement structure**

The settlement structure of mountain areas varies across the whole Europe. In terms of defining the mountain area, the settlement structure (density of settlement, towns, villages, dispersed settlement) has no importance. It will be important within the process of defining the strategy objectives, priorities etc...

### **Protected areas**

Europe's mountains include many regions with high levels of biodiversity, as well as they are significant sources of natural resources (minerals, water power, forests). The purpose of protection varies considerably: from protection of specific habitats and/or species (e.g., through NATURA 2000 or national designations) to fostering rural development through opportunities for tourism based on the natural environment and cultural landscapes.

Protected areas are managed for multiple objectives, often through the definition of different zones with different relative priorities. The presence of a protected area has not to be considered a binding condition: the area can be individuated as a mountain area without being under national, regional or local protection from a naturalistic point of view.

### **Social and economic capital**

Social and economic capital derived from population density, population development, and access to markets. Five categories were identified; 1) the best preconditions; 2) high potentials, negative population trends; 3) low population density islands near high population density areas; 4) remote with low population densities; and 5) remote with high population densities (source: „Mountain Areas in Europe: Analysis of mountain areas in EU Member States, acceding and other European countries“). At the moment in the definition of a mountain area, this criterion doesn't play any role.

### **Transport infrastructure, national and regional accessibility and services**

Transport networks are essential for decreasing the effects of peripherality. Rough terrain significantly increases the costs of constructing and maintaining transport infrastructure in mountain areas. With regard to other services – e.g., medical, education – the lack of easy physical access is often compounded by the fact that populations are small and spread over relatively large areas. Four groups were identified: very good, good, fair and poor (source: „Mountain Areas in Europe: Analysis of mountain areas in EU member states, acceding and other European countries“). Transport infrastructure, national and regional accessibility and services doesn't have to be taken into consideration within the mountain area identification.

### **Mountain area borders**

Mountains often form the boundaries of states and regions. In some cases, they reinforce the effect of administrative borders or make links between each side difficult. Major infrastructures built to compensate for these difficulties have often had negative environmental impacts. From the point of view of the implementation of a mountain area strategy, it is recommended to define the mountain area borders according to the spatial administrative division (structure) of the certain territory.

### **Conclusion:**

A mountain area is defined by its natural conditions and administrative borders. All other aspects will be important later, during the process of preparation of the mountain area sustainable development strategy. They will be taken into consideration in a common methodology and concrete guidelines for local authorities/mountain territories to enable the drawing up of management plans/policies based on an integrated and coordinated approach.

### **1.2 Main approaches (bottom up, multi sector and multi actor cooperation)**

**The bottom-up approach means that local actors participate in decision-making about the strategy and in the selection of the priorities to be pursued in their local area.** Experience has shown that the bottom-up approach should not be considered as alternative or opposed to topdown approaches from national and/or regional authorities, but rather as combining and interacting with them, in order to achieve better overall results<sup>1</sup>.

### **How can we achieve effective cooperation? Multi sector and multi actor cooperation**

How to make partnerships happen more systematically<sup>2</sup>:

*Motivation / awareness* – leaders from across all the sectors need to understand the benefits of cross-sectoral action and be inspired by successes.

*Means / capacity* – bringing together different sectors with different values, interests, timescales and vocabularies is difficult. People often don't appreciate the need to learn the skill set and develop the mindset necessary for effective partnering.

*Opportunity* – It's essential to have the right platforms through which people from all sectors can meet, discuss issues, find common interests and spark possibilities.

*Research and learning* - finally this all needs to be underpinned by knowledge drawn from research on what works, what doesn't work and why, and an enabling environment that encourages and rewards cross-sectoral collaboration.

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<sup>1</sup> [http://www.elard.eu/en\\_GB/the-bottom-up-approach](http://www.elard.eu/en_GB/the-bottom-up-approach)

<sup>2</sup> <http://capacitydevelopment.ning.com/>



## 2. Overview of existing situation

### Summary of main/common problems of Mountain areas

#### - Demography

In many countries, the demographic development in the mountainous regions, or at least in parts of them, is characterized by depopulation and an ageing of the population. Otherwise, the general trend is migration to urban area, loss of productive population, growth of unproductive population and rising unemployment.

#### - Economy

Economy is a wide category, but the general impression is that, in many mountain areas, basic industries are in decline, while the 'new' industry – developed to different degrees – is tourism. Tourism is an important industry in many mountain areas. Even though basic industries in many cases are in decline, they can still be important. Many mountain areas are key sources of energy, especially hydro-electricity, and are important sources also for an economic development through agriculture, the exploitation of forest resources, water, or minerals.

#### - Tourism

Tourism is a source of employment, income, and development, and is an essential element for the general attractiveness of the mountain areas. Factors relating to the landscape, to the environment (e.g., biodiversity, clean air, snow), and to various aspects of cultural heritage make many mountain areas important for tourism. Eco-tourism, agro-tourism and wildlife tourism (including hunting) are seen as future opportunities for development. Indeed such 'innovations' are also seen as a way of preventing the over-exploitation of these regions, which is often mentioned as a significant future threat. Thus, in some cases the potential conflict between (economic) development and (environmental or cultural) protection of the region, is emerging. In many cases, there are no comprehensive services and a comprehensive information system on tourism.

#### - Agriculture

In many of the mountain areas, small-scale and 'low tech' agriculture still persists in the mountains. Such agriculture contributes little to national economies and in many cases is in decline, leading both to decreases in population and to the expansion of forests. Nevertheless, it remains a potential sector of development when focused on the production of quality food products, as an environmentally-friendly agricultural production sector in its own right, or joined with tourism.

#### - Environment

Mountain areas include many regions with high levels of biodiversity, as well as being significant sources of natural resources (minerals, water power, forest). Moreover, given the generally sparse settlement structures and peripheral locations of such regions, many mountain areas enjoy good environmental conditions. The over-development of mountain regions or of the areas close to them, can thus be seen as a significant future threat to biodiversity and environmental quality. Consequently, notions of development potential are often discussed in terms of potential inherent in protecting significant parts of mountain areas national parks, nature reserves, and other types of 'protected area'. However, the purpose of protection varies considerably: from protection of specific habitats and/or species (e.g., through NATURA 2000 or national designations) to fostering rural development through opportunities for tourism based on the natural environment and cultural landscapes. Increasingly, protected areas are managed for multiple objectives, often through the definition of different zones with different relative priorities and regulations.

Natural stress factors - windbreaks, floods, growing ecological hazards, deforestation, land and associated landslides, climate change, inadequate environmental awareness among the population are the most important environmental problems of the mountain areas.

#### - Service provision

Many mountain areas suffer from 'natural handicaps' (e.g., complex topography, harsh climate), peripherality, isolation and distance from urban centers, and sparse settlement. The general depopulation trend also negatively affects service provision.

#### - Infrastructure/accessibility

Accessibility is a challenge in many mountain areas due to the physical topography, climate (especially where snow can be heavy in winter), high construction and maintenance costs, and sparse settlement patterns. The road and rail infrastructure is inadequately upkept in many mountain areas. With regard to other types of communication, information and communications technologies (ICT) are a future opportunity for development. In regions characterized by sparse settlement and extreme natural conditions, it is important that telephone (land-line or mobile) and Internet communication is facilitated.

#### - Cultural identity

Cultural identity in the mountain areas is intimately connected to both tourism and agriculture. The old agricultural and handicraft professions continue to exist in some countries and are important sources of identity. Moreover, in many of these regions, the slowness of their development has preserved a significant architectural and landscape heritage. A future threat in all the mountain regions is the loss of their historical culture and traditions due to the out-migration of young people. At the same time, the maintenance of culture and traditions can be the key to long-term self-determination.

### **3. Management plan**

#### **3.1 Management plan structure and content**

##### **Management Plan as a separate document for each priority (structure, content):**

In this chapter is described structure of Management Plan (MP) as a separate document. MP contains descriptions of all the work steps that needs to be carried out in order to meet defined objectives.

##### **3.1.1. Introduction part**

###### **3.1.1.1 Management Plan purpose, aim and objective**

The Management Plan is the strategic document which helps to systematically organize and manage changes aiming to ensure balanced sustainable development of the concerned mountain area. MP summarizes the key elements in this area and on the basis the SWOT analysis, and taking into account the defined vision it sets down objectives towards positive growth of the area.

The main purpose of the MP is:

- to specify the concrete activities and actions to achieve the vision, aim and objectives,
- to summarize the potential financial sources to ensure the realisation of the relevant activities,
- to specify the bodies responsible for implementation of the proposed activities and actions,
- to define / create the list of projects for implementation of the proposed activities,
- to establish the framework timetable of the proposed project realisation.

Management Plan provides a comprehensive view of the concerned mountain area and specifies the answers to two basic questions:

- What should be achieved in this area to ensure its sustainable development?
- How should it be achieved?

Preparation of Management Plan is designed to prevent the implementation of activities and projects with negative effects on quality of life in the affected area.

In addition to above-mentioned, the Management Plan has several other objectives:

- to provide a baseline description of the mountain area;
- to anticipate any conflicts and suggest the best means of resolving them;
- to implement current policies and strategies. To identify the monitoring needed to measure the effectiveness of management;
- to act as a guide for new staff and to guarantee continuity of effective management;
- to act as a tool for communication and education;
- to demonstrate that management is effective and efficient;
- to highlight areas in legislation that need improvement;
- to provide guidance for appropriate physical development and broader planning needs;
- to establish local socio-economic value/benefits of biodiversity/green mountain areas;
- to define whom planning and management is for.

Sustainable development is a very complex matter, and its strategic planning will help to find optimal linkage between all the aspects of development and progress and ensure their compliance with the sustainability principles. Sustainable development planning is difficult first and foremost because the concept is so vast. In order to keep a sustainable development strategy realistic and implementable, the number of priorities and targets need to be limited to the most essential. The preconditioning factor is the emphasis on quality and objective evaluation of processes triggered by the adoption of the document, and on the openness and continual updating of the document in reaction to changes in each sector. A realistic and implementable document cannot contain everything, it must rather concentrate on expertly selected key topics. Its simple and comprehensible form then also facilitates substantial involvement of stakeholders and the public in the entire planning process.

Table 2: Formal criteria for a good sustainable development plan<sup>3</sup> :

- |   |
|---|
| <ul style="list-style-type: none"><li>○ A time period of at least 15 years.</li><li>○ A modern, well-arranged, plain and brief strategic plan increases the chances of participation of all stakeholders.</li><li>○ Framework and cross-section strategic plan – regional development is an issue across all sectors.</li><li>○ Emphasis on instrument for monitoring and evaluation of the strategic plan implementation.</li><li>○ Specific and quantified strategic targets enable more realistic and effective implementation; they are not dogmas, but outlined directions for future progress.</li><li>○ A live document – it is going to be updated, or its contents will be included in related departmental documents when they are updated.</li></ul> |
|---|

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<sup>3</sup> Manual for planning and evaluation of Sustainable Development at the regional level, Prague 2006)

- The document is based on a broad range of credible information provided by official statistical institutions or organisations authorised to collect and interpret data.
- The document is prepared in an open participatory way together with an expert working group participates, it is discussed with stakeholders and the public.
- Consensual document – it respects the stakeholders’ opinions and public opinion.
- The document is grounded in the current social situation.
- The document is realistic and its implementation is viable.

Management Plan is intended for different stakeholder groups and therefore must be developed in clear and understandable way for all stakeholder groups.

**Management Plan consists of five interrelated parts:**

- Introduction part

This part defines the basic information on concerned area and subjects involved in the development process of this area, including the definitions of the forms of their cooperation.

- Analytical part

The analytical part provides summary information about the concerned area to be comprehensively mapped. It includes the SWOT analysis focused on assessing the strengths and weaknesses of the area, opportunities and threats to its development.

- Strategic part

The aim of the strategic part is to summarise the strategic vision, strategic aim and specific objectives of the mountain area development and priorities and measures to achieve objectives and fulfil the vision.

- Implementation part

The implementation part specifies activities, financial requirements, potential sources, as well as design of specific projects and the timeframe for their implementation.

- Monitoring and evaluation part

This part establishes procedures for obtaining the feedback on the effectiveness of Management Plan and specific evaluation of the results. There are included the recommendations for the establishment of indicators as a form of quantitative and qualitative assessment of progress.

Table 3: Management Plan content

Introduction part	<ul style="list-style-type: none"> <li>○ Management Plan purpose, aim and objective for concerned mountain area</li> <li>○ MP leader, manager and Management Plan team</li> <li>○ Territory identification</li> <li>○ Actors/authorities identification</li> <li>○ Definition of cooperation</li> </ul>
Analytical part	<ul style="list-style-type: none"> <li>○ Sources analysis, including potential analysis</li> <li>○ SWOT analysis</li> <li>○ Problem analysis</li> <li>○ Problems from the resident’s point of view</li> </ul>

Strategic part	<ul style="list-style-type: none"> <li>○ Vision</li> <li>○ Strategic aim, specific objectives</li> <li>○ Priorities, measures</li> </ul>
Implementation part	<ul style="list-style-type: none"> <li>○ Activities, steps</li> <li>○ Responsibilities</li> <li>○ Financial requirements, sources, possibilities</li> <li>○ Projects</li> <li>○ Timeframe</li> <li>○ Summary</li> </ul>
Monitoring and evaluation part	<ul style="list-style-type: none"> <li>○ List of the indicators</li> <li>○ Indicator methodological fact sheets</li> </ul>

### 3.1.1.2 Management Plan leader and its team

Teamwork means working with people, the knowledge about personal strengths and weaknesses, task sharing, allocation of competences, decision about leadership and the clarification about the information and communication flow.

The definition about the important roles of the team contents the description of important roles of the management plan, assignment of persons to the different roles, illustration of the management plan organisation (organisation plan), assignment of tasks, agreement of the information flow within the management and creation of the responsible management<sup>4</sup>.

MP leader should be an institution with legal personality (municipality, regional government, self-government administration, protected area administration, LAG, etc.), located in the mountain territory, which will be responsible for processes of MP development, MP implementation and MP monitoring and evaluation. MP leader is responsible for compliance with the rules and approaches set out into MP development guideline. First of all, MP leader should create an organizational structure for all MP processes (manager, steering group, working groups, etc.).

Table 4: Identification of MP leader – organization which is responsible for MP development:

Institution (original language, official name)			
Institution (official English translation)			
Department			
Address		Postal code	
Town		Country	
NUTS 1		NUTS 2	
NUTS 3		web site	

<sup>4</sup> Keßler and Winkelhofer: Projektmanagement, Springer-Verlag; ISBN 3-540-65566-2

Legal representative:			
First name		Surname	
Contact person (manager of MP development):			
Function		Email	
Phone-office		Phone-mobile	
Fax			
Legal status			
Geographic level of activities			
Thematic field of activities			

### 3.1.1.3 Territory identification

The purpose of this sub-part is to provide summary information on the territory, including maps, graphs etc.

Table 5: Territory identification

Number of inhabitants		Area (km <sup>2</sup> )	
Population density (people/km <sup>2</sup> )		Number of municipalities	
Municipalities (namely)			
Protected areas			
total area (km <sup>2</sup> )			
protected areas categories (IUCN classification)			
protected areas namely			

### 3.1.1.4 Actors / authorities identification

The participatory approach requires the involvement of a wide range of relevant 'interested people' often known as '*stakeholders*'. This term was developed in the English language and is often hard to translate into other languages in a meaningful way 'Interested Groups' is a common way to express the term.

Definition of a stakeholder - Adapted from Borini-Feyerabend (1997)

Stakeholders are those who have a direct, significant and specific 'stake' or interest in a given area or set of natural resources.

- Stakeholders are usually aware of their own interests in the management of the area or set of natural resources.
- Stakeholders usually possess specific knowledge and skills for such management and are in a position to use them.
- Stakeholders are usually willing to invest specific resources for such management.

#### Stakeholder Analysis and Stakeholder List


In a planning process it is important to identify at the earliest stage who are the main stakeholders and how they can be involved in management planning.

Participation is a wide-ranging term that can cover different activities from simple information provision through active involvement in decision making to assumption of management

control. Participation is a powerful and important tool, based on the fundamental belief that people who are informed, involved and empowered will make better choices themselves and will help managers and decision makers make better choices too.

A widely used analysis defines seven forms of participation, ranging from passively providing information to taking charge of and steering the process. Ideally you should try to include the most active mode of participation that is practical and realistic for your situation. The level of participation that is appropriate will vary with the aims of the project, and with regard to the relative role/importance of different stakeholder groups, including their relative impact, information source and ownership with regard to the project. The table below lists the seven forms of participation and is a useful reference point for deciding how participation should happen.

Table 6: Seven ways to enable participation (From Pretty et al. 1995)

a. Provide information to people	<i>Mode of Participation</i> MOST PASSIVE   MOST ACTIVE
b. Request specific information from people	
c. Consult/gain information/views from people (through open or specific meetings, round-table consultations)	
d. Provide resources or other incentives for people to gather information or undertake specific research	
e. Involve people in working groups to provide feedback on specific issues	
f. Involve people in the analysis of the issues and direction finding (workshop attendance)	
g. Involve people directly in the project development, decision-making, and/or approval process.	

Stakeholder analysis is a one of communication tools used in the process of MP development and is drawn up with an aim of better communication among MP leader and stakeholders. In the mountain area, there are many different categories and target groups of stakeholders in each sector. Use table below for Stakeholder Analysis - identification of stakeholders and target groups operated in the mountain area, summarize a relationship between stakeholders and mountain area, the potential impact of the territory or plan on stakeholder activities (positive, negative, without impact) and try to identify the appropriate level of participation during the MP development process.

The result of Stakeholder Analysis will be knowledge, how important will be to involved identified stakeholder and target group in MP development process and in which ways it should be done.

Table 7: Stakeholder Analysis

Stakeholder Category & Target groups	How Affected by Management Plan and General + Specific Interest  Summarise the relationship between stakeholder and	Appropriate/Possible Actions to Effectively Address Stakeholders Interests  Identify the appropriate level of participation for the stakeholder group using the following categories: a. Provide information only b. Request information c. Consult and ask opinions d. Provide incentives for information
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	the mountain area	e. Solicit feedback f. Involve in analysis and direction finding g. Involve in planning and decision making
Public sector		
Municipalities		
Self-government region		
etc.		
Private sector		
Land owners, Land owners associations		
Entrepreneurs in tourism, agriculture, ...		
etc.		
Civil sector		
NGO		
Volunteers		
etc.		

After Stakeholder Analysis table fulfill Stakeholder List table. This means to collect and insert data containing name, address, contacts. It will be helpful for communication among MP leader, stakeholders and target groups during the MP development process.

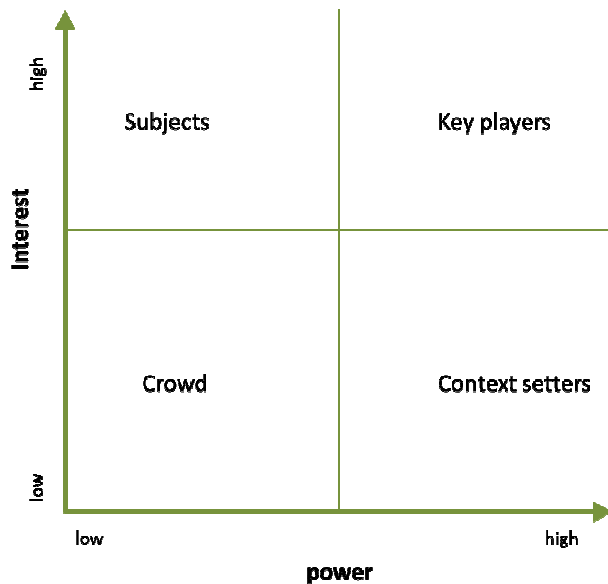
Table 8: Stakeholder List

	Institution	Contact person (firstname, surname, title)	position	email	phone (office, mobile, fax)
Public sector					
Private sector					
Civil sector					



When is the analysis of the different stakeholders ready, their classification should be done. There is a big variety of different kinds of stakeholder classifications, as an example the classification following the power-influence grid (Ackermann, 2001) will be presented<sup>5</sup>.

Figure 2: Example of stakeholders classification (From Power-Interest-Grid in Ackermann, 2001)



Every stakeholder should be assigned to a group in regard to their power and their interest on MP development processes. According to their interest-power position, the stakeholders should be addressed in an appropriate manner: *Key Players* should be “actively groomed”, due to their high interest and influence. *Context setters* have high influence, but their interest is little. They should be monitored and managed, as they may become a significant risk. *Subjects* are highly interested and often supportive in processes and projects, but have no big influence. The *Crowd* includes stakeholders who have little interest and little influence, so is not necessary to try to involve them with big efforts (Reed *et al.* 2009)<sup>6</sup>. After the classification, an investigation about the relationships between the different stakeholders should follow.

### 3.1.1.5 Definition of cooperation

For good mutual cooperation among MP leader, stakeholders and key actors, authorities involved into MP development process, is really important to identify the type of cooperation. Understanding and knowledge of stakeholder roles and expected inputs, results, outcomes is a basic principle of successful cooperation.

### 3.1.2. Analytical part - WHY (in context with area strategy)

An important stage in the management planning process is to gather and present information in a structured way and to provide a full, clear and concise description of all important aspects of the concerned area.

<sup>5</sup> Ackermann, F., and Eden, Colin (2001): Stakeholders Matter: Techniques for their Identification and Management. Strathclyde Business School Research Paper (No. 2001/20), 15

<sup>6</sup> Reed, M.S.; Graves, A.; Dandy, N.; Posthumus, H.; Hubacek, K.; Morris, J.; Prell, C.; Quinn, C.H. and Stringer, L.C. (2009): Who's in and why? A typology of stakeholder analysis methods for natural resource management. *Journal of Environmental Management* 90 (5), 1933-1949.

The analytical part of Management Plan is drawn up on the basis of all relevant sources (documentations) on the territory, which were drawn up before Management Plan development process and it is modified from the view of selected priority/ies. There is an assumption that detailed analyses have been developed in relevant territory within this time and they are contained in available strategic documentations on the territory (spatial development documentation, integrated strategies, social and economic development plan, etc). The analytical part should be brief and on problems focused. It is really important to summarize all relevant documentations focusing on regional development, spatial development and strategic development of the territory.

### **3.1.2.1 Sources analysis, including potential analysis**

The purpose of this sub-part is to provide actual information on following topics, including maps, tables, graphs etc where appropriate. The availability of data in the different countries is not the same. If it is difficult to get any data, the detailed analysis should be done after the identification of concrete projects.

#### 3.1.2.1.1 Territory in general

- territory advantages and disadvantages from the view of mountain character
- traits of territory and its comparative advantages to other territories
- administrative jurisdiction of the territory
- history of territory
- list of all relevant documentations focusing on area regional development, spatial development and strategic territory development and their relations/connections

#### 3.1.2.1.2 Environment

- geological and geomorphological conditions
- hydrological conditions
- climate conditions
- soil conditions
- land use conditions
- environmental risks and stress factors
- nature and landscape protection (including NATURA 2000)

#### 3.1.2.1.3 Demographic situation

- number of inhabitants
- structure of population (by age, by productivity, by economic activity ...)
- demographic changes

#### 3.1.2.1.4 Social, cultural and historical sources

- education situation (elementary, secondary schools, universities, number of pupils, teachers, ...)
- health services situation
- social services situation
- self-government situation (regional and local)
- cultural and historical sources (monuments characteristic and its potential, traditions, spirits, ....)

#### 3.1.2.1.5 Material and economic sources

- structure of economy
- branch, sectoral structure (agriculture, forestry, tourism, industry, ...)

- land ownership
- infrastructure situation
- socio-economic characteristic

Table 9: Expected range of the analytical part:

Sub-part	%
Territory in general	5
Natural sources	25
Demography	15
Social, cultural and historical sources	20
Material and economic sources	35

### 3.1.2.2 SWOT analysis

SWOT analysis is a practical tool for the evaluation of the territory and the activities that take place in it (Strengths - Weaknesses - Opportunities - Threats). Strengths and weakness are internal area factors concerning in particular the past and the present. Opportunities and threats are external factors having more a link to the future. MP will solve problems identified in weaknesses, with the help of strengths taking into account opportunities and threats of mountain area.

The deeper is developed the previous part, the better SWOT analysis will be elaborate.

Table 10: SWOT analysis

	External factors	
	Opportunities	Threats
Strengths	Strengths/ Opportunities strategy	Strengths/ Threats strategy
Weaknesses	Weaknesses/ Opportunities strategy	Weaknesses/ Threats strategy

If the SWOTS` are correlated to the matrix, it is possible to establish correspondent strategies<sup>7</sup>:

#### **Strengths/ Opportunities strategy**

Use internal strengths to realize external opportunities.

#### **Weaknesses/ Opportunities strategy**

Reduce weaknesses for the use of external opportunities.

#### **Strengths/ Threats strategy**

Use strengths to avoid external threats.

#### **Weaknesses/ Threats strategy**

Reduce internal weaknesses and at the same time avoid threats.

### 3.1.2.3 Problem analysis

Problem analysis aim is to identify key problems of the territory, which are a basic for priorities development. Identification of causes and effects is really important for further strategic planning.

Problem analysis highlights the problems arising from the SWOT analysis and setting priorities to address them.

To identify problems, their causes and solutions techniques are used:

- Tree of problems: compiled causality adverse events (problems) and displays them in the form of a graph of which is a clear relationship between the hierarchy problem

<sup>7</sup> Baumfeld L., Lukesch, R. (2003): Die Strategieentwicklung - Systemische Instrumente für die Regionalentwicklung

- Tree of goals: flip the negative effects of tree problem in a positive state while preserving the hierarchy and interrelationships provides a clear overview of the overall desired future situation
- Analysis of strategies: taking into account the different objectives of the same nature, to develop strategies.

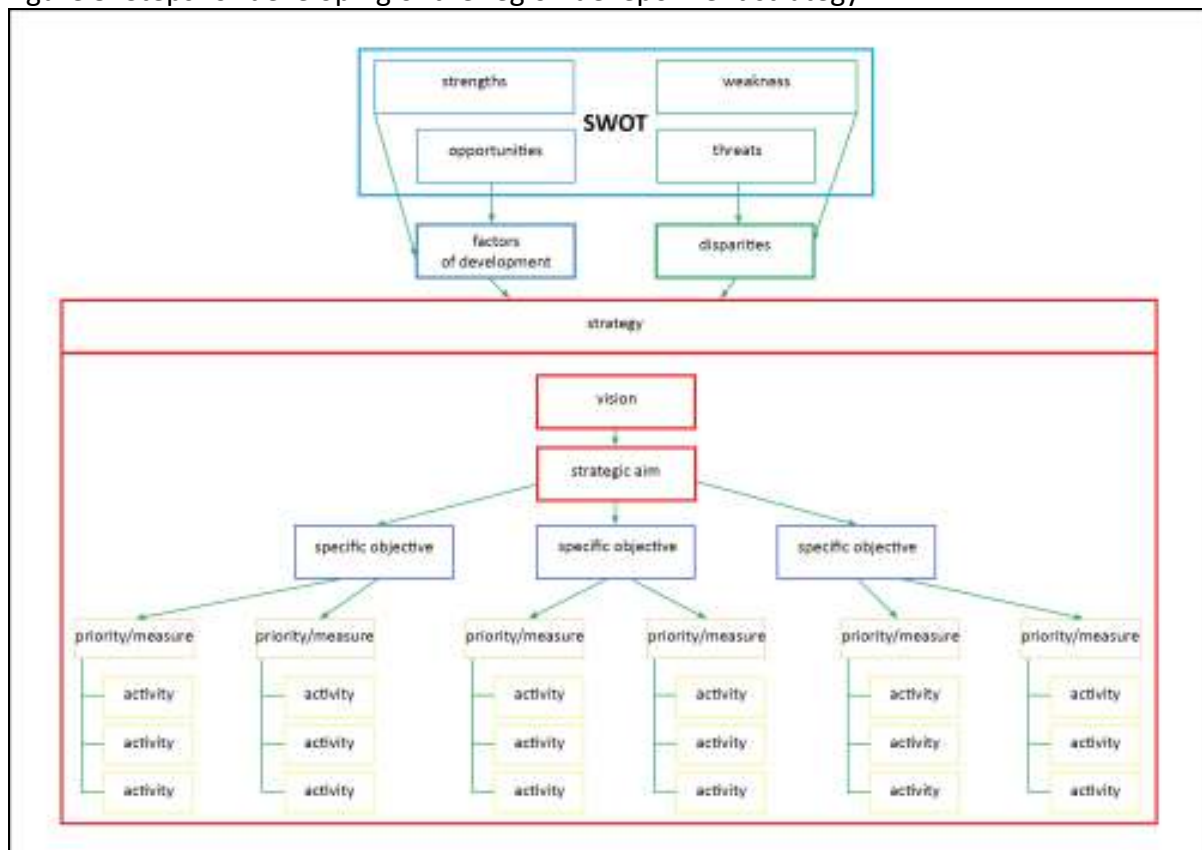
### 3.1.2.4 Problems from the resident’s point of view

The specific situation in the affected mountain area can only be realistically depicted if the local population is involved in the analysis and defining of problems. They are local specialists and are spending their life in the region, knowing best the difficulties and possibilities of their living environment. Therefore it is important to include the population into the analysis and the following process of developing visions.

### 3.1.3. Strategic part - WHAT (in context with area strategy)

Strategic part of Management Plan is connected with existing area strategic documentations and modified to priority or priorities for which is Management Plan developed, with the partners and stakeholders involvement. Strategic planning should involve the cooperative public participation, which may be designed in very different ways. Common methods are for example consensus conferences, Round Table meetings or planning cells. Each of these methods provides for specific procedures and structures as regards participation. As a consequence, also the quality standards differ widely. There are some standards, however, which apply to all types of cooperative public participation (see also “The Public Participation Manual”, [www.partizipation.at/methoden.html](http://www.partizipation.at/methoden.html)).

Figure 3: Steps for developing of the region development strategy



### 3.1.3.1 Vision

The purpose of the vision is to achieve more precise and more concrete idea about the orientation of the region evaluated in the future. The vision describes the ideal situation that occurs after the implementation of strategic and specific objectives in concrete area. Vision is usually developed for 15 or 20 years period and it is an idea of territory target state.

### 3.1.3.2 Strategic aim, specific objectives

Strategic aim and specific objectives are close connected to the mountain area vision. Their formulations are based on territory analysis and vision setting, which were done in the previous steps. These objectives definitions are really important, because all stakeholders (public, private and civil sector) will do all the best to achieve them with using of public and own financial sources. In this step (strategic aim and specific objectives definitions) is possible to use a method of brainstorming with involvement of all stakeholders.

Objectives definition should be SMART<sup>8</sup>:

**Specific** – they should provide a clear target, not just express a vague wish

**Measurable** – they should be possible to measure and provide if they have been achieved

**Adjustable** – they should contain enough flexibility to enable adjustment and adaptation

**Realistic** – they should express what is really possible, assed on your evaluation

**Timed** – the default time to achieve the aims

Objectives should be an impact orientated, measurable, time limited, specific and practical. Objectives definitions are desired target states of territory, which should be achieved by the MP measures and activities implementation.

Table 11: Summary of Objectives

<Insert Mountain Area Name>	
Summary List of Objectives	
1	
2	
3	
4	
etc	
	To monitor and document the results of management actions and the achievement of management objectives

### 3.1.3.3 Priorities, Measures

Specific objectives should be transposed into priorities, in a logical connection and in order of its importance. Priorities define the key ways of the area development. To achieve the priorities, it has to be identified a specific measures. For each priority could be defined several measures. The correct measures definitions are extremely important, because they will form the basic of future projects, which will be implemented.

## 3.1.4. Implementation part

### 3.1.4.1 Activities / Steps

<sup>8</sup> Appleton, R.A., Protected Area Management Planning, A Manual and Toolkit

Following the approved measures, relevant activities must be developed. These activities determine how the individual measures will be implemented.

Each measure is usually associated with a number of development activities. Therefore, a process of selection of the most important activities has to be carried out. The selection is difficult, but must be strict and consistent.

Mountain areas are often short of resources and unexpected demands on time and resources can always occur. Therefore it is important to identify which are the most important actions/activities to complete and which could possibly be postponed or cancelled if absolutely necessary.

ONE of THREE types of priority should be assigned to each action

**PRIORITY 1**

- actions that **MUST** be taken during the life of the plan. This category should not be applied lightly as there is no excuse for failing. It should only be applied to crucial actions which if not achieved would undermine the whole plan

**PRIORITY 2**

- actions that **SHOULD** be completed. There is an element of flexibility but if these actions are not completed there must be a good reason

**PRIORITY 3**

- actions which **MAY** only be undertaken when time and /or resources remain available after completion of priority 1 and 2 activities.

At the same time as assigning a priority for each action you should also decide when it should happen and develop a timetable for project implementation.

Normally actions can be timed in one of four main ways:

**ONE-OFF SHORT TERM ACTIONS**

For example holding a Management Plan launch event or attending a conference

**ONE OFF PROJECTS**

Longer-term one-off activities that may take several days, weeks or even months, such as building a visitor centre or carrying out a baseline biodiversity survey. If these are too large you should break them down into smaller, shorter timed actions.

**RECURRENT EVENTS**

Activities that take place and are repeated regularly. For example an annual monitoring survey, a quarterly community meeting or a monthly check on safety of trails, an annual summer camp for children, taking daily weather records.

**CONTINUOUS EVENTS**

Actions that go on the almost the whole time without defined times or which occur more frequently than your chosen unit of time for timetabling. For example patrolling against poachers, operating a visitor centre, collecting garbage.

Table 12: Activity planning form

Strategic aim	
Specific objective	

Priority, Measure	
Activities (if necessary, add as many as are required)	
A1	
Name of activity	
Description of activity	
Responsibility	
Collaborators	
Expected period of activity realization /Approximate duration	
Estimated amount of requested funds	
Indicator of accomplishment	
A2	
Name of activity	
Description of activity	
Responsibility	
Collaborators	
Expected period of activity realization /Approximate duration	
Estimated amount of requested funds	
Indicator of accomplishment	

#### **3.1.4.2 Responsibilities**

In general, the responsible body for MP implementation is the leading organization /leader/, designated in the introduction part of the plan. Because the realization involves many stakeholders and actors, it is necessary to define commitments of each of them clearly and early on.

For each proposed activity, the responsible bodies must be identified. These bodies will be identified depending on their role in development process, their tasks and opportunities. The responsibilities identification is closely related to the part 1.4 Actors/authorities identification.

#### **3.1.4.3 Financial Requirements/Sources / Possibilities**

For an activities implementation, it is really important to know:

- the financial requirements and
- the possibilities of financial sources.

It is necessary to elaborate an estimation of the financial requirements for realization of the proposed activities.

Following this estimation, the analysis of the potential financial sources must be prepared. This analysis includes:

- the analysis of own funds for each subject, which has been identified as responsible subject for realization of the proposed activities in the part 4.1
- the possibilities of external financial sources at regional and national as well as international level.

The funds of the EU – pre-accession funds for the candidate Members and the structural funds for the Member States are very important. One of the shortcomings of the EU operational programs is that any of them is not entirely focused on specific objectives and needs of mountain areas. Therefore, it is important to have knowledge of all EU operational program and their financial rules which could be possibly applied also for funding the mountain areas project also.

The state budget is also very important part of the priority activities and projects financing. It is necessary to search for opportunities for implementation of activities that will lead to the improvement living standards, the reducing unemployment in the region, the encouraging small and medium businesses, the creation of guarantee funds, etc. Some of the activities could be financed by business sector, but it is necessary to ensure the return of funds, as well as to create the public - private partnerships.

Table 13: Summary of potential external financial sources

Regional financial sources				
Programme	Priorities	Call	Budget eligible	% co-financing
National financial sources				
Programme	Priority	Call	Budget eligible	% co-financing
International financial sources				
Programme	Priority	Call	Budget eligible	% co-financing

Table 14: Financial requirements/sources summary

Activity	Responsibility	Estimated amount of requested funds	Financial source (own/external)
A1			
A2			
A3 (add as many as are required)			

#### 3.1.4.4 Projects

Projects preparation is really important in these stages.

Each activity, identified in the part 4.1 of Management Plan, should be converted into project description in general and after a call for proposals publication, the project should be modified and submitted.

Table 15: Project planning form

Project no. XY (P1111 – PNNN)	
Name of project	
Priority, Measure	
Activity	
Project annotation, summary	



Project background	
Project global aim	
Project specific objectives	
Project activities	
Expected results, outcomes	Project impact
Project expected risks	
Project target groups	
Project Timeframe	
project duration (in months)	
project development	
project implementation	
Place of project implementation	
NUTS II	
NUTS III	
NUTS IV	
Project funding and budget	
programme identification, call (if it is known)	
total budget	
co-financing	
Contact person:	
Name, Surname, Title	
Responsible body (Organization, department)	
Email	
Phone office	
Phone mobile	

### 3.1.4.5 General Timeframe

The best result would be achieved if the timeframe for vision and strategic aim and specific objectives is for a period of 15 years. The timeframe for activities and projects should be shorter – for a period of 5 years. The shorter period would not be real, at least because the period of realization of a project is usually three years.

Table 16: Timeframe

Activity	Project	Timeframe																				
		year 1				year 2				year 3				year 4				year 5 etc				
		I.	II.	III.	IV.	I.	II.	III.	IV.	I.	II.	III.	IV.	I.	II.	III.	IV.	I.	II.	III.	IV.	

### 3.1.4.6 Annual Work Plans

The 5-year specification of activities and projects management plan format defines the objectives and main actions for the mountain area, but does not break down actions into specific tasks; these are best planned on an annual basis for two main reasons

1. Detailed task planning would make the plan a lengthy and unwieldy document
2. It is unwise to pre plan five years of tasks for a mountain area as this prevents the flexibility and adaptability essential for modern mountain area management.

This section therefore should not be included in the plan document, but is included to show the complete process from idea to action.

An annual programme of operations that defines specific tasks, events and targets required to complete the activities of the management plan.

Table 17: Annual work plan

Annual work Plan for year 20__			
Operation	Contributes to activity/project (Insert code from management plan)	Month Active	Notes (include dates of specific events and milestones)

### 3.1.4.7 Summary

It is very useful to create a comprehensive table as a summary of the strategic aim/specific objectives/priorities, measures/activities/projects. Example of the possible form is shown in the table below. It is recommended to use these tables as annexes of the Management Plan.

Example of completed planning form one specific objective A

Background:

- to the specific objective A have been defined N priorities/measures
  - priority/measure A.1,
  - priority/measure A.2,
  - priority/measure A.N
- to each priority/measure have been defined N activities

- to each activity have been defined N projects

Table 18: List of strategic objectives, specific objectives, priorities/measures and activities

Strategic aim					
Specific objective A					
Priority/measure A.1					
Activity A.1.1	Project P.1.1.1	Activity A.1.2	Project P.1.2.1	Activity A.1.N	Project P.1.N.1
	Project P.1.1.2		Project P.1.2.2		Project P.1.N.2
	Project P.1.1.N		Project P.1.2.N		Project P.1.N.N
Priority/measure A.2					
Activity A.2.1	Project P.2.1.1	Activity A.2.2	Project P.2.2.1	Activity A.2.N	Project P.2.N.1
	Project P.2.1.2		Project P.2.2.2		Project P.2.N.2
	Project P.2.1.N		Project P.2.2.N		Project P.2.N.N
Priority/measure A.N					
Activity A.N.1	Project P.N.1.1	Activity A.N.2.	Project P.N.2.1	Activity A.N.N	Project P.N.N.1
	Project P.N.1.2		Project P.N.2.2		Project P.N.N.2
	Project P.N.1.N		Project P.N.2.3		Project P.N.N.N

### 3.1.5. Monitoring and evaluation part/ Indicators

Management of the regions, as well as the mountain regions, is an integrated component of development which can ensure the effectiveness of activities and efforts given in the region. Therefore, the management must be based on respectable outcomes and results which are regularly and systematically evaluated during the implementation and execution of development activities and

projects. It is known that the effective management is necessarily associated with proper evaluation of activities.<sup>9</sup> The evaluation of the Management Plans effectiveness is possible through so-called indicators.

An indicator is something that helps us understand where we are, which way we are going and how far we are from where we want to be. A good indicator alerts us to a problem before it gets too bad and helps you recognize what needs to be done to fix the problem.<sup>10</sup>

Indicators are as varied as the types of systems they monitor. However, there are certain characteristics that effective indicators have in common:<sup>11</sup>

- Effective indicators are relevant; they show us something about the system that we need to know, it must fit the purpose for measuring.
- Effective indicators are easy to understand, even by people who are not experts. We need to know what it is telling us.
- Effective indicators are reliable; we can trust the information that the indicator is providing.
- Lastly, effective indicators are based on accessible data; the information is available or can be gathered while there is still time to act (measurable).

The other criteria of properly chosen indicator are: Reason for monitoring, Usability, Completeness, Representativeness, Validity, Uniqueness, Reliability, Correctness, Comparability over time, Comparability in space, Monitoring frequency, Cost.<sup>12</sup>

Given that management planning is a continuous process and that management should be adaptive, then there is a need to be able to measure what the effect of the actions prescribed in the plan is and whether they are combining to achieve the objectives and attain the goal. To do this it is important to use indicators, but there are several different types of indicator.

Table 19: Types of measurable indicators for monitoring

Type of indicator	Definition	Example and Notes
1. Input	The amount of resources invested in an action	The amount of money spent on capacity building. Measuring the input merely records what has been invested, not the results of the investment. Inputs are weak indicators of success.
2. Activity	The use of time and resources to carry out actions	<b>The number of employees who have attended a capacity building programme.</b> Activity indicators can be useful in recording effort expended for a particular action but do not consider the difference that effort made.
3. Output	Specific products from an action	<b>Employee training manual produced as a result of the capacity building programme.</b> Outputs can be readily documented and are clear and useful indicators of completion of actions, but normally

<sup>9</sup> SKRABAL, I. et. al. 2006. Metodika zavádění managementu rozvoje mikroregionů.

<sup>10</sup> OECD. 2001. Environmental Indicators Towards Sustainable Development 2001

<sup>11</sup> <http://www.sustainablemeasures.com/indicators>

<sup>12</sup> SKRABAL, I. et. al. 2006. Metodika zavádění managementu rozvoje mikroregionů

		do not measure the effect of the actions.
4. Result (Out-come)	Specific results of the action	Outcomes measure specific changes in conditions resulting from the action. They are highly useful indicators, but can be harder to measure .
5. Impact	Consequences of results of the action	Poaching is reduced and successful convictions of poachers increase. Impact measures the wider change caused by the action and often its contribution towards plan objectives and goals. These are powerful measures but are often very hard to monitor in the short term.

### 3.1.5.1. List of indicators

In the region conditions the indicators are not used individually but the group of indicators (set of indicators) is used instead of it. The sets of indicators provide a unique opportunity to evaluate the different phenomena in the regions as a whole complex<sup>13</sup>.

Indicators should be ordered according their:

- complexity<sup>14</sup>:
  - summary indicators,
  - subtitle indicators,
  - partial indicators.
- effectiveness of region management<sup>15</sup>
  - Descriptive indicators
    - o This group is used for description of basic characteristics of region and for the basic comparison between the regions. This set of indicators is important mainly due to avoiding the incorrect interpretation during the comparison of management indicators (benchmarking). Every region is different and has the different conditions (natural, historical, settlement conditions). From this point of view there should not be placed excessive emphasis on the horizontal comparison (among other regions) but rather on vertical comparison (in time).
  - Management indicators
    - o This group of indicators is crucial for evaluating the micro-region effectiveness. These indicators assess the financial management aspects of the micro-region management and its effectiveness.
  - Impact indicators
    - o This group of indicators is based on the priorities to which the micro-region intends to address. Priorities could be identified within the questionnaire survey. The examples of priorities defined by micro-regions representatives could be: development of tourism and local business activities, the environment protection and local infrastructure.
  - Economic indicators
    - o This group of indicators is used to describe and quantify the economic factors of micro-region management functioning. Set of indicators allow not only the basic comparison between the regions but mainly the comparison for micro-region itself.

<sup>13</sup> SKRABAL, I. et. al. 2006. Metodika zavádění managementu rozvoje mikroregionů

<sup>14</sup> SKRABAL, I. et. al. 2006. Metodika zavádění managementu rozvoje mikroregionů

<sup>15</sup> SKRABAL, I. et. al. 2006. Metodika zavádění managementu rozvoje mikroregionů

- theme:
  - environment, biodiversity
  - demographic situation
  - social, cultural and historical sources
  - material and economic sources
  - etc.

Table 20: Indicators List

Summary indicators (Theme, sub-theme)	Subtitle indicator	Partial indicators	Relation to the measure
Descriptive indicators			
D 1 Indicator	D 1.1 Indicator	D 1.1.1 Indicator	ID of measure (for example A.1)*
		D 1.1.2 Indicator	See *
		D 1.1.N Indicator	See *
	D 1.N Indicators	D 1. N.N Indicators	See *
D 2 Indicator	D 2.1 Indicator	D 2.1.1 Indicator	See *
		D 2.1.N Indicator	See *
	D 2.N Indicator	D 2.N.N Indicator	See *
D N Indicators	D N.N Indicator	D N.N.N Indicator	See *
....			
Management indicators			
M N Indicators	M N.N Indicator	M N.N.N Indicator	See *
....			
Impact indicators			
I N Indicators	I N.N Indicator	I N.N.N Indicator	See *
....			
Economic indicators			
E N Indicators	E N.N Indicator	E N.N.N Indicator	See *
...			

Note: ID - identification number

Source: The methodology for implementing micro-region management (SKRABAL, I. et. al. 2006. *Metodika zavádění managementu rozvoje mikroregionů*) and its amendment.

### 3.1.5.2. Indicator methodology fact sheet

Each indicator also must have its methodology fact sheet which lists and describes it's most important characteristics and allowing them to be monitored.

Table 21: Indicator methodology fact sheet

Indicator methodology fact sheet	
Priority	
Strategic aim:	
Specific objective:	
Measure:	
Identification	
Group:	
Theme:	
Sub-theme:	
Title [name] indicator:	
Definition:	
Methodology	

Methodology:	
Unit:	
Monitoring frequency:	
Cost:	
More information:	
Evaluation	
Present state (year):	
Range:	
Trends:	
Comments:	
Reference	
Data Source:	

### 3.2 Guidelines and methodology to develop a management plan

A management strategy for sustainable development in mountain regions involving all the relevant actors (multi-actor approach) and comprising all the different sectors (multi-sector approach) facilitates those territorial, social and economic synergies able to develop more efficient interventions and sound policies, improves the standard of living and preserves the natural environment. In combination with practical experience and in conjunction with the applicable legislation and with due consideration of the particular mountain context, a Management Plan (MP) is the implementing document of the management strategy. Looking ahead, MP provides an essential tool for ensuring the mitigation of negative impacts and the enhancement of positive ones.

Management Plan consists in a document drawn up as a part of a strategy on a local, regional or national base, which meets with the vision of the interested mountain area, its strategic aim, specific aims, priorities and measures. It is developed for each priority / measure separately. The Management plan is not a strategic document, but an implementing document that could face the main problems of the involving area through the projects implementation. Time frame for the MP planning could cover a period from 3 to 5 years and after each period, there should be a monitoring and assessment phase through the developed indicators, to evaluate the projects impact /effects on the environment, economic and social sphere.

#### 3.2.1. Leadership and Management (Leader, Manager and Management team identification)

The need to develop, manage and implement a MP in some cases arise from a legislative requirement as for a protected area. But, at the base of this process there is always the necessity to provide benefits and improve the sustainable development in mountain areas, preserving its natural resources and inhabitants.

The **leader of a MP** of development and implementation should be an organization with legal personality coordinating the Management Plan development and, after its approval, its implementation and monitoring of its impact. In relation to the particular context of a mountain area, to the specific territorial-administrative structure and to the particular regional conditions, the types of organization could be different.

The leader could be in particular one of following organisations:

- Regional bodies or authorities of state public administration, which have competences in regional / spatial planning
- Branches of state administration or organizations founded by the state (e.g. management authorities of protected areas in terms of nature and landscape protection)
- Voluntary unions of municipalities
- Civil associations, NGO 's, associations of legal entity
- Public institutions
- others

The MP leadership and management must go hand in hand. They are not the same thing, but they are necessarily linked, and complementary. The plan management has the overall organizational responsibility for the successful implementation of the plan. First of all, the management role is to set out the overarching framework of management principles that will be applied to the plan.

The **manager** should be an actor who has the legal competence to safeguard the interests of the involved actors. For the development and implementation of a Management Plan, the manager has to establish an organizational structure (team) which includes a steering committee, working groups and technical support for the proceeding of the Management Plan. Manager position could also be occupied by an external organization or an external expertise.

The MP manager could be:

- an internal staff of MP leader
- an external support belonging to the civil associations, associations of legal entity, public institutions, etc.

The **management team** is really very important. Teamwork means cooperation, task sharing, allocation of competences, individual skills and constructive feedback etc. It has to oversee the Management Plan process. The team will develop series of worksheets that could be the tool to identify what activities are having an environmental impact in the territory and to identify the priority environmental issues that need addressing<sup>16</sup>.

The **technical support** for developing the MP should include beside the manger and different stakeholders also external experts, like research institutes or universities depending from the topic.

### 3.2.2. Stakeholder analysis

Stakeholders are defined as group or persons who are affected by the decisions and the following impact from the management plan. Before starting the development of a MP, it is important to do a thorough stakeholder analysis to understand the balance between power and potentially conflicting interests and to include underrepresented groups or individuals<sup>17</sup>.

Inadequate stakeholder involvement is one of the most common reasons why the plans, programmes and projects use to fail. Therefore, every effort should be made to encourage broad and active stakeholder engagement in the planning, monitoring and evaluation processes. The planning process should aim to ensure the involvement as many stakeholders as possible (especially those who may not be so able to promote their own interests), to create opportunities for the different

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<sup>16</sup> Keßler and Winkelhofer: Projektmanagement, Springer-Verlag; ISBN 3-540-65566-2

<sup>17</sup> Reed, M. S. (2008). Stakeholder participation for environmental management. Biological Conservation, 141, 2417-2431



parties and hear each other’s perspectives. Stakeholders often need to be educated and trained to gain the necessary knowledge and confidence to meaningfully participate<sup>18</sup>.

Active stakeholder engagement is the key to success. An assessment can involve a range of stakeholders that can support and drive the process – for example beneficiaries, those initiating the assessment, civil society representatives, private sector partners, political, economic and social leaders, employees, development partners, academics, the media, and various public interest groups<sup>19</sup>.

In defined mountain areas, there is a range of actors who fulfill roles in development of the territory and other groups of persons which have their own interests in this area. In general, these subjects can be divided into the following sectors:

- public sector,
- private sector,
- civil sector.

Table 22: Overview of role and contribution of particular sectors in process of MP development<sup>20</sup>

Sector	Role / contribution
public sector	“rights driven”, provides access information, stability and legitimacy creates frameworks for economic, political and social rights develops regulations and standard setting mechanisms provides public services
private (business) sector	“profits driven”, inventive, productive, highly focused and fast sector creates goods and services provides employment opportunities, innovation and economic growth
civil sector	“values driven”, responsive, vocal, inclusive and imaginative sector creates opportunities for individual growth and creativity provides support and services for those in need or excluded from mainstream society

Within the process of implementation and evaluation of a Management Plan on the certain mountain area, the stakeholders – actors / authorities should come from regional/ local level according to structure presented in the following table.

Table 23: Overview of role and contribution of particular stakeholders (actors/authorities):

Actor / authority	Role / contribution
Public sector	
municipalities	<ul style="list-style-type: none"> <li>- decision-making competences at local level</li> <li>- the obligation to manage the area development</li> <li>- the responsibility for preparing the development plans at local level,</li> <li>- municipalities act as an executor of the Act. On the other hand they have sufficient space to solve community problems</li> <li>- professional platform to address development issues. A representative of the interests of citizens</li> </ul>

<sup>18</sup> Reed, M. S. (2008). Stakeholder participation for environmental management. *Biological Conservation*, 141, 2417-2431

<sup>19</sup> UNDP Capacity Assessment Methodology User’s Guide

<sup>20</sup> Ros Tennyson: Partnering Toolbook – prepared in co-operation with GAIN, UNDP, IAEA, IBLF, 2003

regional government	<ul style="list-style-type: none"> <li>- provides and coordinates the execution of sectional policies and strategies of economic and social development of the region</li> <li>- acts as a subject responsible for development at regional level. Analyses the development of the region and its parts</li> <li>- provides and coordinates the execution of the Program of economic and social development of the region</li> <li>- technical and financial support</li> </ul>
protected area administrations	<ul style="list-style-type: none"> <li>- the obligation to take care of the territory with the designated level of nature and landscape protection</li> <li>- the competence to accept documents aimed at this protection</li> </ul>
public sector authorities and organisations	<ul style="list-style-type: none"> <li>- good knowledge of state administration, civil service, government</li> <li>- a lot of information on differential issues</li> <li>- knowledge of legislation and key persons in regional scale</li> <li>- potential source of financial support</li> </ul>
political actors and decision makers	<ul style="list-style-type: none"> <li>- political leadership</li> <li>- ability to influence the decisions at various operative levels</li> </ul>
other partners	<ul style="list-style-type: none"> <li>- schools of public or state character – an important role especially in terms of human resources development. Their importance for regional development policy is undoubted. Regarding the regional education (especially the secondary schools), they represent, like universities, a group of actors in execution of development policy with significant potential at regional and local level</li> <li>- mediator – as a key person who maintain the flow of the proceedings and keeps everyone on time and track (he can arise from public, private or civil sector)</li> <li>- experts as external consultants</li> </ul>
<b>Private sector</b>	
land owners land owners associations	<ul style="list-style-type: none"> <li>- representation of the interests of property protection and development</li> <li>- source of information</li> </ul>
economic active actors: <ul style="list-style-type: none"> <li>• small and middle entrepreneurs in agriculture</li> <li>• small and middle entrepreneurs in tourism</li> <li>• small and middle entrepreneurs in forestry</li> <li>• small and middle entrepreneurs in crafts</li> </ul>	<ul style="list-style-type: none"> <li>- driving engine of the local economy, providing jobs, trying to optimize /minimize the costs in order to make a profit</li> <li>- they can identify the economic benefits of partnerships and cooperation because of the fact that enterprises create a determining number of jobs in economically developed countries, their requirements play a crucial role in execution of development policy at local and regional level</li> <li>- for local and regional level of policy is a typical fact, that they are rarely influenced by businesses of transnational character. On the other hand, small and medium enterprises with local or regional character are often linked with the indicated level of policy also in personal way - especially in cases where local entrepreneurs or business owners enter politics at the mentioned two levels. In addition, these companies with its activities substantially affect the development possibilities and progress of regions or sites, which ultimately means that local and regional politicians have to take into account also their requirements</li> </ul>
interest associations or organisations (of tourism, of local product distribution etc.)	<ul style="list-style-type: none"> <li>- coordination of common interests in development of selected areas,</li> <li>- they bring together multiple stakeholders and undertake activities to achieve these interests.</li> </ul>
others	<ul style="list-style-type: none"> <li>- financial institutions providing funding</li> <li>- private universities - as businesses subjects - with legal status to provide the education. They also represent a group of actors in execution of development policy with significant potential at regional and local level</li> <li>- mediator – as a key person who maintain the flow of the proceedings and keeps everyone on time and track (he can arise from public, private or civil sector)</li> </ul>

	- experts as external consultants
Civil sector	
NGO's (non-governmental organisations) LAG's (local action groups) PPP's (public –private – partnerships)	- protection of public interest, support of cross-sectional cooperation, pursuit of democracy and openness - powering the needs of society that are not fulfilled by state administration, self government or business - NGOs have a defined range of problems to deal with and they orient the largest share of his attention
citizen associations	- protection and promotion the citizen interests. - variability of independent associations and interest groups. Interest group is an interest aggregation of persons who are organized in order to meet any particular interest, create a mechanism through which citizens can influence the actual policy-making and thereby reduce and control those who have reached positions of power in region.
local clubs and associations	- protection and promotion of the interests of selected population groups
public	- assertion of their own rights, a source of information
local activists, volunteers	- law enforcement and interests defending of different individuals or groups
others	- mediator – as a key person who maintain the flow of the proceedings and keeps everyone on time and track (he can arise from public, private or civil sector) - experts as external consultants

The determination of stakeholder groups can be implemented in practice with the following methods<sup>21</sup>: self – identification (“whoever wants, is welcome to co-operate), identification by third party – using the participants “whom should be invite, who could be interested”), identification by organizers, geographic, historical and demographic analyses, based on personal experience, based on role in territorial development, extracted from existing address books, consultation with local/regional institutions, user analysis.

Identifying stakeholder groups is usually an iterative process that can be done using the following methods. After the listing of stakeholder groups they should be categorized and set in relationship to each other. The following table shows an scientific overview of different methods for the stakeholder analysis following Reed 2008:<sup>22</sup>:

Table 24: Method to identifying stakeholders

Method to identifying stakeholders	Description	Strengths	Weaknesses
Focus groups	A small group brainstorm stakeholders, their interests, influence and other attributes, and categorize them	Rapid and hence cost-effective; adaptable; possible to reach group consensus over stakeholder categories;	Less structured than some alternatives so requires effective facilitation for good results
Semi-structured interviews	Interviews with a cross-section of stakeholders to check/ supplement focus	Useful for in-depth insights to stakeholder relationships and to	Time-consuming and hence costly; difficult to reach consensus over

<sup>21</sup> Animating Local Partnerships in Rural Areas – a practical guide. Maunal prepared within TEPA – a Visegrad-Slovenian-Swedish Initiative in Training of European Partnership Animators, supported by the European Commission within the Socrates-Gruntvig Programme

<sup>22</sup> Reed, M. S. (2008). Stakeholder participation for environmental management. *Biological Conservation*, 141, 2417-2431

	group data	triangulate data collected in focus groups	stakeholder categories
Snow-ball sampling	Individuals from initial stakeholder categories are interviewed, identifying new stakeholder categories and contacts	Easy to secure interviews without data protection issues; fewer interviews declined	Sample may be biased by the social networks of the first individual in the snow-ball sample
Q methodology	Stakeholders sort statements drawn from a concourse according to how much they agree with them, analysis allows social discourses to be identified	Different social discourses surrounding an issue can be identified and individuals can be categorized according to their 'fit' within these discourses	Does not identify all possible discourses, only the ones exhibited by the interviewed stakeholders
Knowledge mapping	Used in conjunction with Social Network Analysis (SNA); involves semi-structured interviews to identify interactions and knowledge	Identifies stakeholders that would work well together as well as those with power balances	Knowledge needs may still not be met due to differences in the types of knowledge held and needed by different stakeholders
Radical transactiveness	Snow-ball sampling to identify fringe stakeholders; development of strategies to address their concerns	Identifies stakeholders and issues that might otherwise be missed and minimizes risks to future of project	Time-consuming and hence costly

Stakeholder analysis can be done by different methods and techniques: the integration of bottom up approach with the mode of consultation, participation, collaboration and partnership can be used. The following table shows the relationship of the stakeholders and the methods of integration within the different modes.

Table 25: Methods to work with stakeholders (Reference: ESCAP public involvement: Guidelines for Natural Resource Development Project)

Methods to work with stakeholders	Relationship with stakeholders	Method of integration, monitoring and enforcement
Consultation	Government formulates plans and policies and present to stakeholders for comments and reactions.	Consultation meetings and consideration of some or all recommendations. Involvement of other groups in implementation and monitoring may or may not be sought.
Participation	Government encourages involvement of stakeholder groups (voluntarily or with market incentives) in its programs and activities.	Public awareness campaigns, affiliation with NGOs and community groups. Joint government and community monitoring and enforcement.
Collaboration	Government involves stakeholder groups in the design and operation of programs and projects but under its	Public awareness, consultations at the initial stage and community assistance with monitoring and enforcement.

	overall direction and leadership.	
Partnership	Together, stakeholder groups design, implement and monitor plans, policies, programs and projects in equal footing.	Stakeholders share in formulating, raising public commitment, funding, monitoring and enforcement.

### 3.2.3. Model and rules of cooperation

Cooperation describes a process of working or acting together. In its more complicated forms, it can involve a lot of different actors with different points of view. The following table shows different types of cooperation with strengths/weaknesses analysis<sup>23</sup>.

Table 26: Types of cooperations with stakeholders

Type of cooperation	Description	Strengths	Weaknesses
Public-private partnership	contract between public and private sector, in which the private sector provides a project and assumes substantial financial, technical and operational risk in it	High legal binding	Highest coordinating effort
Public partnership	partnership between government bodies or public authorities or non-profit organizations to provide services and facilities	legal binding	Higher coordinating effort
Consortium	association of several stakeholders with the objective of participating in a common activity	legal binding	coordinating effort
Simple partnership agreement	written agreement between actors with the objective of cooperation	Easy to implement	Legal bindings are weak
Letter of intent	first agreement summarizing the main points of a proposed deal, confirms that a certain course of action is going to be taken	Easy to implement	No binding
Oral agreement	contract that is not in a written form, but is entirely valid and enforceable; difficult to prove the existence and the terms of an oral contract	Easiest way to come to an agreement	No real obligation, depending on the acting person

The factors which should be used for choosing of appropriate cooperation type are mainly the local culture, the history of former MP, the area of the MP, the legal situation, the involved stakeholders, the financial sources, the bottom up approach, the multi sector cooperation in all phases of management plans development, the volunteers and the enthusiastic inhabitants.

The rules of cooperation, for the work in the team but also with the people from the region should be: transparency, traceability, respectfully, dealing with each other with fairness, equal access to information, communicating clearly and understandably.

A MP can only be successful when a bottom up approach is included, multi actor - multi sector cooperation is considered in all phases, volunteers and enthusiastic inhabitants are considered as an important factor, financial support is clear from the beginning of the MP development.

<sup>23</sup> <http://www.businessdictionary.com>, last visit 29.03.2012, adapted

### 3.2.4. General time frame

Within the timing of the management plan, the temporal and logical sequence is established. Through this planning step time table of the project is set up.

A basic differences between the process planning and scheduling is as follows:

- the scheduling is the logical arrangement of the task items from the start of the project to the project termination.
- the planning is the assignment of the parameter to the time frame specified in the scheduling sequence.

Methods of sequence and scheduling

#### *Speed Chart*

List of tasks (work packages) and their performance progress.

Presentation of project to be rather coarse parts of the project.

#### *Event List*

Holding the end date of the events in the project process.

#### *Bar Chart*

Presentation of tasks and appointments time table in graphical form. There can be seen approximately dates and duration of the work packages in the bar chart.

#### *Cross-linked bar chart*

Presentation of tasks and their sequence it in graphical form. Visualization of critical paths.

The cross-linked bar chart is a bar diagram that contains the bar chart in addition to pure essential dependencies.

#### *Network*

Graphical representation of a project process by linking the processes according to their technological dependencies. The network is initially a flow chart. It is calculated by time values to a time schedule and may be delegated to the calendar for a schedule.

#### Comparison of the planning methods

During the preparation of management plans a good clear view is needed. As a management plan planning tool bar charts can be recommended. For more complex tasks, the use of cross-linked bar charts will be an advantage.

Table 27: Comparing of planning methods<sup>24</sup>:

Requirement	Event List	Bar Chart	Cross-linked bar chart	Network
Fast graphical overview of the most important project deadlines	3	1	2	5
In controlling schedule changes will be automatically extrapolated to the rest of the project.	5	5	1	1
The detailed project process must be planed and controlled to	5	3	1	1

<sup>24</sup> Comparing of planning methods, Patzak, Rattay 1998

minimize the risk of date				
For the controlling are only completion dates for each work package available.	1	2	4	5
The presentation of the events must be clear and concise.	2	1	3	5
Many professionals are to coordinate the project process.	5	3	1	3
They are directly covering more than 200 work packages and control.	3	2	1	3
Only a few work packages are to schedule and to control	2	1	2	3
Many externally predetermined fixed dates are available.	1	2	5	5
Rapid plan development and maintenance without IT support	1	3	5	5
Rapid plan development and maintenance with IT support	3	2	1	5

### 3.2.5. Management Plan development

Management Plan development is a process where should be “participatory” involving the people affected by management of the area. This should take place as early as possible and continue throughout. In the participatory process are involved local people and other stakeholders and the staff who is charge with the plan’s preparation and implementation.

To facilitate this participatory process in the development of the MP draft, it’s useful to open a negotiation process (see Table: Methods to work with stakeholders).

Each **MP** has to set up the list of **goals** of region development and **measures** necessary for their achievement. Each measure must be associated with one or more development **activities**. Therefore, a process of selection of the most important activities has to be carried out. The selection is difficult, but must be strict and consistent. The vision, strategy, goals of MP as well as above mentioned measures and activities are subjects of the negotiations with stakeholders, which are carried out on a working group (WG) level.

WGs negotiate with the aim of the individual priorities / measures (e.g. agriculture, tourism, awareness raising) and finally try to identify corresponding projects for realisation of activities, which were identified. Many project ideas will arise in the public meetings (open space conference, etc.) and will be transfer to the project planning forms by the working groups. During the course of the implementation of activities, new projects and activities will arise, which have to be assessed.

WGs creation should be started with the stakeholders identification and on the public participation meetings, where local activism and interest for the area development could be reflected. Management Plan manager is responsible for the WGs meetings, he/she could appoint WG leaders and manage their meetings.

Before the start of WG meetings, each working group should:

- identify its WG leader and his role
- identify its members and their roles

- define the purpose of WG
- define the outputs of WG
- define the time table of the finalisation of WG outputs
- define the members responsible for each output development and finalisation
- define the time schedule of WG meetings (kick off meeting, progress meetings, final meeting)
- define the agenda for each WG meeting

After negotiation of WG, the WG leader should execute following tasks:

- elaboration of minutes from each WG meeting (define meeting conclusions, list of tasks with responsible persons and deadlines, evaluation of achieving the tasks defined within previous meeting)
- supervising and processing of WG outputs elaboration
- elaboration of final WG report (assessment of the WG activities, its outputs and its contribution for whole project)
- in case of more WGs involved in the project, it is necessary to define expected outputs of each of the WGs and its expected contribution for other WGs and for final project outputs as a whole. This should be a task of the project leader, or person responsible for particular project outputs.

WGs negotiation meetings could be divided as follows:

- 1<sup>st</sup> common meeting of WGs members – so called “kick off” meeting. The purpose of this meeting is to introduce the process of WG action (aim, rules, leader introduction, analysis, vision and objectives introduction, etc..)
- next working groups meetings would be hold separately for each WG in progress
- final meeting will be again a common meeting of all WGs members. The purpose of this meeting is presentation of all outcomes of all WGs.

### **Management Plan draft elaboration and commenting process**

Draft of the Management Plan is a result of summarization of outcomes of particular WGs. The MP manager is responsible for whole Management Plan drafting process and commenting process.

This process could be described in the following steps:

- each WG has to define its own priority and their tasks (according to the MP structure and content)
- MP manager has to supervise wheathe the priorities of each WGs and their tasks are compatible, interlink to each others and wheather their are not controversial from the common region development point of view, and will support the certain part of MP structure
- WGS members, WGs leaders together with MP manager have to adopt the common vision of MP and the goals what have to be achieved by MP implementation in the region
- WGs leaders together with MP manager, and after consultation with the member of WGs, set up the particular role of WG according to the MP vision and goals adopted for MP
- WG and WG leader working on their outputs (situation analyses, problem analyses, SWOT analysis, recommendations, conclusion, etc.), which are in a final stage passed to MP manager for consultation/comments
- MP manager has to summarize partial WGs outcomes into draft of the one Management plan
- WGs leaders and WGs members then have to comment the MP draft version, later then MP manager has to incorporate WGs leaders comments into MP final version
- final version of MP is discuss with public during the public hearings. Accordig the importance of the task solving by MP, the WG leader or MP manager could decide to carry out the public hearing



for what ever part of MP preparation. It is important that the WGs communicate with public everytime when it is needed and to seek to know their opinions (for example by questionnaire survey, info days, workshops, etc.)

- WGs and WG leaders incorporate the public comments into MP and MP manager will finalise the MP. It is very helpful to make a list of comments and link each comment with description whether the comment was accepted or no, and if not, indication of its decline should be stated. Evaluation of this commenting process should be made available for public, to give the public possibility to receive the feedback and to feel still in the process.

- MP final version will be approved by MP manager, WG leaders, as well as WGs members

### **Public hearing**

The opportunity for the general public and stakeholders to comment, make suggestion and review the MP draft is a fundamental step in what we called a participatory process.

Public hearing or consultation is the semi-final step of the MP development process – a step before the MP approval. Public hearing means the last chance given to the public in general to incorporate comments into the Management Plan. There are two kinds of methods of public hearing. The first one is with direct and active public participation (conference, workshop, info-day, etc.) and the second one is with passive public participation (MP is made available on the web site or on the other open space – for example MP leader headquarter). The best way of public hearing is to use combination of both these possibilities.

The public hearing has to be carried out for two different steps of the MP development:

1. MP Draft elaboration
2. MP Final Plan elaboration

1. The public participatory process begins with informing interested stakeholders and the public in general that the draft of the MP is available for viewing and commenting, where is possible to obtain a copy of this document and what is the deadline by which comments should be received.

Taking into account the comments received, the written ones and those resulted from i.e. public meeting, the management team draws up the final version incorporating or attaching the received comments.

2. The final version has to be published and made available as a public document. Also during this step, it is necessary to call the public participation through a second phase of consultation to show how the revision process has developed the final version of the MP.

The final Management Plan will be ready for its formal approval by management plan leader or his/her competent authorities.

### **Final Management Plan, Management Plan approval**

This is a procedure step involving submission of the final plan for approval by the management plan leader or his/her competent authorities. Procedures will vary from country to country but in most cases there will be formal process of adoption or approval to give authority to the plan, often laid down in legislation and clearly documented.

The final Management Plan will be ready for its approval after the incorporation of comments from public hearing process.

Management Plan approval (by local, regional, national authorities)

The approval of the Management Plan by the MP leader, according to the national law, is the confirmation, that the plan information and management strategy has been developed to a level of sufficient details to proceed to the implementation phase for the development of a planning solution in compliance with the project objectives and requirements.

### **3.2.6. Management Plan monitoring and reviewing processes**

The evaluation and monitoring of management plan implementation is of utmost importance. Sustainability means fitness for future and therefore the implemented development processes need to be checked regarding their influence on the existing problems. If problems are met properly there may arise new aspects, dangers or possibilities which need to be dealt with. Monitoring and evaluation is based on data which is collected in the beginning and during the whole process. Thorough data maintenance is an important aspect for controlling the direction and success of the management plan development. Evaluation could be done by using so-called “indicators”. There will be some general indicators to check and evaluate the success of sustainable mountain development, but, depending on the aims, there may be additional indicators important.

An indicator is something that helps us understand where we are, which way we are going and how far we are from where we want to be. A good indicator alerts us to a problem before it gets too bad and helps you recognize what needs to be done to fix the problem.<sup>25</sup>

Indicators are as varied as the types of systems they monitor. However, there are certain characteristics that effective indicators have in common:<sup>26</sup>

- Effective indicators are relevant; they show us something about the system that we need to know, it must fit the purpose for measuring.
- Effective indicators are easy to understand, even by people who are not experts. We need to know what it is telling us.
- Effective indicators are reliable; we can trust the information that the indicator is providing.
- Lastly, effective indicators are based on accessible data; the information is available or can be gathered while there is still time to act (measurable).

The other criteria of properly chosen indicator are: Reason for monitoring, Usability, Completeness, Representativeness, Validity, Uniqueness, Reliability, Correctness, Comparability over time, Comparability in space, Monitoring frequency, Cost.<sup>27</sup>

It will not be easy to find quantitatively statistical data as indicators, to verify or not verify the success of the whole process of sustainable development.

In the sustainable development process all levels of this process must be monitored and evaluated. That's meant that we need indicators for:

- evaluation of management plan effectiveness and implementation
- evaluation of each management plans for SD effectiveness and its results
- evaluation of each priorities and projects and their activities, whether the our project/activities were successful and whether the priorities were reached.

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<sup>25</sup> OECD. 2001. Environmental Indicators Towards Sustainable Development 2001, and <http://www.sustainablemeasures.com/node/89>

<sup>26</sup> <http://www.sustainablemeasures.com/indicators>

<sup>27</sup> SKRABAL, I. et. al. 2006. Metodika zavádění managementu rozvoje mikroregionů

- evaluation of economical, social and environmental situation of the region (what was the starting position in the region, what changes were achieved during or after MP/Projects/Activities implementation)

In general, it is recommended to determine the indicators according to the strategic objectives set in CSDMM or MPs. It is very important for the selection and formation of adequate indicators to measure and evaluate process efficiency and effectiveness.

Given that management planning is a continuous process and that management should be adaptive, then there is a need to be able to measure what the effect of the actions prescribed in the plan is and whether they are combining to achieve the objectives and attain the goal. To do this, it is important to use indicators, but there are several different types of indicator.

Table 28: Type of indicators

Type of indicator	Definition	Example
<u>Checklist indicators</u> (or descriptive indicators)	<p>Checklist indicators describe and document whether the necessary „top down“ framework is set up correctly.</p> <p>They formulate strategy and according objectives, legislative framework, existing compilation of general facts and figures describe the initial situation within the region.</p> <p>They are used for description of basic characteristics of region and for the basic comparison between the regions (benchmarking). Every region is different and has the different conditions (natural, historical, settlement conditions). From this point of view there should not be placed excessive emphasis on the horizontal comparison (among other regions) but rather on vertical comparison (in time).</p>	<p>population figures and trends, number and kind of jobs, number of guest-nights, zoning plans, number and kind of civil sector organisations/ enterpreneures in the region</p>
<u>Input indicators</u>	<p>Input indicators provide information on a broader spectrum of activities taking place in terms of the implementation of CSDMM/ strategy/ plans/ projects/ activities.</p> <p>They represent amount of resources invested in an action.</p> <p>Measuring the input merely records what has been invested, not the results of the investment. Inputs are weak indicators of success.</p>	<p>amount of public authority money invested in the education for sustainable development (ESD) materials, proportion of publicly supported research, the amount of money spent on capacity building</p>
<u>Output indicators</u>	<p>Output indicators provide quantitative information on the results of activities as a specific products from an action.</p> <p>They describe and measure the impact of input indicators plus changes concerning the checklist indicators.</p> <p>Outputs indicators can be readily documented and are clear and useful indicators of completion of actions, but normally do not measure the effect of the actions.</p>	<p>number of employee training manual produced as a result of the capacity building programme, number of businesses involved in ESD projects</p>

<p><u>Outcome indicators</u></p>	<p>Outcome indicators describe the impact and changes due (specific results of the action) to carried out activities and invested means in a more qualitative than quantitative sense.</p> <p>They provide information on the possible impact due to the implementation of the CSDMM/strategy/ plans/ projects/ activities, in particular its qualitative aspect in terms of values, attitudes and choices in favour of sustainable development.</p> <p>Outcomes indicators measure specific changes in conditions resulting from the action. They are highly useful indicators, but can be harder to measure.</p>	<p>learning outcomes resulting from ESD partnerships, community-based projects and business involvement</p>
<p>5. Impact</p>	<p>Impact indicators describe the consequences of results of the action.</p> <p>This group of indicators is based on the priorities to which the micro-region intends to address.</p> <p>These are powerful measures but are often very hard to monitor in the short term.</p>	<p>percentage of number of jobs increase, percentage of number of tourist beds rise, description of tourism and local business activities, description of environment protection and local infrastructure, percentage of amount of separated waste in comparison to total amount of waste generated in the region, number of protected areas endangered by intensive tourism activities</p>

In the region conditions the indicators are not used individually but the group of indicators (set of indicators) is used instead of it. The sets of indicators provide a unique opportunity to evaluate the different phenomena in the regions as a whole complex<sup>28</sup>.

For the better handling with indicators and better assessment of the particular objectives and measures of CSDMM/Plans, the indicators could be ordered also according their:

- complexity<sup>29</sup>:
  - summary indicators,
  - subtitle indicators,
  - partial indicators.
- theme:
  - environment, biodiversity
  - demographic situation

<sup>28</sup> SKRABAL, I. et. al. 2006. Metodika zavádění managementu rozvoje mikroregionů

<sup>29</sup> SKRABAL, I. et. al. 2006. Metodika zavádění managementu rozvoje mikroregionů

- social, cultural and historical sources
- material and economic sources
- etc.

### **Indicator methodology fact sheet**

Each indicator also must have its methodology fact sheet which lists and describes its most important characteristics and allowing them to be monitored. Methodological fact sheet contains the descriptors which facilitate the understanding of the indicator. These descriptors are:

- name of indicator,
- definition of indicators,
- unit used for measuring of indicators,
- importance of indicator,
- data sources of indicator,
- description of monitoring and evaluation methodology
- references for data presented in indicator.

These descriptors allow to everybody to understand what data and which methods were monitored, how the data were collected and how they were evaluated and used. Due to this sheets the other persons (during the next years or during the next project etc.) can monitored and collect the same data in the same way, what make data comparable with the previous years and allow us to see changes of the same phenomenon of the region development.

### Steps for indicators development

Indicators must be determined according to the strategic objectives. That's why the strategic phase of sustainable development planning processes must be carried out in first. That's mean that before the developing of the set of effectiveness indicator it is necessary:

1. to define the our problems (problems of region development)
2. to define strategic priority
3. to define our overall objectives and specific objectives how we can solve these problems
4. to define the measures for achieving our objectives
5. to define the outcomes of the activities, which are focused to reach our objectives

Next steps for identifying the indicators for each objective:

6. to find the question which can answer whether the our objective/outcome was achieved or not
7. to find out how the answer will help us and whether it will really indicate the progress and effectiveness of our measures of the state of the our objectives

If the answer will be yes, we can continue:

8. to group indicators according the types (checklist/descriptive, input, output, outcome, impact indicators) and a common theme
9. to define the name of indicator
10. to define the unit which measurably indicative the state of objectives or other monitored phenomena development
11. to define the target value of indicator (if appropriate)
12. to check whether the indicator is monitored and the data will be available
13. to develop the indicator check list
14. according to evaluate of the indicator (indicate of state/trend of monitored phenomena in region or the efficiency of our objectives) evaluate whether the objectives were achieved and

whether the measures were effective and, also to evaluate the effectiveness of financial source valorization/spending.

15. to use indicator for comparison of state of region development before the measures implementation and after the measures implementation, and to draw the conclusions (what was achieved, what are remaining gaps).

As it was mentioned in previous parts, the properly developed indicator must:

- meet the basic criteria: relevance; comprehensibility, reliability, accessibility of data
- meet the particular criteria: reason for monitoring, usability, completeness, representativeness, validity, uniqueness, reliability, correctness, comparability over time, comparability in space, monitoring frequency, cost
- be listed and grouped together according the hierarchy (Summary indicators, Subtitle indicators, Partial indicators) and theme (environment, biodiversity, demographic situation, economic sources, etc.)
- be described in its own methodology fact sheet (see Annex - Management Plan content and structure).

It is helpful when indicators are summarise in the table, together with priorities and objectives. That's mean, that the table will contain the list of priorities. To each priority the objective will be assign, to each objective the measures will be assigned, to each measure activities will be assigned, to each activity the outcomes will be assigned, and to each outcome the indicator of effectiveness of this activities will be assigned. The indicator could be developed also on the level of measure, objective or strategy, according the interest of the person involve in evaluation (in which detail he is intended to evaluate the process of sustainable development).

## 4. Indicators of sustainability

### Indices/indicators of sustainability of agricultural activities

Indices and indicators are useful to evaluate the current state of the environment and the effects of works and activities on the ecosystems. However, it is important to note that, as no index/indicator is exhaustive if considered singly, it is wise to use indices/indicators sets that refer to different scales, according to the specific aim and to the subject of analysis.

Indices/indicators sets chosen for the assessment and monitoring of sustainability of agricultural activities with regard to biodiversity conservation are useful: for land planning, at landscape scale; for management of natural resources, at ecosystem scale; and for the economic management of the farm, at farm scale.

#### 4.1 Landscape scale

##### *Index of landscape conservation status (ILC)*

The Index of Landscape Conservation status (ILC) (Pizzolotto and Brandmayr, 1996) is calculated to assess the naturalness (*i.e.*, distance of the actual vegetation from the potential one) of a given area, according to the following formula:

$$ILC = 1 - (\sum x_i - 100) / 100(n-1),$$

where n is the number of naturalness classes, and  $x_i$  is the cumulative percent value of the  $i$ -th naturalness category. ILC values range from 0 (maximum anthropization) to 1 (maximum

naturalness), and are determined by the cumulative percent frequency of ten previously selected naturalness classes (e.g., urban area, arable land, tree-planted arable land, reforestation, badland, grassland, shrubland, pre-wooded community, coppiced woods, mature woods), arranged in ascending order of naturalness (1 for urban areas, and 10 for mature woods).

#### *Index of changes in landscape conservation status ( $\Delta$ ILC)*

Variation in the index of landscape conservation status (ILC) over the time. The index is useful for monitoring land use changes in terms of naturalness.

Positive scores ( $0 < \Delta$ ILC  $\leq 1$ ) indicate increasing naturalness over time; negative scores ( $-1 \leq \Delta$ ILC  $< 0$ ) point out the loss of naturalness and the occurrence of anthropization processes.

#### *Land use sustainability (LUS)*

LUS = Area covered by natural and seminatural ecosystems / Area covered by anthropic ecosystems

The index expresses the degree of land naturalness/anthropization.

Optimal values: mountain areas  $> 3.00$ ; hilly areas  $> 1.00$ .

#### *Agricultural ecotone composition (AEC)*

AEC = Ecotone length of tree-covered agricultural patches / Ecotone length of herb-covered agricultural patches.

The index expresses the balance between tree and herb components of the most disturbed agroecosystems.

#### *Sustainability of ecotone system (SES)*

SES = Ecotone length of uncultivated patches / Ecotone length of cultivated patches

The index expresses the intensity of pressure exerted by tillage by at the edges of the fields and ecotones. Its value increases with the decrease of cultivated lands.

#### *Road density (RD)*

RD = Road length / Area

The index expresses the degree of fragmentation of the rural landscape due to the road network.

#### *Complexity index (CI)*

CI = Patch perimeter / Patch area

It may be calculated for patches belonging to each land use class or ecosystem or for patches of all land use classes as a whole. The index varies depending on patch size and shape. Higher index values for a class indicate patches with a higher amount of edges and/or ecotones. If it is calculated considering all land use classes, it is the expression of the heterogeneity of the rural landscape.

#### *Hedge density (HD)*

HD = Hedge length / Agricultural area of cultivated land

The index quantifies the hedges density in the agricultural landscape considering their functions of ecological corridor, biological filter, biodiversity source, and refuge for plant and animal species.

#### *Water body density (WBD)*

WBD = Water body length / Agricultural area

The presence of linear structures such as rivers and ditches (natural or artificial) carry out dynamic and static functions (decrease of soil erosion, downstream transport of leached fertilizers, water reserve for animal watering crop irrigation), very important for ecological processes.

#### *Ecotone length (EL)*



Ecotones are bands of transition between two different biological communities, which generally express a greater degree of biodiversity of adjacent areas.

The index describes the availability of habitat characterized by high species diversity.

It may be calculated for patches belonging to each land use class or ecosystem or for patches of all land use class as a whole.

#### *Ecotone intensity (EI)*

The index quantifies the length of ecotone bands every 100 km of patch edges. It describes the degree of diversification of ecotones.

It may be calculated for patches belonging to each land use class or ecosystem or for patches of every land use class.

#### *Network connectivity index*

$$\gamma = L / L_{\max} = L / 3*(V-2)$$

where:  $\gamma$  is the network connectivity index; L is the number of the existing linkages between nodes;  $L_{\max}$  is the maximum number of linkages; V is the number of nodes.

The index can be used for the analysis of corridors and connections among patches.

#### *Network circuitry index*

$$\alpha = C / C_{\max} = (L-V+1) / 2V-5$$

where:  $\alpha$  is the network circuitry index; C is the number of existing circuits;  $C_{\max}$  is the maximum number of circuits; L is the number of linkages between nodes; V is the number of nodes.

The index can be used for the analysis of corridors and connections among patches.

## **4.2 Ecosystem scale**

### *Floristic quality index*

The conservation value of each of the floristic entities counted in a given site can be assessed using the methodology described in Tardella et al. (2007), on the basis of a set of indicators, grouped into five categories, one of which divided into two subcategories (Table 29).

A weight (k) is assigned to each category. k, ranging from 1 to 4, depends on the importance from the conservation viewpoint. For each indicator within each category or subcategory a score (n), ranging from 1 to 5, depending on their relative conservation importance is assigned.

The conservation value of a species is defined by the sum of the products of the score of each indicator by the weight of the category and subcategory of belonging and can be expressed as follows,

$$V = \sum nk_i,$$

where V is the species conservation value, n is the value obtained by the indicator with a maximum score for each category or subcategory,  $k_i$  is the weight assigned to each category.

For each syntaxon, or for each patch of each syntaxon, the sum of V values attributed to each floristic entity is carried out, obtaining the floristic quality value (FQI):

$$FQI = \sum V_{n_i}$$

where V is the species conservation value and n is the number of species of conservation value

Table 29: Indicators selected for the assessment of floristic conservation value

<b>n</b>	<b>Extinction risk</b> (k = 4)
5	IUCN Red List
4	National Red List
3	Regional Red List

<b>n</b>	<b>Biogeographic value</b> (k = 3)
	<i>Location within the distribution area</i>
5	Disjointed distribution area; glacial, xerothermal relicts; paleoendemisms
4	At the border of the global distribution area
3	At the border of national distribution area
	<i>Endemicity</i>
5	Endemic restricted to small areas
4	Endemic C-Apenninic
3	Endemic CN-Apenninic
	Endemic CS-Apenninic
2	Endemic of Italy, of Italian Peninsula, of Italian Peninsula and islands, of Apennines; of Apennines and islands
1	Subendemic

<b>n</b>	<b>Rarity</b> (k = 2)
5	Species present in 1-5 sites in the regional territory, where they occur with a low number of individuals
4	Species present in 1-5 sites in the regional territory; population with an abundant number of individuals
3	Species present in more than 5 sites, but isolated, confined to particular environments or with population generally with a low number of individuals

<b>n</b>	<b>Habitat vulnerability</b> (k = 2)
5	Species characteristic of endangered and rare habitats
3	Species characteristic of endangered non rare habitats

<b>n</b>	<b>Protection</b> (k = 1)
5	Annex II, 92/43/EEC Directive
3	Annex I Berna Convention
	Annexes IV and V 92/43/EEC Directive
	Annex II Washington Convention about the international trade of endangered species
	Annexes B and D, EU Wildlife Trade Regulation [Council Regulation (EC) n. 338/97]
1	Protection lists at lower levels

### *Fluvial ecosystems functionality index*

The index of ecological functionality of fluvial ecosystems has been developed for assessing the status of rivers (Catorci et al., 2009). The river may be divided in parts, and the index may be applied to each part of the river. The index calculation is based on compiling a form composed of multiple choice questions that follows the existing one built by Siligardi (2007) for the calculation of the Index of River Functionality, as regards the structure of the perfluvial vegetation and hydromorphological features, integrated with questions on the quality of the riverbed flora, assessed using the methodology reported in Tardella et al. (2007), and on the naturalness of riparian, back riparian, and riverbed vegetation.

The range of possible values of the index is divided into levels of ecological functionality, which correspond to the relative ratings of functionality. Each rating is also associated with a conventional color for the mapping (Table 30).

Table 30: Classes and functionality ratings for riparian ecosystems

<i>Fluvial ecosystems functionality index value</i>	Functionality level	Functionality evaluation	Colour (for mapping)
305-355	I	High	Blue
290-305	I-II	High-Good	Blue-Green
235-290	II	Good	Green
210-235	II-III	Good-Mediocre	Green-Yellow
145-210	III	Mediocre	Yellow
120-145	III-IV	Mediocre-Low	Yellow-Orange
70-120	IV	Low	Orange
55-70	IV-V	Low-Very low	Orange-Red
16 - 55	V	Very low	Red

### *Geobotanic quality index of plant communities (GQI)*

The GQI is used to assess the geobotanic quality of a plant community.

$$GQI = D + V + F + FV$$

where:

GQI is the *Geobotanic quality index*

D is the diffusion subindex

V is the vulnerability subindex

F is the fragmentation type subindex

FV is the floristic value subindex

Table 31: Diffusiom, vulnerability, fragmentation type, floristic value

Diffusion (D)	biogeographic scale	rare (present in less than 10 sites)	uncommon (present in 10-50 sites)
		regional scale	12
		8	6

	local scale	4	2
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		endangered	vulnerable
Vulnerability (V)	biogeographic scale	12	10
	regional scale	8	6
	local scale	4	2

		insula	scattered patches	habitat destruction	extrazonality
Fragmentation type (F)	regional scale	8	4	4	2

Floristic value (FV)	Very high (FQI > 100)	10
	High (75 < FQI ≤ 100)	8
	Very good (50 < FQI ≤ 75)	6
	Good (25 < FQI ≤ 50)	4
	Mediocre (1 < FQI ≤ 25)	2

Diffusion (D) and vulnerability (V) were measured on three levels of analysis (biogeographical, regional and local), using a numerical scale ranging from 2 (coenoses uncommon and / or vulnerable) to 12 (coenoses rare and / or threatened), with steps of 2 points.

The assessment of the status of plant communities in relation to the vulnerability was made by applying to the plant communities of the IUCN criteria (points A and B) defined for plant species (IUCN Species Survival Commission, 2001).

Regarding the assessment of the type of fragmentation (F) the higher value (8) is adopted to represent the condition of maximum fragmentation (isolation of biocoenoses) on a regional scale (insula); the middle value (4) of the rating scale was used for coenoses present in a dispersed region for natural causes, and for the effect of anthropogenic fragmentation type (habitat destruction).

The lowest value (2) is associated with cenoses presenting a condition of bioclimatic insularity (extrazonality).

Floristic value (FV) is attributed on the basis of floristic quality index (FQI) calculation. Five classes are distinguished: very high (> 100); high (75-100); very good (50-75); good (25-50); mediocre (0-25).

The number of classes of geobotanic quality is calculated following Sturges' (1926) formula,

$$C = 1 + \frac{10}{3} \times \log_{10}(N)$$

where C is the optimal number of classes, and N is the number of observations (i.e., the number of *syntaxa*).

#### *Farmland bird index*

The indicator is an aggregated index of population trend estimates of a selected group of breeding bird species dependent on agricultural land for nesting or feeding. Indices are calculated for each species independently and are weighted equally when combined in the aggregate index using a geometric mean.

#### *Non-passerine species / passerine species ratio (nP/P)*

The non-passerine species / passerine species ratio (nP/P) is an index for the assessment of the complexity level of ornithic community and, consequently, of biocoenoses and habitats. Non-passerine species are more numerous, thus the nP/P ratio is higher in better structured, more mature and diversified habitats.

#### *Invasive alien species*

Number and percent value of invasive alien species in the ecosystem with respect to the total species number. This index is used to assess the conservation status of the ecosystem.

#### *Red List Index (RLI)*

The RLI is based on the proportion of species in each Red List category, and the proportion moving between categories in different assessments owing to genuine improvements and deterioration in status only (i.e. category changes owing to revised taxonomy or improved knowledge are excluded). At any particular point in time, the number of species in each Red List Category is multiplied by a weight (ranging from one for near threatened up to five for extinct and extinct in the Wild) and these products are then summed. The total is then divided by a 'maximum threat score' (the number of species multiplied by the weight assigned to the extinct category). This final value is subtracted from 1 to give the IUCN RLI value, so that when all species are Least Concern the IUCN RLI is equal to 1, and when all species are extinct the IUCN RLI is equal to 0.

#### *Extended Biotic Index (EBI)*

The index is based on the analyses of the modifications of macro-invertebrates communities living on river ecosystems substrata, caused by pollution elements and environmental alterations and with various sensitivity to change of environmental conditions. As the macro-invertebrates long life, the index supplies a time integrated information regarding the consequences caused on environment by various pollution elements (physical, chemical e biological causes).

#### *Eutrophication Pollution Diatomic Index (EPI-D)*

The index provides an assessment of water quality considering the saprobic, halobic, and trophic level. It is based on the mathematical formula of Zelinka and Marvan as most of the indices diatomici used in Europe. EPI-D values range from 0 to 4.

The values close to 0 are indicative of clean water, increasing index values increase the impairment of the quality of the water body, up to the identification of situations of total degradation.

### **4.3 Farm scale**

#### *Area under management practices potentially supporting biodiversity*

This indicator is based on three subindicators and shows trends in area (as proportion of the total utilised area) of three (not mutually exclusive) categories of agricultural land:

- a. High nature value farmland area.
- b. Area under organic farming.
- c. Area under biodiversity supportive agri-environment schemes.
  - a. 'High nature value farmland area' (ha) indicates the area where farming systems are sustaining a high level of biodiversity. They are often characterised by extensive farming practices, associated with a high species and habitat diversity or the presence of species of European conservation concern.
  - b. 'Area under organic farming' (ha) indicates trends in the organic farming area and the share of the organic farming area in the total utilised agricultural area. Farming is only considered to be organic at EU level if it complies with Council Regulation (EEC) No 2092/91.
  - c. 'Area under biodiversity supportive agri-environment schemes' (ha) indicates where farming systems are generally focusing on sustainability. In theory, 'Budget for biodiversity supportive measures' could be used as a proxy indicator but this no longer indicates an 'area' as suggested by the Headline Indicator.

*Density of herbaceous crops (DHC) - Density of tree crops (DTC)*

DHC = No. herbaceous crops / Total utilised area

DTC = No. woody crops / Total utilised area

Cropping systems are subjected to frequent tilling, so that the decline of biodiversity is due to human disturbance. Hence, density of herbaceous and tree crops may be an indicator of the degree of human disturbance that affects biodiversity. The more the number of herbaceous and tree crops the more the field edges available for colonization by plant communities and animals, improving the landscape functionality.

Optimal DHC values: > 0.3; Optimal DTC values: > 0.1

*Legumes crops density (LCD) - Poliannual legumes crops density (PLCD) - Alfalfa crop cover percentage (ACP)*

LCD = No. legumes crops fields / Total utilised area

Optimal value: > 0.02

PLCD = No. poliannual legumes crops fields / Total utilised area

Optimal value: > 0.01

ACP = Alfalfa crop area / Herbaceous crop area

The presence of livestock in the farm system, as well as the supply of biologically fixed nitrogen to the benefit of the crops in rotation depend on legume cultivation.

The presence of alfalfa cultivation (the most widespread legume crop in Italy) is important for biodiversity and agroecosystems sustainability.

*Poliannual herbaceous crop area / Annual herbaceous crop area*

The Poliannual herbaceous crop area / Annual herbaceous crop area ratio is an indicator of biodiversity and sustainability of agroecosystems. The presence of poliannual herbaceous crops in the rotation determines numerous agroecological benefits.

*Intercropped area / Total utilised area*

The presence of combined crops usually involves a more continuous soil cover throughout the year, with little or no soil tillage operations. The amount of intercropped areas is indicator of decreasing degree of human disturbance on biodiversity and the growing use of natural resources (solar radiation, precipitation, atmospheric nitrogen, etc.).

*No. of animal species at farm level*

$\Sigma$  (no. heads \* LU), where LU is livestock units per hectare.

Number of heads belonging to one or more races expressed in livestock units. It is important for the conservation of agrobiodiversity.

*Crop field size (CFS)*

CFS =  $\Sigma$  Parcels surface area / No. parcels

Crop fields should be great enough to be ecosystems for micro and macro-organisms and insects. The minimum crop field size should not be less than 1 ha.

Optimal values range from 1 to 5 ha.

*Field length / width*

( $\Sigma$  Max length / max width crop fields) / No. crop fields

Crop fields round or square-shaped contribute to the agroecosystem identity of the farm.

Optimal value: < 4

*Field adjacency (FA)*

$FA = (\sum AP / n) / n$ , where AP is the number of adjacent parcels; n is the total no. of parcels in the farm.

In order to have an agroecosystemic unit it is necessary that the parcels are adjacent. For organic farms boundaries adjacent to non organic farms are considered at risk.

Optimal value: 1

#### *Crop diversity (Hc)*

$Hc = - \sum p * \ln p$ , where Hc is the Shannon diversity index; p = Crop surface area / Total crop surface area.

The index is a measure of crop diversity and complexity in spatial distribution of the parcels in the farm.

Optimal values: > 1

#### *Natural and seminatural vegetation areas*

Percentage of areas covered by natural and seminatural vegetation (woods, grasslands, hedges, shrubs, wetlands) with respect to the total utilised area. The presence of natural and seminatural vegetation types indicates a minor disturbance.

Optimal values: > 5%

#### *Hedge biodiversity (HB)*

$HB = (\sum L_h * Ce_i * C_p) / TUA$ , where:

HB is the hedge biodiversity;

$L_h$  is the hedge length;

$Ce_i$  is the time of planting: > 5 years => 1; < 5 years => 0.8;

$C_p$  is the coefficient of species origin: autochthonous => 1; allochthonous => 0.8;

TUA is the total utilised agricultural area.

Estimate of hedge length in the utilised agricultural area

Optimal values: > 0.2

#### *Wood biodiversity (WB)*

$WB = (\sum A_w * Cwd * Cwt) / TUA$ , where:

WB is the wood biodiversity;

$A_w$  is the area covered by each wood type;

$Cwd$  is the coefficient of spatial distribution of wood (1.33: linear wood formations, length more than 4 times than width, surface area > 500 sqm, width ranging from 6 and 20 m; 1.0: small woods, surface area ranging from 500 to 5000 sqm; 0.66, natural or artificial wooded formations, tree cover > 10%, surface area > 5000 m<sup>2</sup>, height > 5 m, width > 20 m).

$Cwt$  is the coefficient of wood type; it has four possible scores (1.4, 1.2, 1.0, 0.6, in descending order of importance). The wood communities which can be attributed to each level depend on the territory under consideration. Their relative geobotanic value may be assessed through the calculation of the Geobotanic quality index of plant communities (GQI).

TUA is the utilised agricultural area.

Objective of the index is to evaluate the surface coverage of forest in relation to the utilised agricultural area. The structure and density of forests in relation to the utilised agricultural area (TUA) is evaluated. The index is expressed as the ratio between the sum of the areas occupied by wood (each multiplied by two coefficients that consider the spatial distribution and types of wood formations) and the utilised agricultural area.

Optimal values: > 0.1

#### *Ecological infrastructure species richness*

Species no (herbaceous or woody species). The index is a measure of richness in herbaceous or woody species in hedges and hedgerows.

Optimal values: > 40

#### *Ecological infrastructure diversity*

$H_{ei} = - \sum p * \ln p$ , where:

$H_{ei}$  is the Shannon diversity index;

$p$  = Species cover percent / Total species cover percent (herbaceous or woody species).

The index is a measure of diversity in herbaceous or woody species in hedges and hedgerows.

Optimal values: > 2

#### *Ecological field diversity*

$H_{ef} = - \sum p * \ln p$ , where:

$H_{ef}$  is the Shannon diversity index;

$p$  = Species percent occurrences / Total species occurrences.

The index is a measure of diversity in herbaceous species in the parcels.

Optimal values: > 2

#### *Ecological field species richness*

No. herbaceous species

The index is a measure of richness in herbaceous species in the parcels.

Optimal values: > 35 (indicative value depending on the biogeographic, climatic, and edaphic context)

#### *Target species diversity*

$H = - \sum p * \ln p$ , where:

$H$  is the Shannon index;  $p$  = No. of individuals of a species / Total no. of individuals.

It may be referred to a surface area unit or to a volume unit. Target species may be soil or water quality indicator species (edafofauna e specie di artropodi target)

Optimal value: > 2

#### *Target species richness*

No. of target species. Target species may be soil or water quality indicator species

Optimal value: > 25 (indicative value depending on the biogeographic, climatic, and edaphic context)

#### *Population trend of animal and/or plant target species*

##### *Employment and Gross value added*

These two indicators describe key information on one social and one economic aspect: how many people are employed in the sector and what is the gross value added of the sector.

*No. farms with owner less than 40 years old*

*No. farms offering multifunctional services*

*No. organic farms*

*No. farms with websites*

*Amount of public and private economic investments for agricultural and tourism promoting*

*No. of products with certification of origin*

*No. producer groups and/or no. of associated producers relative to the total number of producers*

*No. products with production disciplinary*

*Amount of funding requests to support investment*