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## PROGRAM FOR EDUCATION FOR SUSTAINABLE DEVELOPMENT IN THE CARPATHIAN ECO-REGION

*Living with nature*

- WORKBOOK -

*By*

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**&**

**Ecological Society **ENDEMIT**, Belgrade, Serbia**

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Introduction

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Dear beneficiaries of the Workbook for Education for Sustainable Development of the Carpathian EcoRegion,

In front of you is the first issues of a manual which contains basic instructions on how to learn about sustainable development in the Carpathians.

In this workbook you will find very useful information about different issues which, all together, indicate what does the sustainable development actually means.

The main purpose of the manual is to provide basic information on sustainability in the Carpathian EcoRegion and to provide a good and comprehensive discussion about various social, environmental and economic problems of local communities in light of efforts towards sustainable development. It is a tool for conducting trainings on sustainable development in local communities.

Do not expect that you will learn what the sustainability actually is just by reading one of the given chapters of the workbook. In order to get a broad picture about how to make sustainable living, you will have to go through all the issues, and practice upon each of them.

For your convenience, we have provided case studies, examples of good practice and tasks in the end of each chapter. This will help you to summarize your knowledge and discussions and, perhaps, create some new ideas and solutions for solving some of your local communities' problems in a sustainable manner.

With respect to your previous knowledge, we strongly suggest you to have critical approach to each of the chapters and upgrade them with your own experiences and information. The more different stakeholders you have in this discussion, the better and diverse will be solutions for the local problems.

Due to the fact that the workbook is made for the trainers in sustainable development on local scale level, it is strongly recommended that, before organizing a training, first perform research within local community in order to adjust your presentations with the level of knowledge of your target groups.

Most important thing to do, before starting with the training, is to provide participation of different stakeholders of local communities in the training sessions. This is important because of the fact that sustainable development is a multisectoral issue and can only be achieved by involving all those sectors which can actually make a change and make sustainable development a reality (local governments, nongovernmental organizations, business sector, media, schools etc.).

On the first pages of the workbook, you will find the Program for Education for Sustainable Development. This Program is made in order to facilitate the implementation of training seminars in local communities. If you go carefully through the Program, and fulfill as much requirements as possible, you will have a solid basis for conducting the training in most effective way, with less expenses.

Also, once you complete the Program requirements, you will have a solid basis for any other activities regarding environment and sustainable development on local community scale level.

And, in the end of this introduction, I would strongly suggest you to be creative, innovative and critical as much as it is possible on your way towards sustainable development of your local communities.

In the name of Ecological Society ENDEMIT, I'm wishing you the most of success in spreading the information and knowledge about sustainability of the world.

Miroslav Tadic, Coordinator/Editor

## Climate change already has begun

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Life on the earth is made possible by energy from the sun. The sunlight arrives mainly in the form of visible light and about 30 per cent is scattered back into space by the outer atmosphere, but the rest reaches the earth's surface. Most of the sun's energy that reaches the earth is absorbed by the oceans and land masses and radiated back into the atmosphere in the form of heat or infrared radiation. Most of this infrared energy is absorbed and reradiated in atmosphere, by atmospheric gases called greenhouse gases (GHGs).

Some of the greenhouse gases are naturally occurring in the atmosphere, while others result from different human activities. Naturally occurring greenhouse gases include water vapor, carbon dioxide, methane, nitrous oxide and ozone. There are also several long-lived industrial gases that are almost entirely due to anthropogenic sources such as: chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. At the same way, by certain human activities, such as: the burning of coal, oil, and natural gas; farming activities; changes in land use and waste management, levels of naturally occurring greenhouse gases are being supplemented. Increased emissions of greenhouse gases mean that the amount of energy being trapped in the atmosphere increases. As a result, the lower atmosphere is likely to warm, changing weather and climate.

The term used to describe this role of the atmosphere, in insulating the planet from heat loss, is the greenhouse effect. The term greenhouse effect may be used to refer either to the natural greenhouse effect or to the enhanced greenhouse effect.

The term natural greenhouse effect describes the role of the naturally occurring greenhouse gases. Without the presence of these gases the average temperature of the earth would be about 33°C cooler. About three-quarters of the natural greenhouse effect is due to water vapor. The next most significant greenhouse gas is carbon dioxide. Since the industrial revolution and expansion of agriculture around 200 years ago, we have been pumping additional carbon dioxide gas into the atmosphere. Today, the concentration of this gas is approximately 30 per cent greater than in

the 18th century. The enhanced greenhouse effect is term used to refer "enhancing" of the natural greenhouse effect. This "enhancing" is result from increased amounts of greenhouse gases from human activities which mean, as is mentioned above, that more heat may be trapping near the earth's surface.

In fact, some scientists suggest that recent trends in global warming are part of the natural patterns of warming and cooling that have taken place over the past million years. Other says that the enhanced greenhouse effect causes an unnatural increase in global temperatures. However, from the end of the last Ice Age episode about 10,000 years ago until the end of the 18th century, the levels of greenhouse gases in the atmosphere remained fairly constant. Since the Industrial Revolution 200 years ago, mankind has been releasing extra quantities of greenhouse gases into the atmosphere, which trap more heat, enhancing the natural greenhouse effect. During the 20th century, the earth's surface warmed by about 0.6°C.

In generally, the rising of temperatures mean greater evaporation, a warmer atmosphere is able to hold more moisture and the result is more water aloft that can fall as precipitation. This also means more frequent and powerful cyclones and hurricanes, more frequent and intense floods and droughts. At the same time dry regions are apt to lose still more moisture which exacerbates droughts and desertification. It is validated that even a small rise in temperature is accompanied by changes in climate what exactly more frequent "extreme weather events". For a recent increase in "extreme weather events" which has been explained away as random scientists say it's an indication that climate change already has begun.

One of the regions where the effects of global warming and climate change are already felt is the Carpathian Basin. The Carpathian Basin is susceptible to droughts, because of it relative isolation. According to many scientists, in the latest decades the climate of the countries in the Carpathian Region became drier, as droughts are quite common. Summers are hotter and winters became milder.

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For these reasons snow is not often as before. There is an opinion that the four-season system became a two-season system as spring and autumn are becoming shorter and shorter, even vanishing some years. In the last few years serious flood events occurred at the watershed of the rivers, at the first place the Danube and the Tisza. In the Carpathian Region emissions from human activities and primarily fossil fuels as well as significant change in land-use/land-cover contribute to climate change, global warming and the greenhouse effect.

Evidence, in the 1960s and '70s, that concentrations of carbon dioxide in the atmosphere were increasing and this may be the cause of climate change first led climatologists and others to press for action. It took years before the international community responded.

In 1988, an Intergovernmental Panel on Climate Change was created by the World Meteorological Organization and the United Nations Environment Programme (UNEP). The Panel's was making the influence on governments to create United Nations Framework Convention on Climate Change, which entered into force on 21 March 1994. This was the first step taken by the international community to protect the earth's climate from dangerous man-made interference. The main objective of this Convention is stabilization of GHGs concentrations in the atmosphere at the level that would prevent dangerous anthropogenic interference with climate system. It was obvious this aim would not be reached without stronger and more detailed commitments.

Governments were started intense negotiations, and after two and a half years the Kyoto Protocol was adopted, and entered into force on 16 February 2005. This international agreement shares the Convention's objective, principles and institutions, but significantly strengthens the Convention by committing Annex I Parties to individual, legally-binding targets to limit or reduce their greenhouse gas emissions. In the first commitment period, from 2008 to 2012, the assigned amount for each Party included in Annex I, of the Convention, shall be equal to the percentage inscribed

for it in Annex B, of the Kyoto protocol, of its aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A in 1990, or the base year or period, multiplied by five. These add up to a total cut in greenhouse-gas emissions of at least 5% from 1990 levels in the commitment period 2008-2012. To achieve their targets, Annex I Parties must put in place domestic policies and measures. The Protocol provides an indicative list of policies and measures that might help mitigate climate change and promote sustainable development.

All countries in the Carpathian Region, except Serbia, are Annex I Parties. In the first commitment period quantified emission limitation or reduction for each of these countries are: for Austria, Czech Republic, Romania and Slovakia 8%, for Poland and Hungary 6% and the obligation for Ukraine is stabilization of emissions at the level of basic year.

Parties may offset their emissions by increasing the amount of greenhouse gases removed from the atmosphere by so-called carbon "sinks" in the land use, land-use change and forestry (LULUCF) sector. However, only certain activities in this sector are eligible.

The Protocol also establishes three innovative "mechanisms" known as joint implementation, the clean development mechanism and emissions trading. These are designed to help Annex I Parties cut the cost of meeting their emissions targets by taking advantage of opportunities to reduce emissions, or increase greenhouse gas removals, that cost less in other countries than at home. Any Annex I Party that has ratified the Protocol may use these mechanisms. At the same time these mechanisms will help Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention. Businesses, environmental NGOs and other "legal entities" may participate in the mechanisms, albeit under the responsibility of their governments.

Some of a possible ways for reducing of GHGs emissions are: use of natural gas which releases less carbon dioxide per unit of energy than coal or oil;

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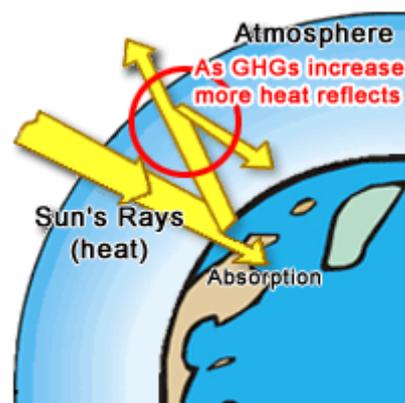
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use of biomass sources of energy and methane gas emitted by waste dumps; use of solar energy and wind-generated electricity instead of some fossil-fuel; improvement of building insulation can reduce the amount of fuel needed for heating or air conditioning; etc.

Without the commitments defined under the Kyoto protocol and real actions which will reduce greenhouse emissions the average global temperature will rise by 1.4 to 5.8°C and the sea level will rise from 9 to 88 cm, by the year 2100 than in 1990, according to computer climate models. Climate models also show that land will warm more than the sea. The daily temperature range over land is likely to decrease. The greatest warming is expected to occur in the sub-polar regions of the northern hemisphere during winter. These changes in global temperature will affect more precipitation, wind patterns and ocean circulation.

Generally, the models show that increasing of levels of greenhouse gases will produce additional warming at the earth's surface and that the enhanced greenhouse effect will likely to lead to pronounced changes in weather and climate. Over the next few decades warmer conditions might: alter the forests, wetlands, and rangelands they depend on; reduce the quality and quantity of freshwater supplies; expand the range of some dangerous "vector-borne" diseases, etc.

Naturally, not all changes will be bad for everybody but without the concern from all individuals, groups, companies and institutions to mitigate their own greenhouse gases emissions sustain life on earth would not be possible.



## Sustainable Production and Consumption

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### Sustainable development

*“Sustainable development is development which meets the needs of the present without compromising the ability of future generations to meet their own needs”*

Sustainable development represents social, economic and cultural development of humans which take into consideration limits of the environment and nature.

World's population continues to increase. The past twenty years experience shows that current model of development is unsustainable. Our way of life is placing an increasing burden on the planet. The stress we put on resources and ecosystems are constantly increasing. Globally we are not even meeting the needs of the present let alone considering the needs of future generations. We face a future that is less certain and less secure.

Not just because it is the right thing to do, but also because it is in our own long-term best interests. We need to make a decisive move toward more sustainable development. We all have a part to play. Our small everyday actions add up to make a big difference.

*Think globally, act locally*<sup>1</sup>

**Inter-generational equity** is the principle of equity between people alive today and future generations. The implication is that unsustainable production and consumption by today's society will degrade the ecological, social, and economic basis for tomorrow's society, whereas sustainability involves ensuring that future generations will have the means to achieve a quality of life equal to or better than today's.

**Intra-generational equity** is the principle of equity between different groups of people alive today. Similarly to inter-generational equity,

intra-generational equity implies that consumption and production in one community should not undermine the ecological, social, and economic basis for other communities to maintain or improve their quality of life.

### The problem: Production and consumption of goods

Today we live in both a carbon and water constrained world. Pressures on the environment are increasing as world population grows and parts of society become wealthier. The planet's renewable resources - like water, timber or fish - are rapidly being exhausted and our use and disposal of non-renewable resources are radically altering our environment.

The extent, to which we are using resources, including the 'sinks' we rely on to deal with the waste we produce, means that the chances of developing countries - and future generations - to have access to their fair share of resources are threatened. Our own wellbeing and quality-of-life, as well as the health of ecosystems, are becoming increasingly compromised by pollution and over-exploitation of resources. A situation created, in large part, by our enormous, collective consumer appetite.

Any product consumed has an impact on the environment somewhere across its life cycle, whether during its manufacture, its use, or disposal. You don't have to be an economist to see that almost every environmental problem connects to consumption and production, though the impacts are not always obvious.

We see ever-expanding production, use, and disposal of goods and services; we don't always see how this growing economic activity depends on rising operation of materials, water, and energy.

<sup>1</sup>was reportedly coined by David Brower, founder of Friends of the Earth, as the slogan for FOE when it was founded in 1969, although others have stated it was originated by Rene Dubos as an advisor to the United Nations Conference on the Human Environment in 1972. Others later converged "global" and "local" into the single word "glocal," a term used by several companies in their advertising and branding strategies in the 1980s and 1990s).

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The results are unchecked growth in solid waste, greenhouse gas emissions and a multitude of other problems. Yet it seems almost taboo to examine the economic forces that inevitably lead to rapid ecological degradation. The dominance of pro-growth politics and the prevailing “more is better” economic and cultural norms have prevented scrutiny of current patterns of commerce as a root cause of environmental problems.

The past decade has seen the emergence of numerous initiatives aimed at redirecting consumption and production. These initiatives seek to minimize environmental pressure, support economic prosperity and improve quality of life.

These emerging programs are primarily driven by environmental concerns, but some stem from growing misgivings about excessive commercialism, crass materialism and the commodification of all parts of life. Some of the initiatives have arisen from the recognition that current patterns of consumption, production, and economic development are exacerbating poverty and failing to meet genuine human needs. For most, these environmental and quality-of-life issues converge.

People need to be able to choose to live more sustainable lifestyles. However, in many instances, consumers are denied any real choice as many of the avoidable impacts of what we use and buy are already 'designed in' long before they reach consumers. Some innovative producers are using eco-design tools to re-think products and services; creating goods that perform as well or better than conventional products, using resources more productively, reducing pollution and improving profitability. It is very important to use resources much more efficiently in order to prevent the widening of social inequalities, increasing demands on resources and the amount of waste associated with unsustainable levels of production and consumption.

The product areas identified as having the greatest impact on the environment are: food and drink, transport, energy-using products (in buildings), construction products, and clothing. It is common to think of production and consumption as discrete stages in a product's life cycle chain. Usually production is pre-

sented as an industrial activity which is preceding consumption as a domestic activity. But production and consumption are interconnected and interdependent. The production of products requires that products be consumed, and the consumption of products requires that they be produced.

*Production and Consumption comprise a single integrated system focused on products.*

In this system, products and services serve as the natural nexus between production and consumption. A systems approach allows for the exploration of comprehensive strategies to address the sustainability of products and services at all stages of their life cycle.

### Ecological footprint

**Ecological footprint** is the area of land and water required to support a defined economy or population at a specified standard of living. Industrialized economies are considered to require far more land than they have, thus, through trade, impacting on resources in other countries. Also known as 'appropriated carrying capacity', this concept also incorporates the distributional aspects of sustainable production and consumption.



Our current economy has given rise to increasing demands which compete for dwindling supplies of life's basic necessities such as food, clean water, etc. A group's **ecological footprint** can be used to measure its current consumption against projected requirements and point out likely shortfalls. In this way society as a whole can compare the choices we need to make in the near future about our demands on nature - or else nature will make our choices for us. We'll have to look at issues like long term ecological sustainability as they relate to future economic health. You can calculate your ecological footprint at the Internet addresses [www.myfootprint.org](http://www.myfootprint.org).

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### The solution: Sustainable Production and Consumption

#### What is Sustainable Production?

Sustainable Production is the *creation* of goods and services using processes and systems that are: non-polluting; conserving of energy and natural resources; economically efficient; safe and healthful for workers, communities, and consumers; and socially and creatively rewarding for all working people.

#### What is Sustainable Consumption?

Sustainable consumption is the *selection, use and disposal* of products and services in a way that conserves energy and materials, minimizes the depletion of natural resources, avoids toxic and hazardous substances, and optimizes the quality of life of consumers and workers throughout the life cycle of the products or services.

Sustainable production and sustainable consumption involve meeting present needs without compromising the capacity of future generations to do the same.

*"Sustainable production and consumption is the use of goods and services that respond to basic needs and bring a better quality of life, while minimizing the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardize the needs of future generations."*<sup>2</sup>

*"Sustainable production and consumption involves business, government, communities and households contributing to environmental quality through the efficient production and use of natural resources, the minimization of wastes, and the optimization of products and services."*<sup>3</sup>

The current production systems are linear, a cradle-to-grave system, often using hazardous substances and finite resources in vast quantities and at fast rates.

The goal of clean or further in text sustainable production is to fulfill the need for products in a sustainable way and create a system which is circular, cradle-to-cradle. This system uses fewer materials and less water and energy. Sustainable production has four elements: the precautionary approach, the preventative approach, democratic control and an integrated and holistic approach.

#### Driving forces of sustainable production

Production practices and pollution have long been targeted by environmental legislation and by fiscal measures, with recent priority put on ways to tackle unsustainable levels of carbon emissions and waste. Cost is another major factor.

Producers are rarely aware of how inefficient they are in their use of resources and how much this costs them and so by extension their customers.

In the case of waste, once the outlay on materials, treatment, energy and wasted labour are added to the costs of disposal, most producers find that minimizing waste at source will boost profitability.

*Reducing or preventing pollution - over expensive end-of-pipe fixes - will almost always lower costs, and so could raise the value of products.*

Forward-thinking producers can benefit in many ways from identifying improvements to the efficiency of existing processes or designing new ways of production. Sustainable innovation can lead to reduced costs, better management of risks, improved stakeholder relations, and can create a more productive working environment by engaging employees.

<sup>2</sup>Symposium: Sustainable Consumption. Oslo, Norway; 19-20 January 1994.

<sup>3</sup>Edwin G. Falkman, Waste Management International. Sustainable Production and Consumption: A Business Perspective. WBCSD, n.d.

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### Step I: Extended Producer Responsibility (EPR).

Many businesses have realised that acting in a socially and environmentally responsible manner is more than just an ethical duty for a company. Sustainable development is an area of risk that, when managed effectively, can create opportunities. This is partly a response to signals from legislation, but many also see it as a way of becoming more competitive.

The focus of EPR is on product systems and has the aim to encourage producers to prevent pollution and reduce resource and energy use in each stage of the product life-cycle. Producers bear a degree of responsibility for all the environmental impacts of their products. The model example of EPR is the 'product take back', where the producer takes back a product at the end of its useful life either directly or through a third party. Take back laws must be accompanied by an obligation to recycle. A lot of industrial sectors are alarmed at the prospect of EPR. Instead of EPR they favor Extended Stakeholder Responsibility (ESR), which disperses responsibility onto consumers.

Companies can make financial savings on energy costs, reduced inputs, waste disposal and compliance with regulations. They can enhance reputation and brand value, fostering customer loyalty, motivating staff and be rewarded from the investors. Companies can also use it as an opportunity to encourage innovation in sustainable product design (eco-design or design for sustainability-DfS), increase investment and open up new markets.

### Step II: Improve resources efficiently and introduce the clean technology

The first steps towards clean production are changes in the production process. Clean technology, as an incentive to change product, changes the process. Also required is the examining of the product itself. Today society must move to full cost accounting as a way to understand the environmental, social and monetary costs of resource depletion and waste generation. In supporting the development of cleaner production and cleaner products the governments play a

major role. Governments need to develop resource policies favoring long-life products, renewable energy and natural materials.

For any producer to perform well it must be resource efficient. Resource efficiency is about achieving more with less.

With rising energy and waste costs, tougher environmental legislation and higher stakeholder expectations, producers are increasingly focusing their attention on improving operation practices to both enhance performance and demonstrate responsible behavior.

There is usually great potential for organisations to minimise the use of resources at all stages of a product's life cycle - production, distribution, use and disposal. It is important to think about each of these stages. Significant improvements can be made through reducing carbon emissions, minimising waste and taking a strategic approach to resource productivity. Improved resource productivity has the potential to drive down costs by reducing raw material use, waste and pollution. The penalties for failing to manage environmental risks properly can also be substantial, whether in terms of lost reputation, loss of the license to operate, build or market, or straight financial penalties.

Reducing energy costs is a key driver for businesses, the public sector and individuals to cut carbon emissions. Energy saving is often the easiest way for an organisation to reduce emissions although many are investing in low carbon technologies and renewable energy.

Waste minimisation is about reducing waste at source. Waste can be designed out of production processes and what cannot be designed out, can often be re-used or recycled.

An effective waste minimisation programme scrutinises the whole organisation from suppliers to production practices and disposal, looking to minimise the use of resources such as water, energy, chemicals and equipment.

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### Step II: Environmental management systems, environmental reporting and life-cycle analysis

Environmental management systems (EMS) provide producers with a more thorough way of managing the impacts of production processes and products, transport and distribution operations, and supply chains. EMS can help reduce a producer's environmental impacts, improve resource efficiency, reduce costs, demonstrate responsible management of environmental risks and liabilities and comply with stakeholder expectations.

Environmental reporting involves the regular publishing of environmental policy statements, which typically include details of environmental performance on greenhouse gas emissions, waste, water use and other impacts. Regular reporting makes producers to comply with regulatory requirements and enables them to raise their performance by understanding where improvements can be made.

Databanks, provided with information on products can be used as an instrument of pressure towards the industry. By making a life-cycle analysis one can show the level of input of resources in a product: such as the use of energy, of water, solid materials, toxins, land-use and transport. It is a presentation of the ecological rucksack of a product.

**Ecological rucksack** is the total weight of material flow 'carried by' an item of consumption in the course of its life cycle. Like the ecological footprint, the ecological rucksack concept deals with displaced environmental impacts but has a more technical focus. It is concerned with reducing material intensity and resource inefficiency.

### Step III: Participation and stakeholder involvement

One of the initiatives must be toward public access to information and public participation in decision making process. Expanding public debate and involvement in policy development related to consumption and production patterns through participatory decision-making mechanisms can not only help improve policies, but also contribute to generally in-

creasing consumer and producer awareness and commitment to environmental issues.

Partnership or "multi-stakeholder" approaches to environmental policy development is likely to increase in importance in the years to come.

### Step IV: Regulations, environmental taxes and market instruments

Modern, outcome-focused regulation it should tackle pollution from production processes - by preventing or minimising environmental impacts - and to achieve high standards of environmental management.

While direct regulation plays an important role in minimising pollution, today's challenges mean we need to move beyond it to find smarter ways of driving resource efficiency. Taxation can send broad price signals aimed at achieving fairly widespread changes in behaviour. It is highly recommended for the Government to implement ecological tax reform.

Market instruments are also being employed to drive change. For example, trading can provide a least-cost solution to environmental pollution by giving participants the flexibility to make improvements when and where they decide.

### The problem with unsustainable consumption

There is huge potential for better products and production practices to deliver improvements. However, a sustainable society will require that all sectors - businesses, public sector and households - consume differently and more efficiently as well.

*Some calculations suggest that this would require three planets' worth of resources. Instead we need to move towards 'one planet living'.*

Consumption is not just about shopping but all the ways we use the planet's resources in our everyday lives. The products and services all have social and environmental impacts, whether in their production and distribution, when in use or when they are thrown away as waste.

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As society has become more prosperous and the number of separate households has increased, consumption levels have risen sharply. Four areas of our lives generate four-fifths of our overall impact on the environment around us; how we run our homes; the food we eat; how we get around; and how we travel on our holidays.

There is obviously huge potential to deliver improvements through consuming better products and services as well as learning to consume differently.

### Encouraging sustainable consumption Labelling

Labelling is the simplest and most direct way of communicating information on a product's environmental or social credentials to consumers.

There are many ways of providing information on labels. Manufacturers and others can make their own claims about products, or may participate in one of the many voluntary labelling schemes designed to highlight some special feature of a product. In some cases, companies are legally obliged to state certain information on products in prescribed formats.

There are green labelling schemes somewhere in the world for almost every type of product. Many schemes cover the same types of products. There are also schemes for different types of environmental impacts, and for combinations of products and impacts. Good schemes provide an excellent way for companies to advertise to their customers that a product has achieved demanding environmental standards.

"Green labels" is mainly used to apply to consumer assurance schemes using labels or logos with a recognisable environmental or sustainability strand. These can cover a range of issues, including protection of natural resources, biodiversity, and habitats, as well as minimisation of energy and water used in manufacturing, and restrictions on chemicals, emissions to air, water and soil, reduction of energy and water consumption in use, through to schemes reflecting policies on packaging, noise, waste

management and recycling. No single label covers all aspects of sustainability.

Different kinds of labels address different needs. Some labelling schemes focus on a symbol, to identify a product as achieving the scheme's high environmental standards; so these labels may be particularly suitable for instant communication with consumers, where the expectation is that the consumer will identify the symbol, and be encouraged to buy the product on account of it, but may not be seeking more information at the point of purchase about the product's specific impacts. An example is the European Ecolabel, Fig. 1, the European Union's prestige labelling scheme for consumer products and services, which uses a flower logo to signify that a product meets the scheme's standards.



European Ecolabel is an official Europe-wide award for non-food products that minimise impacts on the environment. Products must be independently certified, and have to meet strict criteria for all the main environmental impacts across their whole life cycle. It could be applied to many different types of products.

Other labels set out more detailed data about a product in a standard easy-to-read format. These types of schemes may be especially useful for consumers or producers wanting to make comparisons when buying. An example is the European Energy Label Fig. 2, all European manufacturers and retailers must tell you about the energy efficiency of household electrical fridges, freezers, washing machines, tumble dryers, washerdryers, dishwashers, air conditioners, ovens and light bulbs. Products are generally rated from 'A' to 'G', with 'A' being the most efficient ('A+' and 'A++' for the most efficient fridges and freezers).

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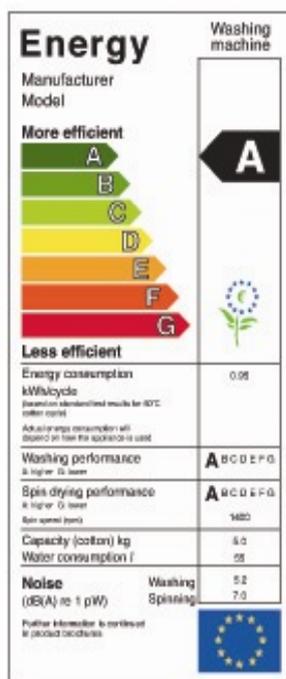


Fig. 2 European Energy Label

So there is room for a range of schemes, and for different types of schemes. Even where other labels cover similar territory, a degree of choice may help industry. The first-rate schemes encourage better environmental standards, and can stimulate other certification producers to improve their schemes.

Green labels are not always easy to define, and there is no simple way of

categorising all green labels according to what they cover. But the International Organization for Standardization (ISO) has developed a classification system for environmental product claims and labels, based on the nature of the claim.

**ISO 14024** is for what are known as Type 1 claims - declarations which meet criteria set by third parties (i.e. not by the manufacturer or retailer themselves), and are based on life cycle impacts, like the EU Ecolabel and national labelling schemes. **ISO 14021** is for Type 2 claims, which are manufacturers' or retailers' own declarations. **ISO 14025** is for Type 3 claims, which consist of quantified information about products based on life cycle impacts.

**Type 1 claims** are award-type labels. As they are based on life cycle impacts, and require the product to meet independently set criteria, they are in theory fairly demanding, but this depends on how strict the criteria are, and on the body which controls the criteria.

**Type 2 claims** can be useful, but much depends on the type of claim that the manufacturer or retailer makes. **Type 3 claims** should enable products to be compared easily, because they consist of quantified information about aspects such as energy output.

Less formally, the following categories can also be useful as a way of differentiating the different types of labelling scheme. Some schemes fit into more than one of the following categories, and the categories themselves are not mutually exclusive - a sector-specific label may be a valid Type 1 ecolabel, for example - but these categories may be a helpful description of the main types of schemes:

**Ecolabels** (used here to mean schemes for a wide range of products) Fig. 1,

**Energy labels** (which focus on the energy impacts of products) Fig. 2,



[www.organicfarmers.org.uk](http://www.organicfarmers.org.uk)

Fig. 3 Organic label

**Sector-specific labels** (which apply to one kind of product, like textiles),

**Organic labels** (which cover food, drink and other products) The word "organic" is defined by law. One characteristic of organic farming is that it strictly limits use of artificial chemical fertilisers

and pesticides. Organic standards don't just apply to food. Additional private standards used by authorised bodies increasingly cover other products, including textiles, cosmetics, wood products and composts Fig. 3

**Food labels** (including drink),

**Social and "wider world" labels** (which primarily address specific ethical or environmental issues associated with the places where products are sourced) These are examples of schemes which focus on providing sustainable livelihoods and protecting ecosystems and biodiversity in places where products originate.

## Sustainable Production and Consumption

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The Fairtrade Foundation awards the FAIR-TRADE Mark to Fig. 4 Fairtrade label products that meet international Fairtrade standards. These include long-term trading contracts and a price that covers the cost of sustainable production and living.



Fig. 4 Fairtrade label

Farmers and workers' organisations receive a premium to invest in social and environmental projects benefiting their communities. The Mark appears on a wide range of certified products, including coffee, tea, fruit, cotton and footballs, and composite products like biscuits which include a minimum percentage of Fairtrade ingredients (Fig. 4 and

**Green claims** (which are Type 2 labels in the ISO classification above).

### Support for consumer behaviour change

Encouraging us to behave differently as consumers is a complex process. For example, 30% of people claim to care about companies' environmental and social records but only 3% reflect this in the purchases they make. Clearly, there is an 'attitude-behaviour' gap.

Growing prosperity in Europe has contributed to unsustainable consumption levels in relation to fossil fuels, waste and water use. There is an urgent need for policies and initiatives that encourage, motivate and influence people to think about, and take responsibility for, their behaviour and lifestyle. This is against a background of more European and national regulation and target setting to improve environmental practices and make sustainable development an integral part of all policy areas.

### Current EU project-ChangeLAB

ChangeLAB is an exciting on-going project about changing lifestyles, attitudes and behaviour. European partner organisations will share experience

and knowledge on how to promote sustainable patterns of consumption in order to help solve increasingly serious environmental problems at home and worldwide. The challenge for the organisations taking part in the ChangeLAB project, mainly local and regional authorities, is how to reduce forms of consumption which damage the environment, without reducing quality of life and prosperity. ChangeLAB will assist politicians and policymakers by creating a base of knowledge and a better understanding about the effectiveness of a wide variety of policies and projects that aim to influence behaviour and arrest unsustainable trends at local and regional level.

ChangeLAB has two main aims to improve the capacity of regional and local authorities across the EU to influence consumer behaviour in the areas of waste, water, transport and energy, through drawing on existing best practice in all sectors and developing ways of measuring the effectiveness of such activities and to disseminate its findings to policymakers and practitioners and provide a practical toolkit, with an interactive decision-making tool, linked to a database of relevant practice examples and analysis

### Promoting Sustainable Production and Consumption:

#### Policy Study-Leaded gasoline phase-out in Slovakia

##### Introduction

Since the 1920s, lead has been used in gasoline as an octane enhancer and engine lubricant. Lead is, however, a highly toxic heavy metal that has a negative effect on human and animal health. It affects many organ systems in the body including the nervous system, the blood forming system, the kidneys and the reproductive system. Lead exposure can cause reduced mental development, reading and learning difficulties, hyperactivity, and adverse effects on kidney functions.

## Sustainable Production and Consumption

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Lead exposure is therefore regarded as a serious health problem for the general population and especially for children. Lead and lead compounds are absorbed by the human body either through inhalation into the lungs or through ingestion of lead-contaminated soil and dust. The largest source of human exposure to lead is airborne lead from the exhaust of motor vehicles using leaded gasoline, accounting for up to 90 per cent of airborne lead pollution. Research has shown a direct correlation between lead in gasoline and lead in the blood. Other sources of airborne lead are industrial processes such as metal smelting or battery manufacturing and combustion sources such as coal-powered generating plants. Since the 1970s, substitutes for lead in gasoline have been available. The octane level of gasoline can be raised through refining processes, and engines now generally do not need lead for lubrication. While unleaded gasoline was more expensive to refine than leaded gasoline through the 1980s, it can now be refined at about the same cost as leaded gasoline of equivalent performance. Now, the most important obstacle to unleaded gasoline is the cost of modifying the refining process in existing refineries. Cost-benefit analyses show that the health costs resulting from the use of leaded gasoline are much greater than the costs of shifting to unleaded gasoline. Some studies have concluded that elimination of lead from gasoline can result in reductions in health care spending up to six times the cost of the transition. Furthermore, catalytic converters to reduce other pollutants from motor vehicles require unleaded gasoline, as lead destroys the effectiveness of the catalysts. A transition from leaded to unleaded gasoline requires adaptation of the refineries, which can be costly if the technology standard of the refinery is low. Gasoline pumps and tanks that have been used for leaded gasoline need to be thoroughly cleaned for use with unleaded gasoline. Furthermore, the public should be informed of the benefits of switching as resistance to the shift by drivers due to concerns about the effect of unleaded gasoline on the performance of the car may slow the transition. Drivers in some countries, for example, have resisted a switch in the belief that a car must have a catalytic converter in order to use unleaded gasoline.

### Slovakia

Slovakia faced these problems in the beginning of the 1990s, stimulated in part by the need to harmonize regulations with the European Union as part of its application for membership. Slovakia's single refinery was not geared for refining unleaded gasoline, which meant that unleaded fuel had to be imported, and attachment to the familiar leaded fuel on the part of the public was an additional hindrance to the transition. The government began to address the lead problem in 1990 by reducing taxes on unleaded gasoline, but only sufficiently to offset the higher costs of refining unleaded fuel, thus equalizing the prices of leaded and unleaded gasoline. In 1993, the government required all imported cars to have catalytic converters, which required the use of unleaded gasoline, and further reduced taxes on unleaded gasoline, making it cheaper than leaded gasoline. Furthermore the road tax was reduced on cars with converters. However, the turnover of cars was so low, that by 1995, only 4 per cent of cars had catalytic converters, and drivers of cars without catalytic converters were reluctant to shift to a new type of fuel. In 1995, the government banned all sale of leaded gasoline. This required a reconstruction of Slovakia's single refinery to produce only unleaded gasoline. Since the refinery, which is now privately owned, is a modern facility, it could be adapted relatively easily, particularly since conversion for production of unleaded gasoline had started in 1993.

Gasoline stations, which are mostly privately owned, adapted quickly to the change without problems, as did drivers. The elimination of unleaded gasoline resulted in a large decline in airborne lead, and eventually resulted in a general improvement in the health of the public, especially of young children and urban residents. Slovakia's modest attempts to address the problem of leaded gasoline through fuel pricing and requirements and incentives for cars with catalytic converters were not enough to change the consumption patterns of Slovakian motorists, particularly in light of the lack of public understanding of the implications of switching. A simple ban on leaded gasoline solved the problem within a year at very modest cost and with substantial health benefits.

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As Slovakia has only one refinery, implementation of the ban was simple, and the cost of reconstruction did not pose problems with respect to competitiveness.

### **An idea for future action** **The Sustainable Product Campaign**

The Sustainable Product Campaign aims to increase environmental awareness of consumers and to enable change towards sustainable consumption and production. It will stimulate the shift in consumer attitudes by providing them with life cycle analysis of a number of selected everyday products. In order to enable change in purchase decisions consumers will be provided with information on other environmentally sound product options and lifestyles. The campaign should result in the recognition of the campaign workshop participants and the broader public that sustainable products need more than just technological fixes; it requires a joint effort of all social sectors to adapt our values, institutions, legislation and infrastructures to achieve sustainable consumption and production. The campaign will focus on 2 - 3 selected every day products. The aim is to stimulate a shift in the consumer attitudes by providing them with the information about environmental and social cradle to grave impacts of products. In order to enable the change in the purchase decisions the consumers will be provided with information on other environmentally sound product options and alternative life styles.

The stories of the products will also provide a starting point for organizing a dialogue (a national roundtable) among different stakeholders (citizens' organizations, representatives of producers and retailers, government agencies). At the workshop roundtable a balanced group of participants will identify measures towards the necessary policy change to enable consumer choice and green the economy (e.g. ecological tax and subsidy reform, increased producer responsibility). The mutual understanding created during the roundtable should lead to the creation of a national network or an alliance for promoting sustainable consumption.

The campaign should result in the recognition of the campaign workshop participants and the broader public that the shift to sustainable products needs more than just technological fixes: it requires a joint effort of all social sectors to adapt their values, institutions, legislation, and infrastructures to allow the shift to sustainable consumption and production.

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## Environmental pollution in Carpathians

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### Introduction

The Carpathian Mountains (170 000 km<sup>2</sup>) unfold in eight countries: Austria, Czech Republic, Slovak Republic, Hungary, Poland, Ukraine, Romania and Serbia. Most of this chain rises in the middle and the lower Danube Basin, crossing also countries, which are in the process of transition from the centralized communist economy to the free - market system. Land use changes, deforestations and increasingly extreme climate phenomena against the background of global environmental change have enhanced the vulnerability of these mountains to hydro-meteorological phenomena.

The Carpathians are the largest, the most twisted and fragmented range in Europe. They reach highest altitudes in the Gerlachowsky Peak (2 668 m), but otherwise the dominant elements are the middle and low mountains, as a matter of fact severely affected by human activity. At present they shelter about 16-18 million people

From a bio geographical point of view, the Carpathians Mountains represent a link between the taiga of Northern Europe and the Mediterranean ecosystems of the south, also exhibiting the largest pristine forest on the Continent (UNEP, 2001). The rich endemic plants and animals, characteristic of the Carpathians ecosystems, are an essential component of biodiversity in Europe, as are some big carnivores (e.g. the brown bear, the lynx and the wolf) extinct or disappearing from another mountain chains in Europe. Many birds' species, such as the imperial eagle, the Ural owl and the black grouse are monuments of nature.

Carpathians are divided in the following mountains groups:

- North-western Carpathians in the Czech Republic, Slovak Republic, Hungary and Poland
- North Eastern Carpathians in Poland and Ukraine
- Eastern Carpathians in Romania and Ukraine
- Southern Carpathians in Romania
- South-Western Carpathians in Romania and Serbia

The main economic activities are wood processing, mining, animal husbandry and agriculture practiced mostly in the depressions.

All Carpathian countries inherited from the past decades some of the worst environmental problems in the world. Their economies were several times more pollution producing, as well as energy and raw material intensive using (just about every dimension of pollution: air, water, waste...) than the far richer economies of the West. Many "hot spot" areas existed with extreme pollution loads and severe environmental degradation and risks for human health.

### The state of environment

#### Waste and Hazardous chemicals

The production of municipal waste in Carpathians countries has been a serious problem. It was a significant problem in previous period and it is continuing and even growing in some aspects yet (e.g. Hungary has the highest relative production of municipal waste among all OECD countries per unit of consumption).

However, absolute production of municipal waste in Carpathians countries (except Hungary) is below EU and OECD average, but it is growing at a faster pace, and thus the difference is diminishing. The estimated quantity of municipal waste per capita in Hungary corresponds to the average of the European OECD countries and much higher than other Carpathians countries.

Amount of municipal waste in all Carpathian countries has grown significantly in last ten years. Waste management remained a problem and creation of modern disposal sites and waste incineration plants were facing heavy protest by local municipalities. Reuse and recycling of municipal waste is insignificant in all Carpathian countries being below 5 % (e.g. only 3,5% of total municipal waste in Slovakia was separated in 2004). In Hungary, about 82 % of municipal waste has been collected. Most of the waste is disposed of at waste disposal sites, and 15% is incinerated.

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Capacity of presently existing waste disposal sites is sufficient for several more years, but not all of them meet all environmental standards. There are also numerous illegal dump sites and waste disposal sites which do not meet environmental standards.

The great majority of hazardous waste belongs to the category of manufacturing (65% of the total amount of the hazardous waste).

The share of recovered waste is relatively higher in other waste categories (e.g. in Slovakia almost 79% of agricultural waste and 60% of waste from hotels and restaurants has been recovered in some way. Relatively high is the percentage of recovered waste in the field of industry - about 29%. Much worse situation in the waste recovery is in the field of mining and quarrying, construction, electricity, gas and water supply, wholesale and retail trade, repair of motor vehicles, health and social work, as well as other community, social and personal service activities.

Waste, particularly municipal waste, belongs to the greatest environmental problems in Poland, too. Compared to the other areas of pollution, the total quantity of waste generated each year fell only moderately from the beginning of the 1990s to 2000 (14%). Polish consumption, skyrocketing in the 1990s, was confronted with a block log in the construction of modern landfills and waste disposal facilities.

The amount of waste generated in Carpathian countries (industrial waste as well as hazardous waste) by industry decreased between 1990-1996 due to economic recession. Since the recovery, the amount of waste has increased again.

The damage done to environment by waste primarily takes the form of water and soil pollution and the destruction of aesthetic and landscape values.

However, an increase in proper waste management techniques can be seen among both companies and local governments, as evidence by an increasing number of new municipal waste management investment projects and waste processing plants. New legal and economic measures favor these trends.

### Other types of pollution and their impact on environment

#### Air pollution

In Carpathian region there exist only one metropolitan city (with more than one million inhabitants) and a few cities with more than 200 000 inhabitants. The biggest negative environmental impacts are manifested in these cities. First of all transport is the main emission producer. Main emissions include: VOC, CO, NO<sub>x</sub>, SO<sub>2</sub>, particulates, heavy metals and GHG. The growth of number of cars and the traffic intensity is on other hand partially compensated by the improvement of technical conditions of cars, unleaded petrol utilization etc., what finally, results to the absolute decrease of emitted pollutants, except of CO<sub>2</sub>. In CEE countries transport produces about 8% of CO<sub>2</sub>.

#### Water pollution

The Carpathians are rich in rivers. Among them the Danube is the most important one. River basin is the most international river basin in the world, draining 18 countries on its 2800 km journey from Black Forest in Germany to the Black Sea. 80% of the Carpathians water drains into the Danube. The water runoff from the Carpathians escapes for the most part (90 %) into the Black Sea.

The status of the Danube river depends considerably on pollutant inputs from upstream countries (particularly for N and P loads). Diffuse agricultural sources, especially chemical fertilizer use and improper working of waste water treatment plants are a major input.

#### Threats to Biodiversity

The nature and landscape of the Carpathians is under strong pressure from human activity. Main activities that have strong effects on biodiversity are:

-Air and water pollution. The most serious impact of air pollution has been observed in the upper mountain forest zone in the North-western part of the west Carpathians (mnt Beskidy).

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From the sixties, the yearly wood increment of trees decreased by about 30-50% compared with the first half of the century

-Hydroelectric investments. Almost all the larger Carpathian tributaries of the Vistula river are dammed. Some investments dam reservoirs on the Dunajec river have destroyed values of the unique medieval historical landscape and pose threats to the nature of the Pieniny N.P (Poland) and Pienap (Slovakia). The impact of hydroelectric developments will certainly grow in future, as the Carpathian rivers contribute up to 30 % of the water resources of the countries surrounding the range.

-Planning and construction of trans carpathians highways and motorways. These roads will increase the isolation of the Carpathian nature from other mountain ranges and to the northern part of our continent. Moreover, the realized highways crossing the Carpathians (Czech- Polish-Slovakian) adversely affect the biological and landscape diversity of the North-Western part of the range

-Planning and establishment of large tourist centers, particularly ski resorts. An example of excessive development proposals is the idea of organization of Winter Olympic Games in Poprad. In both proposals competition are to be located the interior of the Tatra Mts, which would seriously destroy nature

-Multidirectional changes in agriculture and forestry in the Carpathians. The abandonment of the extensive forms of agriculture and forestry, such as pasturage or coppicing is common. Many domesticated species and races are vanishing. As a consequence, the traditional pattern of local landscapes (fine grain) is disappearing and the species and landscape diversity decrease and disappears. The process is most advanced in the West Carpathians where rate of forest fragmentation, changes into large scale agriculture processes and urban type settlement are now the main cause of species extinction

-Hunting, poaching, collection and human persecution. This forms of pressure concerns almost all taxons of flora and fauna. For some hunters, packers

and collectors more unique individual or more threatened means more valuable trofee.

### Deforestation

Forests are the main value of the Carpathians. Not only because of more than 95% of the range lies in the forest zone, but also because in many parts of this mountains vast areas are still covered by forests. In general Carpathians are forested in 59%, but this value ranges significantly from country to country and between regions. The richest in forests are the East Carpathians, while the West and South parts are much deforested. Deforestation and fragmentation increases also when starting from the centre of the range to its periphery, where forests were intercepted by other land uses.

In the West Carpathians some processes of deforestation are observed as an effect of coincidence and synergy of negative impacts of several factors:

- Increase of soil pollution and acidification due to long-term effects of acid rain,
- Weakness of spruce forests as an effect of primary and secondary pest and pathogen attacks,
- Opening the verge of forests to negative impact of climate factors – wind, sun and snow in down hill skiing areas,
- Increase of fertilization and compactness of soils in the regions of mass summer tourism.

### Soil degradation

Some important threats of soil cover of the Carpathian mountains are caused by the slope processes (natural processes) and human activity (pastures, forest management, tourism and recreation). Natural threats for the soil cover reaches is highest extend in areas above the border of forest zone where one observe the highest intensity of geomorphological processes (debris flows, rockfalls, gravitational slumping of waste-mantle etc.) (Kotarba et al. 2002). Another example of changes in soil cover are various forms of human activity, mainly agriculture and tourism. Degraded soil cover within the tourist paths, chemically changed and thinned soil cover in pasture glades, and particularly soil degradation and erosion after

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timber extraction – all lead to decrease of water retention in soil. An example of these negative effects were the catastrophic floods in Ukrainian Carpathians (Tisa Valley) known from the last decade.

Chemical contamination by dust fumes are known from the near vicinity of the great industrial agglomerations. The contamination by radioactive after the crash of nuclear power station in Chernobyl is insignificant (Skiba et al 2005) and has not any threat potential for the Carpathian nature.

### Conclusions

There exist different environmental problems in Carpathian countries.

Concerning waste the situation in Carpathian countries has been improved, in general, since 1989, especially in the field of hazardous waste. The biggest problem seems to be municipal waste, where situation in the waste generation is even worse like 17 years ago. Surviving problem has been the existence of obstacle hazardous chemical and emerging problem seems to be new types of hazardous chemicals.

In the field of environmental security the biggest complex of problems seems to be related to the global climate change and its regional / local manifestations: first of all floods on one hand and growing problem on draught on the other. A special category of negative manifestation of the climate change, in Carpathians are strong winds with growing catastrophic impacts on settlements, but first of all on forest.

In Carpathian cities and towns new problem and challenges arises, too. The most visible are related to processes which could be called “urban sprawl” and “car expansion”. Common denominator of all these changes is really rapidly changing mobility mode: from the public transportation to the individual car one. On the other, new and perspectives is possible to see in the case of Carpathian cities, which is possible to summaries under title: *Sustainable city*. Carpathians are rich in a historical heritage, which is necessary to protect and o utilize in a sensitive and meaningful way.

In general, the environmental pillar in Carpathian countries is far from the target of the environmental sustainability. In other words, as far as sustainable development is concerned, the achievements of the Carpathian countries, as is the case with the rest of the world, are far from satisfactory. Carpathian countries have to cope actively with some global (climate change, habitat loss, etc) but also with regional and local ones (growing pressure from private transportation, municipal waste generation, sub-urbanization etc).

Carpathian countries should also maintain and further develop several positive aspects of their current conditions e.g. public transport, in some fields less harmful traditional agriculture, traditional skills, more modest consumption patterns, and a rich diversity of natural and cultural heritage.

## Carpathian Biodiversity

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The term “biodiversity”, which is short for biological diversity, describes the richness and variety of the natural world, from the diversity of habitats such as forests and meadows, to plants and animal populations, all the way down to the genetic diversity found within those populations.

The lifespan of species is not unlimited and species either become extinct or develop into new distinctive forms. Although in natural conditions approximately one species per year becomes extinct for purely natural reasons, this situation has rapidly changed today. Humanity is pushing an uncountable number of species to the verge of extinction, and the rate of man-made extinctions is high enough to be called catastrophic. Tens of thousands of species are annually disappearing from our planet and the intensity of the extinction process is as high as the mass extinctions known from paleo-biological records. There are assumptions that extinction rate is nowadays as high as 75 species per day, or around 3 species per hour! As we have described less than 2 million species globally, which is only 10-15% fraction of total world species diversity, the majority of extinct forms is not known and never will be known to science.

Environmental research has proven that mountain areas are of particular value for human beings as key sources and reservoirs of freshwater, as well as means for diminishment of the global greenhouse effect. Moreover, mountain forests are vital for the timber production industry, and mountains have become the main areas for the rapid development of tourism and recreation. First and foremost, however, mountains host a unique variety of species, many of which are rare, vulnerable or threatened. All over the world, mountains are the sites of continental or regional species diversity hot spots.

The Carpathians are the last remaining almost pristine major ecosystem in Europe. Covering an area of approximately 206,000 square km, the Carpathians are one of Europe’s largest mountain ranges. Owing to its relatively intact habitats and particularly extensive forest complexes, the Carpathians are one of Europe’s most valuable refuges of primeval forest fauna. The

Carpathians' position as a bridge linking the north and south of Europe and a refuge for species during the Ice age has also had a huge impact on its biodiversity over the centuries. As a result, the region supports an incredibly high natural diversity of species, with many endemics (species unique to the region). Today, the mountains provide a vital link between the northern and southern forests of Europe, allowing species like brown bear and the wolf to migrate.

Despite this, only 16% of the land of the Carpathian region is currently under some form of large-scale protection. In order to secure the effective conservation of the region's biodiversity, it is estimated that approximately 50% of the total area of the Carpathians should be subject to some form of protection, with 10–15% under strict protection. It is also the last European stronghold of large mammals, such as the brown bear, wolf and lynx (outside Russia). When viewed within a continental perspective, the biological resources of the Carpathians can be typified by three keywords: *unique*, *rich* and *threatened*.

According to Carpathian Red List of Endangered Species (Kukula *et al.*, 2003) there are 17 Extinct species, 126 Critically Endangered species, 303 Endangered species and 369 Vulnerable species in Carpathian region.

In European terms, the Carpathians are also remarkably rich in plant species. About one-quarter of all European plant species can be found in the region. These include about 3800 vascular plant species and about 300 plant communities. There is also great richness of vegetation – it is estimated that there is total number of 133 plant alliances (Braun-Blanquet approach, with exclusion of ruderal plant communities and communities with marginal occurrence). The total number of recorded endemic plants with occurrence within the alliances is 486. Top three alliances according to endemism in Carpathians are: Eastern Carpathian cushion sedge carpets (*Festuco saxatilis-Seslerion bielzii* [Pawl. Et Walas 1949] Coldea 1984), Woolly small-reed tall grass communities (*Calamagrostion villosae* Pawl. *et al.* 1928) and

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West Carpathian alpine calciphilous grasslands (*Seslerion tatrae* Hadac 1962), having 50, 45 and 42 endemic plant species, respectfully.

The region contains beautiful and unique plant species not found anywhere else in the world, such as the East Carpathian lilac (*Syringa josikaea*), Pieniny's chrysanthemum (*Dendranthema zawadzki*), Slovak laurel (*Daphne arbuscula*), Carpathian bellflower (*Campanula carpatica*) and shining pink (*Dianthus nitidus*), which are among the numerous plants found only in the Carpathians. Slovakia alone contains over 100 animals unique to the Carpathians.

It is estimated that nearly 300 000 hectares of preserved virgin forests exist in the Carpathians. Carpathians also harbour 20 000 hectares of primary beech forest - some of the last ancient beech stands remaining in Europe. About half the total area is covered in forest, a bridge linking Europe's forests in the north with those in the south and west. The rest of the region is mainly grassland, including small alpine meadows.

Carpathian region has very rich fish fauna diversity, which is also seriously threatened by human activities. The greatest numbers of threatened fish species belong to Cyprinids (*Cyprinidae*). Particularly alarming is a strong decrease in those fish that were once dominant species in the Carpathian rivers, such as Common barbel (*Barbus barbus*) and Nase (*Chondrostoma nasus*). The population of anadromic Vimba (*Vimba vimba*) has also decreased markedly. Migratory fish are particularly affected by anthropogenic alternations of the environment. For these reasons, Atlantic sturgeon *Acipenser sturio*, Atlantic salmon *Salmo salar* and probably also Sea trout *Salmo trutta* m. *trutta* can be classified as extinct species in the Carpathians.

So far, 20 amphibian and reptiles species have been recognised as characteristic and endangered for the Carpathian Ecoregion, from a total of 31 known Carpathian species. Two species, Aesculapian snake (*Elaphe longissima*) and Carpathian Newt (*Triturus montandonii*) were selected as flagship species. Other focal species are Green lizard (*Lacerta viridis*), Moor

frog (*Rana arvalis*), Fire-bellied toad (*Bombina variagata*), European tree frog (*Hyla arborea*) and Swamp turtle (*Emys orbicularis*).

There are 302 bird species occurring in the Carpathians (nesting, migrating or wintering), and 22 species have been selected as threatened and characteristic for the Carpathian Ecoregion. There are six species suggested as flagship bird species for the Carpathians: Lesser Spotted Eagle (*Aquila pomarina*), Imperial Eagle (*Aquila heliaca*), Ural Owl (*Strix uralensis*), White-backed Woodpecker (*Dendrocopos leucotos*), Capercaillie (*Tetrao urogallus*), Corncrake (*Crex crex*). Main factors of human interference with bird populations in the Carpathians are habitat fragmentation, habitat alteration, tourism or recreation, hunting and human persecution. Nest robbery is also a serious problem in the region.

There are 68 species of mammals identified under the categories "extinct" "endangered" "threatened" or "rare" amongst those recorded in the Carpathians. This includes four species of large carnivores (brown bear, lynx, wolf and wild cat) and three large herbivores (European bison, moose, chamois).

Two species, aurochs (an ancient species of cow) and tarpan (a forest horse), are actually extinct over the whole range. Nevertheless, the Carpathian ecoregion maintains almost a complete European megafauna (set of large animals). This is the last region in Europe (outside Russia) to support viable populations of large carnivores, which were previously found throughout Europe. It is estimated that about 7000 brown bears (*Ursus arctos*), 3900 wolves (*Canis lupus*), 2400 lynx (*Lynx lynx*), 3400 otters (*Lutra lutra*) and numerous wildcats (*Felis silvestris*) inhabit the region. The general trend in numbers of mentioned species in the region is either stable or slightly increasing. The numbers of large carnivores is ten-twenty times greater than in the Alps. The Carpathian mountains are crucial because they are the main source of large carnivores in Europe and probably the only active corridor for genetic exchange between the continent's wolf populations.

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The population of free ranging European bison (*Bison bonasus*) is the only one inhabiting the mountain habitats of Europe. Other key mammal species are beaver (*Castor fiber*), marmot (*Marmota marmota*), Tatra pine vole (*Pitymys tatraicus*), lesser horseshoe bat (*Rhinolophus hipposideros*), chamois (*Rupicapra rupicapra*) and alpine shrew (*Sorex alpinus*). Major threats to the further existence of mammal fauna in Carpathians are habitat loss, habitat fragmentation and locally massive poaching.

The natural diversity supported by the Carpathians is of vital importance for Europe. On a continent where 56% of forest cover has been lost and only 2% of the remaining natural forest is protected, the Carpathians support Europe's most extensive tracts of montane forest, the continent's largest remaining natural mountain beech and beech/fir forest ecosystems and the largest area of virgin forest left in Europe. Together with semi-natural habitats such as montane pastures and hay meadows, which are the result of centuries of traditional management of the land, the Carpathians have a richness of natural diversity that is unsurpassed in Europe.

Threats to this region, especially in terms of infrastructure and transport development, illegal and unsustainable logging and habitat degradation and fragmentation have an unprecedented potential to exacerbate biodiversity loss over the next few years if conservation cannot be proven to improve livelihoods in this region at all levels of society. Unsustainable rural development represents one of the key threats, because traditional, less intensive and sustainable farming practices are threatened by abandonment in the highlands and intensification in the lowlands, which could mean also the lost of an irreparable cultural heritage and lifestyle.

Land privatisation and restitution are also resulting in activities that maximise short-term gain above all else, which is in most cases leading to pressure on the environment. Activities, such as the increased cropping on unstable slopes that increases erosion, or the clearing of small privately owned forests causes serious problems, while forest restitution introduces

new owners and administrators, which yet need to learn and implement sustainable forest management practices. Protective measures are often inadequate because of weak legislative framework in the region. The lack of financial resources for the enforcement of existing legislation leads to corruption, illegal logging and poaching. Unsustainable tourism represents an important opportunity for rural development for the region, able to bring significant potential benefits to both rural environments and economies in the future, but it can represent a real threat if it is not properly planned and developed. Poverty and unemployment have generally increased and rural decline has led to the rise of an informal economy in many areas and an increase in unsustainable natural-resource management practices such as overgrazing, intensified forestry, the illegal cutting of woodlands and high levels of hunting. New investments – mainly in roads, hydro-electric schemes and tourist facilities – are currently concentrated in the north of the region, but these are starting to have a serious impact on biodiversity, particularly through fragmenting and isolating the ecoregion. Public dialogue over conservation is still at a formative stage, but it is evident that good ideas appreciated by local government and conservation groups often lack the financial and legislative support required to carry them through.

### Case study: The wolf

#### Introduction

The Carpathians are the last remaining stronghold in Europe for the grey wolf (*Canis lupus*). In total, the wolf population amounts to 4000 individuals (45% of Europe's population) and the Carpathians provide the only link between Europe's northern and southern populations. Wolves play an essential role in the life of the region, controlling numbers of prey species like red deer. Hunting the wolf and protecting sheep has shaped the lives of highland communities for centuries. Yet the wolf's role as a hunter still brings them into conflict with local people. As shepherds in some parts of the region respond to a drop in rural incomes by increasing livestock numbers,

## Carpathian Biodiversity

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this can only increase. The strong tradition of hunting wolves in the region continues today and protective legislation remains contradictory. In the 1950s and 60s, an “antiwolf” campaign in Romania dramatically reduced their numbers; only the remoteness of the mountains saved them from further decline. As this unique population attracts increasing international attention, awareness of the need to conserve the wolf is growing in Central and Eastern Europe. (*Taken from Webster et al., 2001*)

### Exercise 1 - Discussion

Start a discussion regarding “Pros and Cons” for wolf and its presence in the Carpathians:

Benefits	Disadvantages
Wolves are important part of global biodiversity, and as such must be protected	Prevalent public opinion is that wolf is a very dangerous animal
It plays important role in controlling numbers of prey species populations	
Wolf preys mostly on sick, defect and wounded animals, which makes him an important tool of natural selection	It often preys on domestic animals, and can cause significant damage in rural areas if its numbers significantly increase
By feeding with sick animals and carcasses, wolf is important in preventing disease outbreaks	
Wolves are beautiful animals with great potential for ecotourism development	

### Exercise 2 - Workshop

Participants should try to develop a text for a leaflet, which should explain why is the wolf important part of Carpathian region biodiversity, and why it should be protected. Participants can use statements from exercise 1 as starting points. Target group for a leaflet should be members of Carpathian local communities, especially those engaged in shepherding.

### Exercise 3 – Brainstorming

Conduct a “brainstorming” session on following topic: What are possible activities that nongovernmental organizations and local communities could do, in order to improve condition of wolf populations and

protect them? After the initial brainstorming, participants should choose several most promising ideas and then try to develop them further. After the end of this session, participants should read the section “Successful example” and discuss.

### Successful example

Nongovernmental organization from Czech Republic, “Hnutí DUHA Olomouc” (Friends of Earth Czech Republic) have conducted a Large Carnivore Project, aimed at enabling return of large predators to areas of their original existence in Beskidy Mountains (West Carpathian Mountains). The species of major concern were the grey wolf, the lynx and the brown bear. After their complete extermination in this area in

early 1900s they started to return, but poaching remained a main threat for their survival. Project consists of two interconnected parts. First encompasses so called “Wolf Patrols” - monitoring, actions against poaching, removal of traps and mapping. Second part is focused on education and raising public awareness.

“Wolf Patrols” are small groups (2-4 members) of trained volunteers who oversee the selected area and act as guards against illegal hunting and trapping. During 2006, over 50 people joined fieldwork after the necessary training. They were conducting monitoring, placement of signposts “This area is watched by Monitoring Patrols” near shooting stands, and removal of illegal baits (which numbers were falling due to Wolf Patrols activities).

## Carpathian Biodiversity

A web page about large carnivores and their protection was also developed ([www.selmy.cz](http://www.selmy.cz)).

Organization announced the reward of 50.000 Czech crowns for the person who informs them about poaching, and distributed about 25.000 leaflets with this information in Carpathian villages. (*Taken from Kutal, 2006*)

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## SUSTAINABLE MANAGEMENT OF PROTECTED AREAS

Participants of the IV World Congress on National Parks and Protected Areas, meeting in Caracas, Venezuela, in February 1992, concluded that more and better protected areas were urgently required. According to the proceedings from this meeting, protected areas are about meeting people's needs and not just preserving nature per se. Protected areas must be set in a regional planning context and this should be part of every country's strategy for sustainable management and sustainable use of its natural resources.

Protected area is "an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means" (IUCN 1994a).

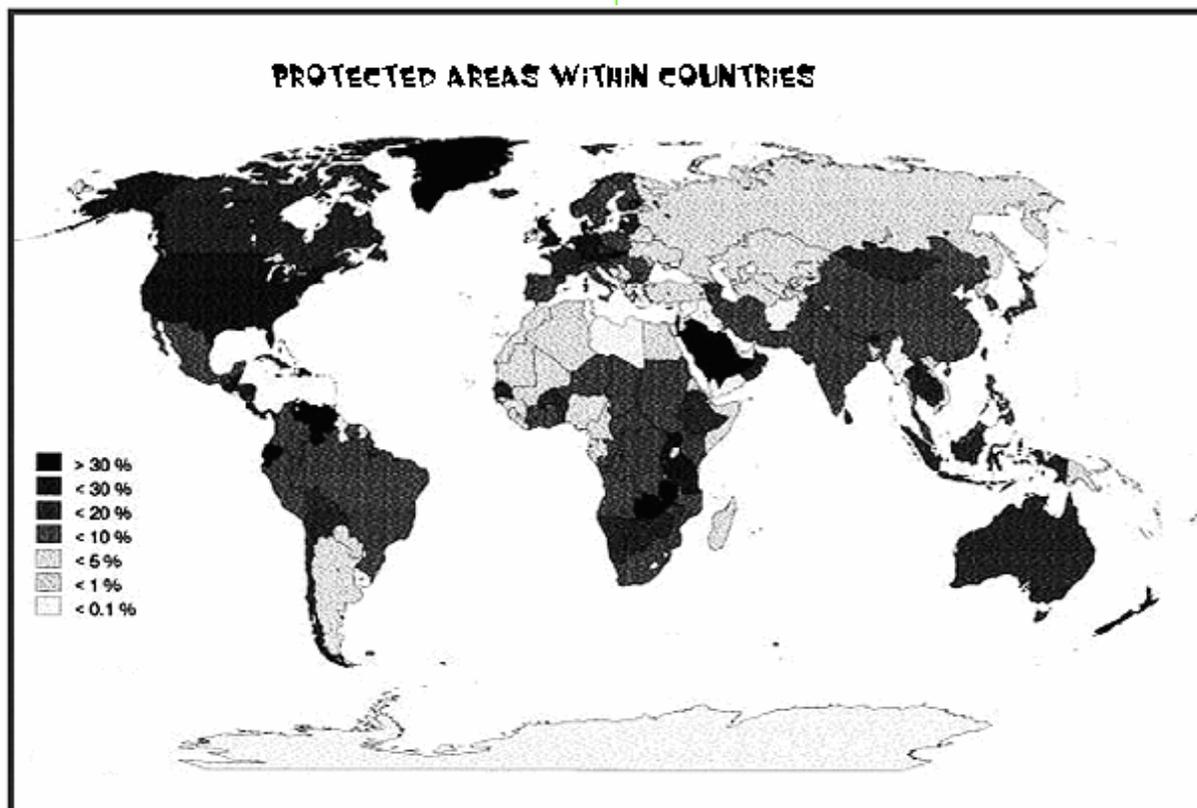
Total number of protected areas in the World is now over 30.300 with over 13.2 million hectares covering 8.84% of the world's land area

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(Green and Paine, 1997). Both number and area have expanded greatly in recent decades – about two thirds of the protected areas having been established within the last 30 years. There has also been a significant increase in the number of countries with protected areas. An overall and widespread concern for conservation and the growing political, social and economic significance of environmental issues, led to the signing of the Convention on Biological Diversity (1992).

However, commensurate developments of management capacities did not follow rapid growth in protected areas (Figure 1). Allocation of land and/or water to protected status has often not resolved (and in some cases has heightened) conflicts over access, use or control of the areas concerned. Economic recession and hardship have thrown such issues into sharper focus in recent years.



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Protected areas will only prosper if they enjoy broad public support. This support comes in the same line with meeting people's fundamental needs. Land use and resource management conflicts, inequities or impacts do not go away simply because an area is given protected status. When they are established by nation states or related entities, protected area boundaries often reflect considerations of sovereignty, governance and tenure as much as the environment types they seek to protect. Txic planning and management of protected areas must be coordinated with the use and management of other areas rather than treated in isolation. The long term success of protected areas must be seen in the light of the search for more sustainable patterns of development in general.

System planning offers a more practical way of putting protected areas management into this wider context.

Protected area system plans are called for under Article 8 of the Convention on Biological Diversity (Glowka *et al.*, 1994), in which protected areas are identified as having an important role in the conservation of biodiversity. The specific requirements of the Convention are set out in Box 2.

Box 2. Specific requirements relating to protected areas in the Convention on Biological Diversity; articles 8(a) and (b)

“(a) Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity;

(b) Develop, where necessary, guidelines for the selection, establishment and management of protected areas where special measures need to be taken to conserve biological

Thus, governments have now agreed a clear mandate under the Convention for coordinated protected area planning at the national levels. *The system plan* is a means of carrying this out, for protected areas also serve many functions other than biodiversity conservation. It is essential that protected area system planning be integrated with national biodiversity strategies, national conservation strategies, sustainable development

strategies and other national-level planning (e.g. Nelson 1987).

Although there is no one model which is universally appropriate, a number of countries have developed system plans in recent years. Examples include Canada (Canada, Environment Canada 1991; see also Appendix 3.1), the Dominican Republic (Republica Dominicana. DVS 1990), India (Rodgers and Panwar 1988), Laos (Salter and Phanthavong 1989; see also Appendix 3.2), Saudi Arabia (Child and Grainger 1990), Venezuela (Venezuela, MARNR 1989) and Western Samoa (Pearsall and Whistler 1991). System planning does have an extensive body of knowledge and field experience on which to build (Hart 1966, Forster 1973, Mackinnon *et al.*, 1986, Thorsell 1990, Kelleher and Kenchington 1991, McNeely and Thorsell 1991, Harrison 1992, Lucas 1992, Poore 1992, Harmon 1994, IUCN 1994a), as well as an extensive technical literature in conservation biology and conservation evaluation.

The core idea of protected area system planning is simple enough – that effective planning and management of protected areas requires a coordinated approach, both with respect to the various units within the system, and with other land uses and management activities.

### The IUCN protected area management categories

In the light of experience, and the new definition of protected areas (IUCN 1994a), the IUCN scheme of graded protected area types has been revised and simplified by WCPA into six categories according to their primary management objectives as follows:

#### I. Strict protection:

- a) Strict Nature Reserve;
- b) Wilderness Area.

#### II. Ecosystem conservation and recreation (National Park).

#### III. Conservation of natural features (Natural Monument).

#### IV. Conservation through active management (Habitat/Species Management Area).

#### V. Landscape/seascape conservation and recreation (Protected Landscape/ Seascape).

#### VI. Sustainable use of natural ecosystems (Managed Resource

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### System Planning

In a general sense, system planning is an organized approach to macro-level planning. It is not a new concept, but builds on existing knowledge and approaches. System planning is a framework for understanding and using systems ideas. It is also a vehicle for convincing others. It is much more than data gathering. It must be a dynamic process. It is a means, not an end. Figure 2 lists the main uses to which a system plan can be put.

The uses of a national system plan for protected areas

- ✓ clarifying objectives;
- ✓ promoting achievement of objectives;
- ✓ identifying options and their implications;
- ✓ encouraging systematic evaluation of options;
- ✓ increasing understanding of issues;
- ✓ defining of future management issues;
- ✓ predicting and orienting future actions;
- ✓ identifying priorities for investment;
- ✓ coordinating a range of inputs;
- ✓ building and sustaining commitment;
- ✓ creating and maintaining partnerships; and
- ✓ establishing a baseline for evaluating future action, and for monitoring.

When system planning is applied to protected areas, it aims to maximize the desirable characteristics of a national protected area system. This should be done in a way which recognizes prevailing conditions in each country arising from its environmental inheritance, history, social, political, economic and cultural context.

In relation to protected areas, system planning is about:

- ✓ defining the priority of protected areas as a worthwhile national concern; defining the relationships between (a) different units and categories of protected areas; and (b) protected areas and other relevant categories of land;
- ✓ taking a more strategic view of protected areas;

- ✓ defining roles of key players in relation to
- ✓ protected areas and the relationships between these players; this may include building support and a constituency for protected areas (i.e. as a means to that end, not as an end in itself);
- ✓ identifying gaps in protected area coverage (including opportunities and needs for connectivity) and deficiencies in management; and
- ✓ identifying current and potential impacts – both those affecting protected areas from surrounding lands and those emanating from the protected areas which affect surrounding lands.

A system plan is a statement and a set of ideas. It will usually be in one or more documents, and should incorporate maps and relevant background information. It has descriptive and strategic elements – characterizing the present and charting a pragmatic way forward to a clearly stated future. The plan should provide guidance on mechanisms, institutions and procedures for coordinating protected areas with other aspects of land use and social development in the country concerned. It must identify relevant means of co-ordination between central and decentralized levels, and between different regions and individual protected areas. It should describe current and proposed protected areas, their condition and the management challenge which they present. It may also need to identify the mandate for, or argue the legitimacy of, protected areas as a priority concern in the context of that country. It should spell out the responsibilities and processes for developing, funding and managing the system and for coordinating its components.

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### Why system planning?

The major threats to conservation in most countries lie outside the protected area system. Unless the linkages between protected area management and external factors are identified and addressed, fundamental conservation issues are difficult to resolve.

Protected area system plans cannot therefore focus solely on protected areas, but must address broader issues of concern to society. The reasons for taking a systems approach to planning are listed in Figure 3.

- ✓ to relate protected areas to national priorities, and to prioritize different aspects of protected area development;
- ✓ to facilitate access to international and national funding, by defining priorities for investment in protected areas and increasing the level of confidence in the efficient use of funds and resources;
- ✓ to get away from a case by case, *ad hoc*, approach to resource management decision making;
- ✓ to target proposed additions to the protected area estate in a more rational and persuasive manner than *ad hoc* planning;
- ✓ to facilitate integration with other relevant planning strategies, such as those for national tourism, national biodiversity conservation or sustainable development;
- ✓ to help resolve conflicts, assist in making decisions relating to trade-offs, clarify roles and responsibilities of different stakeholders, and facilitate diverse stakeholder involvement;
- ✓ to provide a broader perspective for addressing site-specific issues, such as tourism management;
- ✓ to enhance the effectiveness and efficiency of the way in which budgets are developed and spent;
- ✓ to assist in meeting obligations under international treaties;
- ✓ to assist countries to be more proactive in conservation management, and in developing effective protected area systems;
- ✓ to encourage consideration of a “system” which incorporates formal protected areas and areas outside of protected areas;
- ✓ to provide a structured framework for a system of protected areas, ranging from areas managed for strict conservation to areas managed for a range of conservation and appropriate ecologically-sound activities;
- ✓ to assist protected area agencies to build political support for protected areas as a worthwhile concern;
- ✓ to define a better process of decentralization and regionalization of protected area activities, resources and responsibilities, including the involvement of NGOs and the private sector; and

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A system approach improves the probability of substantial progress in conservation. It also promotes a truly integrated approach to linking conservation with other human endeavours.

A system plan will not of itself remove obstacles to progress in biodiversity conservation, community development or protected area management, but if the key issues have been addressed in an appropriate way it should facilitate their removal and should help clearly identify the priorities. A plan cannot create an effective protected area system overnight, nor can it produce immediate change in factors which may be compromising conservation status or management performance. It is, however, a potentially powerful tool and an essential step in achieving these ends. Figure 4. lists some of the factors which might lead to an ineffective or unworkable system plan.

- ✓ they do not specify assumptions, rationale and criteria;
- ✓ they do not address key issues;
- ✓ they fail to involve stakeholders;
- ✓ they cover issues in too much detail;
- ✓ they cover too many areas and issues;
- ✓ they rely too much on “external experts” and fail to involve local people;
- ✓ they are weak on implementation;
- ✓ they fail to raise political support for protected areas as a worthwhile concern;
- ✓ they are poorly publicised;
- ✓ they are overambitious and ignore budget constraints; and
- ✓ they rely too much on external support and/or funding.

### Protected area systems

#### Characteristics of a system

Protected areas are a key part of *in situ* conservation under the Convention on Biological Diversity, but no protected area will succeed if managed in isolation. There are biological, social and economic connections between different places and different system components; moreover, the processes of interaction are complex and dynamic. By switching the focus from individual protected areas to looking at the relation-

ships between them, and putting the whole protected area network into its broader context, system planning provides the means for ensuring that the total significance and effectiveness of a national protected areas system is much more than the sum of the parts.

There are at least five key characteristics of a system of protected areas:

- ✓ representativeness, comprehensiveness and balance;
- ✓ adequacy;
- ✓ coherence and complementarity;
- ✓ consistency; and
- ✓ cost effectiveness, efficiency and equity.

While these characteristics define a system overall, they also serve as criteria against which individual areas can be assessed for their potential or actual contribution to the system relative to other areas. The balance between the criteria is unavoidably subjective and dependent on the circumstances of each country. The criteria are closely linked and cannot be considered in isolation from one another. In applying these criteria, and selecting system components, consideration should be given to questions of irreplaceability and flexibility.

Representativeness, comprehensiveness and balance

*Including highest quality examples of the full range of environment types within a country; includes the extent to which protected areas provide balanced sampling of the environment types they purport to represent.*

This applies particularly to the biodiversity of the country (at relevant levels, such as genetic, species and habitat), but should also apply to other features such as landform types and to cultural landscapes. Since it is most unlikely that any one protected area could be representative of the full range of biogeographic diversity within a single country, representativeness will nearly always require the development of a network of individual protected areas.

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In some parts of the world, existing protected area systems give too much attention to charismatic fauna, or spectacular scenery, and not enough to covering the full suite of plant and animal species which are characteristic of particular ecological zones.

Often existing protected areas do not sample biodiversity in any systematic way, having been created in an *ad hoc*, opportunistic fashion. In many countries, there appears to be a need for fresh surveys to identify the environment types and biodiversity at the national level, with a view to re-designing protected areas, so as to maximise representation of biodiversity and of natural and related cultural landscapes

Biome		Protected Area		
Name	Area (km <sup>2</sup> )	Number	Extent (km <sup>2</sup> )	% Biome Protected
Tropical humid forests	10,513,210	1,030	922,453	8.77%
Subtropical/temperate rain forests/woodlands	3,930,979	977	404,497	10.29%
Temperate needle-leaf forests/woodlands	15,682,817	1,492	897,375	5.72%
Tropical dry forests/woodlands	17,312,538	1,290	1,224,566	7.07%
Temperate broad-leaf forests	11,216,659	3,905	403,298	3.60%
Evergreen sclerophyllous forests	3,757,144	1,469	164,883	4.39%
Warm deserts/semi-deserts	24,279,843	605	1,173,025	4.83%
Cold-winter deserts	9,250,252	290	546,168	5.90%
Tundra communities	22,017,390	171	1,845,188	8.38%
Tropical grasslands/savannas	4,264,832	100	316,465	7.42%
Temperate grasslands	8,976,591	495	88,127	0.98%
Mixed mountain systems	10,633,145	2,766	967,130	9.10%
Mixed island systems	3,252,563	1,980	530,676	16.32%
Lake systems	517,695	66	5,814	1.12%
<b>TOTAL</b>	<b>145,605,658</b>	<b>169,636</b>	<b>9,489,665</b>	<b>6.52%</b>

(see Table 2).

Table 2. Extent and protection of the world's major biomes

Source: Green, M.J.B. and Paine, J.R. (1997).

To assess representativeness, it is necessary to compile one or more relevant classifications of types. The main requirement is that the typologies be appropriate to the scale of planning, and that they be based on the best available science. It also helps if a typology relates to an established international scheme (e.g. Udvardy 1975). The conclusions will always be sensitive to the classification used, so alternative analyses using different schemes and/or using different numbers of classes within the same general scheme should be tested or synthesised. Even in countries with detailed resource inventories and substantial research capacity, classification schemes are capable of refinement, and in that sense remain provisional. Computer-based methods make it much easier to assess the implications of different classifications; the desirable iterative analyses are usually impractical by any other method.

It is then necessary to identify the areas which might be available as examples of each environment type. While it is simplest to identify for presence-only (regardless of the area of the type contained), it is usually desirable for reasons of adequacy (see below) to undertake the analysis using an appropriate range of threshold criteria – such as 1, 2, 5, or 10% of the total extent of the environment type contained within the candidate area – or as defined by a single threshold level at the outset. In all cases, the threshold level is essentially arbitrary, or at best defined by other criteria such as adequacy and management practicality. The candidate areas then need assessment as to their relative qualities, taking account of the extent of each environment type contained within them, their condition and integrity considerations.

Complementarity (the extent to which a candidate area adds to achievement of the representational objective overall) may be more important than high species diversity.

There is an extensive technical literature on this subject. Mackinnon *et al.*, (1986) remains an excellent overview, but should be read in association with more recent contributions (e.g. Margules *et al.*, 1988, 1994, Theberge 1989, Bedward *et al.*, 1992, Belbin 1992,

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Pressey and Logan 1994, Peres and Terborgh 1995, Caughley and Gunn 1996). It may be necessary to combine assessments of reserve coverage which are based on environmental representational objectives (the biogeographic approach) with assessments based on species and habitat conservation objectives (the key species approach). However, a reserve system should not be designed to be representative alone. It should also take account of the need to give protection to refugia areas, rare species habitat, breeding habitat of migratory species and landform features.

### Adequacy

*Integrity, sufficiency of spatial extent and arrangement of contributing units, together with effective management, to support viability of the environmental processes and/or species, populations and communities which make up the biodiversity of the country.*

A wide range of issues must be considered in selecting between alternative designs of national protected area systems. The final location, size and boundaries of contributing areas will be influenced by factors such as (for example, see Figure 1):

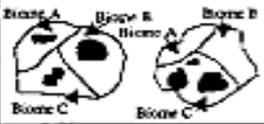
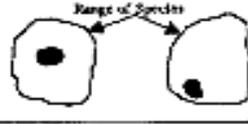
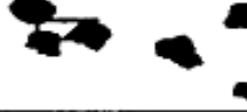
QUESTION	CONSERVATION OBJECTIVE			
	Maintenance of representativeness better worse	Maintenance of ecological processes better worse	Maintenance of maximum species richness better worse	Maintenance of viable populations better worse
Where?				
How big?				
How many?				
Trade-offs? Size vs No. (SLOIS)				
How close/ how connected?				
Shape?				

Figure 1 Guidelines for the selection and design of protected areas

## SUSTAINABLE MANAGEMENT OF PROTECTED AREAS

*Guidelines for the selection and design of protected areas in relationship to four objectives for conserving living resources. The preferable guideline for the selection and design of protected areas in relationship to the conservation objectives and the question of design is presented under the column labeled “better,” whereas the less preferable guideline is presented under the column labeled “worse”.*

*Source: Lusigi, 1992.*

- ✓ habitat/area requirements of rare or other species and their minimum viable population sizes;
- ✓ connectivity between units (corridors) to permit wildlife migration, or occasionally isolation to minimise transfer of disease, predators and the like;
- ✓ perimeter/area relationships;
- ✓ natural system linkages and boundaries – e.g. watersheds (surface and groundwater), volcanism, ocean currents, aeolian or other active geomorphic systems;
- ✓ accessibility to undertake management operations or inaccessibility to deter potentially impacting activity;
- ✓ existing degradation or external threats;
- ✓ traditional use, occupancy and sustainability; and
- ✓ cost of achieving protected area status (most commonly land acquisition, compensation or transfer costs, or costs of establishing co-management mechanisms).

### Coherence and complementarity

*Positive contribution of each site towards the whole.*

Each site needs to add value to the national system of protected areas, in quality as well as quantity. There is little point in increasing the extent or number of protected areas unless this brings benefits at least in proportion to the costs.

### Consistency

*Application of management objectives, policies and classifications under comparable conditions in*

*standard ways, so that the purpose of each unit is clear to all and to maximise the chance that management and use support the objectives.*

Consistency focuses on the links between objectives and action. One of the main purposes of the IUCN protected areas management classification is to promote a scheme of protected area types based on management objectives, and emphasising that management should flow consistently from those objectives.

### Cost effectiveness, efficiency and equity

*Appropriate balance between the costs and benefits, and appropriate equity in their distribution; includes efficiency: the minimum number and area of protected areas needed to achieve system objectives.*

The establishment and management of protected areas is a kind of social contract. They are set up and run for the purpose of realising certain benefits for society. People will therefore need to be assured that they are effective, represent value for money, and are managed in a way which is equitable in terms of their impact on communities.

### System components and interactions

Integrating system plans into the international context

The overriding objective of a National System Plan is to increase the effectiveness of *in situ* biodiversity conservation. IUCN has suggested that the long term success of *in situ* conservation requires that the global network of protected areas comprise a representative sample of each of the world's different ecosystems. In order to maximise the efficiency with which this is done, a global view is needed.

For example, if a country no longer has a significant proportion of its old growth forests remaining, it will be necessary to compensate for this shortfall by protecting a relatively larger proportion of such forests in neighbouring countries. So it is important that effective national system planning promotes cooperation between States.

## SUSTAINABLE MANAGEMENT OF PROTECTED AREAS

Viewing the National System Plan in an international context may also help identify opportunities to increase conservation efficiency through cooperation. Among other things, the lessons learned from island bio-geography research have taught us that a few large protected areas more effectively conserve biodiversity than a series of small ones. As a result, transboundary protected areas may offer opportunities to increase the effectiveness of protected areas, and at a lower cost.

Therefore, it is necessary that each country's system plan acknowledge the conservation needs of the region, and especially those areas of land and sea that adjoin neighbouring States. Possibilities for cooperative approaches should be identified and joint conservation initiatives should be fostered, especially the creation of transboundary protected areas. Among other benefits, international collaboration:

- ✓ efficiently complements the conservation efforts of both countries;
- ✓ promotes better relations between the states (e.g. "Peace Parks"); and
- ✓ facilitates the sharing of information, experience and training capacity.

Although informal arrangements between States can and occasionally do result in collaboration, experience has shown that it is preferable to pursue formal accords. Such commitments can be facilitated by the existing framework of international cooperation. The Biological Diversity, World Heritage, and Ramsar Conventions, initiatives such as WWF's Global 200 Project, UNESCO's Man and the Biosphere Programme, and organisations such as IUCN's World Commission on Protected Areas provide leadership for international cooperation. Agreements made under the Convention on Migratory Species and the Pan European Biodiversity and Landscape Strategy provide specific examples of how international coordination can be organised and formally endorsed at the regional level.

### Bio-regional planning

Within each country the fundamental aim of conserva-

tion should be the care of **all** land and water. Thus, while these guidelines relate to protected areas, it is important not to lose sight of the many links to land use planning and sustainable economic and social development at a broader scale. Bio-regional planning provides a means of making those connections (see, for example, Miller 1996). This approach looks beyond the boundaries of strictly protected areas, to include the establishment of buffer and support zones around them, the creation of corridors of ecologically-friendly land use between them and the restoration of areas which have lost their ecological value. In this way, bio-regional planning can help to strengthen protected areas and place them within a national strategy for conservation. Many of the ideas promoted through bio-regional planning have of course been given more concrete forms through biosphere reserves (see, for example, UNESCO 1996 and Batisse 1997).

A national system plan for protected areas should therefore address the needs of protected areas in the broader context offered by bio-regional planning.

IUCN Protected Area Management Categories

The IUCN scheme provides a range of available categories of protected areas, each suited to particular needs and each capable of contributing towards regional, national or international goals of biodiversity conservation. Each category offers different potential in managing the interaction between the protected area and its community and environmental context, thereby producing different benefits for the country. Units in a national protected area system falling under one category thus support those in other categories; and each needs to be planned in conjunction with those in other categories.

Most countries have a considerable number of protected areas. Overviews of the range of units, their management classification and status are available at global or regional levels (IUCN 1992b, 1994b, McNeely *et al.*, 1994), but it is common for there to be limited systematic appraisal at a national level. Under the former (IUCN 1978) classification scheme (compared with IUCN 1994),

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it was likely that a large number of protected areas in many countries were misclassified (in the sense that the category to which they were assigned did not reflect their primary purpose).

The adoption by IUCN of the 1994 category guidelines called for a fresh look at the most appropriate classification for each unit within the system. It is widely recognised that there is scope for greater application of the more flexible categories (IUCN 1994), especially V (protected landscape/seascape) and VI (managed resource protected area). A national system plan should clearly identify the links between that country's scheme and all six categories of the IUCN classification.

decision-making processes for management of protected areas, forestry reserves or other management category for biodiversity conservation

### Barriers:

Lack of will or culture to open decision making processes

Lack of leadership

Mistrust, and lack of culture to participate

Lack of trained managers in identification of stakeholders

Lack of trained managers in techniques on information

### Box 4. IUCN Protected Area Management Categories

I Strict protection:

a) Strict Nature Reserve;

b) Wilderness Area.

II Ecosystem conservation and recreation (National Park).

III Conservation of natural features (Natural Monument).

IV Conservation through active management (Habitat/Species Management Area).

V Landscape/seascape conservation and recreation (Protected Landscape/ Seascape).

VI Sustainable use of natural ecosystems (Managed Resource Protected Area).

### ACTION PLAN PLANING FOR MANAGEMENT OF PROTECTED AREAS

**GOAL:** Determine the effectiveness, transparency, and involvement of stakeholders in participatory

gathering, analysis and use

### Benefits:

Decisions making processes are developed with the required stakeholders with transparency

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Information and input from stakeholders is analyzed, and taken into consideration for decision making

Ownership and acceptance of decisions improves

ACTIONS	INDICATORS OF SUCCESS	RESOURCES NEEDED
1. Develop an instrument to monitor the participation of stakeholders	- Instrument designed	Partners, contractors
2. Develop the procedures and protocols for application of instrument; and develop a structure to collect data.	- Procedure/protocols developed	Partners, contractors
3. Carry out a training activity for managers in stakeholders identification	- # of managers trained - List of stakeholders participating in meetings	\$ for training activity, \$ for participatory meetings, for publications, for individual meetings
4. Carry out a training for managers in techniques on information/input gathering, analysis, and use	- Responses/points of view/inputs to information disseminated, visits, meetings are collected, analyzed and used - # of surveys to key stakeholders and managers done	\$ for training activity, time for surveys

### Stakeholders:

Stakeholders	Positive	Negative
Communities	- Their ideas and needs are taken into consideration - To be part of the process	Some decisions can affect their interests, and access to resources
Government organization	- To gain credibility, support and collaboration - To receive input from others - Accountability	Accept points of view that may not be in accordance with their plans or ideas
NGO/local organizations	- To have an opportunity to provide input - To work more in partnership	
Municipalities	- To form partnerships - Look for a win - win situation	Accept points of view that may not be in accordance with their plans or ideas
Private sector	- To have an space in discussions to express their points of view - To have confidence in the process	Some decisions can affect their interests and access to resources

### Notes:

Transparency means to share information, to have open discussions, to have records of comments, inputs, etc.

## SUSTAINABLE MANAGEMENT OF PROTECTED AREAS

### IMPLEMENTATION OF INTERPRETATION AS MANAGEMENT TOOL IN NATURAL AND CULTURAL RESOURCES CONSERVATION.

#### Introduction.

Regarding natural and cultural resources conservation, there are two types of communities: community living around Protected Areas (PA) buffer zone (50 Km from PA limits and therein PA) and, community living other natural zones and towns. The first is constituted mainly with native people; the second, with different social layers. In the buffer zone, ICCN is intended to manage wildlife, forest and hunting. In different ways, Ministries of Environment, Nature Conservation, Water and Forests, and of Agriculture work in the same area but having different perspectives from those of Nature Protection Area Management (NPAM).

For long time, NPAM had been worked without caring of communities described above. Consequently, they have been exploited natural resources they depend upon to such extent resources get in scarcity to cope their survival needs. As result, they usually break law by entering the PA to extract natural resources. In a recent past, there are people buying valuable cultural statues. Communities ignore the value of their cultural sites and, to some extent, of their own culture as a part of universal heritage.

In order to respond to this situation, NPAM has relatively recently initiate Community Conservation Based Program. This program deals especially with environmental education/sensitization and, with socio-economic micro projects. During the years of bad socio-economic situation, despite the intensive environmental/sensitization activities directed towards communities and benefices they have been from the program, most of them destroyed PA natural resources today still, as they do not have stronger emotional and intellectual connection that interpretation uses to create between communities (audience) with resources. Dealing specially with ecosystems and their biotic components, environmental education/sensitization does not

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establish such a connection. Moreover, by indirect means, interpretation allows to make a balance between tourism development activities and natural and cultural resources conservations.

Therefore, interpretation (lectures and teaching-learning set of activities) is needed to be set up as management tool in natural and cultural resources conservation equally as other tools: research, monitoring, law enforcement, community conservation based program and tourism.

Action Plans on interpretation will make communities to be more awareness and conservation committed/supported regarding natural and cultural resources issues.

In so doing, it aims to contribute to the improvement of both resources conservation.

**Goal: To set up interpretation as natural and cultural resources management tool.**

**Objectives.** There are three objectives:

- (1). To include, in conservation legislation framework, interpretation as natural and cultural resources conservation management tool.
- (2). To arise, throughout interpretation, emotional and intellectual connection between community and resources and, the values of these resources.
- (3). By the fulfillment of objectives (1) and (2), to significantly contribute to the improvement of natural and cultural resources conservation.

**Constraints or barriers.**

- (1). Political will good and support.
- (2). Communities engagement and implication.
- (3). Financial and humane resources.
- (4). Security conditions.

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Matrix.

Table n°1: Objective 1.

Activities	Indicators of success	Resources Needed
<b>Objective 1.</b>	<b>Interpretation has been integrated in national legislation as natural and cultural resources management tool and applied effectively</b>	<b>1.Financial and human resources</b>
1.1.Provision of a best deep understanding of interpretation: history, theory, techniques and impacts	Government, Politicians, Communities had understood what interpretation is and its usefulness	1.Financial resources 2.Professors/ interpreters
1.2. Lobbying for the incorporation of interpretation as management tool in the reviewing legislation in process	Interpretation has been incorporated in conservation legislation framework	1.Financial resources 2.Lawyers 3.Biologists 4.Professors/Interpreters
1.3. Integration of interpretation in Environment, Nature Conservation, Water and Forests, Art and Culture and, Tourism Ministries and ICCN structures	Structure Chart of the relevant Ministries and NPAM with interpretation therein and effective use of interpretation	1.Financial resources 2.Ministers, NPAM general Director/Manager, interpreters, Managers

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Table n°2: Objective 2.

Activities	Indicators of success	Resources Needed
<b>Objective 2.</b>	<b>Communities have understood natural and cultural resources values, support their conservation through an effective participation way</b>	1. Financial and human resources
2.1. Recruitment of new personal	Interpretation program has been effective	1.Financial resources 2.Human resources: interpreters, psychologists, ethnologists, archeologists, geologists, anthropologists, sociologists, biologists
2.2.Training of trainers, managers and communities members	Trainers, managers and communities' members have been trained.	1.Financial resources 2.Universities professors 3.Materials
2.3. Involvement of personal interpretation	Communities become very natural and cultural resources conservation supported and committed: existence of local conservation NGO, increasing conservation volunteers number Politics support	Idem
2.4. Involvement of non personal interpretation (brochures, exhibits, signs, audiovisual shows...)	Communities become very natural and cultural resources conservation supported and committed: existence of local conservation NGO, increasing conservation volunteers number Politics support	Idem
2.5. Refreshment course	Trainers, managers and communities' members are more efficient than before	1.Financial resources 2.Professors 3.Materials
2.6. Tourism lobbying/marketing	Increase tourists number Increase incomes from tourism activities	
2.7. Restoration and/ or Identification of cultural sites	Existing cultural Sites had been restored, others identified, restored and opened to tourism	1.Financial resources 2.Ingeners 3.Archiologists 4.Geologists 5.Communities leaders
2.8. Construction of museums	Museum have had been constructed	1.Financial resources 2.Ingeners 3.Archeologists 4.Geologists
2.9. Tourism incomes sharing	Communities standing of live has been increased through tourism incomes shared system	1.Financial resources 2.Educated/trained people

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Table n°3: Objective 3.

Activities	Indicators of success	Resources Needed
<b>Objective 3.</b>	<b>Conservation of natural and cultural resources has been improved</b>	<b>1.Financial and human resources</b>
3.1. Activities 1.2, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4, 2.5 & 2.6.	Poaching, encroachment, deforestation had been considerably reduced See other indicators related to objectives 1 & 2.	See objectives 1 & 2
3.2. Implementation, monitoring and evaluation of interpretation program	Interpretation has been implemented, monitored and fully evaluated	1.Financial and human resources

### Expected output.

Activities	Expected output	Sources of verification	Responsibilities	Time table
<b>1.1.</b>	Government and communities are fully interpretation supported	Meeting reports	NPAM Director/Manager NPAM scientists NPAM communities conservation based program service The relevant Ministries	First quarter of year 1
<b>1.2.</b>	Government has voted law related interpretation as management tool	Official journal Legal text	NPAM Director NPAM scientists Local and International conservation NGOs	Third quarter of year 1
<b>1.3.</b>	The relevant Ministries and NPAM have integrated interpretation in their structure chart	Structure charts	Ministries concerned NPAM	Last quarter of year 1
<b>2.1.</b>	New personal has been recruited	Increase in personal number Work contracts	Ministries concerned NPAM	First quarter of year 1
<b>2.2.</b>	Trainers, managers and communities' members had been trained	Training report	Ministries concerned University	Second quarter of year 2
<b>2.3.</b>	Politicians and communities are resources conservation supported / committed	Increase government budget for conservation Seminars, conferences, meetings reports Radio and television schedules related to interpretation program	Ministries concerned NPAM Local and international conservation NGOs	Second quarter of year 2
<b>2.4.</b>	See 2.3.	See 2.3.	See 2.3.	See 2.3.

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Activities	Expected output	Sources of verification	Responsibilities	Time table
2.5.	Trainers, managers and communities' members have been re-trained	Retraining report	Ministries concerned NPAM Local and international conservation NGOs Communities	First quarter of year 4
2.6.	Increase tourism number	Tourism activities report	Ministries concerned NPAM Local and international conservation NGOs	First quarter of year 2
2.7.	Tourism activities in cultural sites	Tourism activities report in cultural sites	Ministries concerned NPAM Local and international conservation NGOs Communities	First quarter year 3
2.8.	Cultural objects are protected therein museums Tourism activities therein museum	Museums reports	Ministry of Art and Culture	First quarter year 3
2.9.	Communities standing of live has increased through tourism incomes sharing	Tourism activities report	Ministries concerned NPAM Local and international conservation NGOs	First quarter year 3

### ANNUAL OPERATIONAL PLAN.

#### WHY ?

To have an overview of overlapping activities throughout the duration of the Action Plan implementation.

To evaluated, through the Execution Rate, the level of activities implementation.

Year	Activities	Chronogram				Execution Rate
1.	1.1	X				
	2.2.		X			<b>IER= 100%</b>
	2.3.			X	X	<b>GER= 29 %</b>
	3.1.				X	
2.	2.1.				X	<b>IER= 100%</b>
	2.2.		X			<b>GER= 50 %</b>
	2.3.		X	X	X	
	2.4.		X	X	X	

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Year	Activities	Chronogram				Execution Rate
	2.6.	X	X	X	X	
	2.7.					
<b>3.</b>	2.6.	X	X	X	X	<b>GER = 53%</b>
	2.7.	X	X	X	X	
	2.8.	X	X	X	X	
	2.9.	X	X	X	X	
<b>4.</b>	2.5.	X				
	2.6.	X	X	X	X	<b>GER = 57%</b>
	2.7.	X	X	X	X	
	2.8.	X	X	X	X	
	2.9.	X	X	X	X	
<b>5.</b>	2.6.	X	X	X	X	<b>GER = 57%</b>
	2.7.	X	X	X	X	
	2.8.	X	X	X	X	
	2.9.	X	X	X	X	

### EVALUATION OF THE INTERPRETATION PROGRAM FINAL REPORT.

#### KEY STAKEHOLDERS AND POTENTIAL PARTENERS.

#### POSITIVELY IMPACTED.

Impacted Entity	How impacted
1. Ministries Concerned	Increase of their positive pictures at national and international level
2. NPAM	Increase its positive pictures at national and international level
	Conservation of biodiversity and cultural sites therein Protected Areas and Buffer zone
	More management to do
5. Managers	More management to do
	More knowledge

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Impacted Entity	How impacted
6. Communities	Natural and Cultural resources conservation
	Effective relationship with their resources
	Incomes from these resources through tourism activities
	Job opportunity
7. Universities	More knowledge
8. Primary and Secondary schools	More knowledge
	Awareness

### NEGATIVELY IMPACTED.

Impacted Entity	How impacted
1. Poachers	Increase of change to detected and punished Decrease of incomes
2. Art Artists	Less raw materials Decrease of their business
3. Fauna and Flora Traders	Less Fauna and Flora available Decreasing of business activities

### POTENTIAL PARTENERS.

1. INTERNATIONAL MUSEUM SOCIETIES
2. UNIVERSITIES
3. LOCAL AND INTERNATIONAL CONSERVATION NGOs
4. INTERNATIONAL ORGANIZATIONS, UN AGENCIES, WB....

## Sustainable Agriculture

### Abstract

*Agriculture has changed dramatically, especially since the end of World War II. Food and fiber productivity soared due to new technologies, mechanization, increased chemical use, specialization and government policies that favored maximizing production. These changes allowed fewer farmers with reduced labor demands to produce the majority of the food and fiber in the world.*

*Although these changes have had many positive effects and reduced many risks in farming, there have also been significant costs. Prominent among these are topsoil depletion, groundwater contamination, the decline of family farms, continued neglect of the living and working conditions for farm laborers, increasing costs of production, and the disintegration of economic and social conditions in rural communities.*

*Today this movement for sustainable agriculture is garnering increasing support and acceptance within mainstream agriculture. Not only does sustainable agriculture address many environmental and social concerns, but it offers innovative and economically viable opportunities for growers, laborers, consumers, policymakers and many others in the entire food system.*

*Sustainable agriculture integrates three main goals--environmental health, economic profitability, and social and economic equity.*

*This document considers specific strategies for realizing these broad themes or goals. The strategies are grouped according to three separate though related areas of concern: Farming and Natural Resources, Plant and Animal Production Practices, and the Economic, Social and Political Context. They represent a range of potential ideas for individuals committed to interpreting the vision of sustainable agriculture within their own circumstances.*

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Sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs. Therefore, *stewardship of both natural and human resources* is of prime importance. Stewardship of human resources includes consideration of social responsibilities such as working and living conditions of laborers, the needs of rural communities, and consumer health and safety both in the present and the future. Stewardship of land and natural resources involves maintaining or enhancing this vital resource base for the long term.

A *systems perspective* is essential to understanding sustainability. The system is envisioned in its broadest sense, from the individual farm, to the local ecosystem, *and* to communities affected by this farming system both locally and globally. An emphasis on the system allows a larger and more thorough view of the consequences of farming practices on both human communities and the environment. A systems approach gives us the tools to explore the interconnections between farming and other aspects of our environment.

A systems approach also implies *interdisciplinary efforts in research and education*. This requires not only the input of researchers from various disciplines, but also farmers, farmworkers, consumers, policymakers and others.

*Making the transition to sustainable agriculture is a process*. For farmers, the transition to sustainable agriculture normally requires a series of small, realistic steps. Family economics and personal goals influence how fast or how far participants can go in the transition. It is important to realize that each small decision can make a difference and contribute to advancing the entire system further on the "sustainable agriculture continuum." The key to moving forward is the will to take the next step. This document considers specific strategies for realizing these broad themes or goals. The strategies are grouped according to three separate though related areas of concern: Farming and Natural Resources, Plant and Animal Production Practices, and the Economic, Social and Political Context.

## Sustainable Agriculture

They represent a range of potential ideas for individuals committed to interpreting the vision of sustainable agriculture within their own circumstances.

### Farming and Natural Resources

When the production of food and fiber degrades the natural resource base, the ability of future generations to produce and flourish decreases. Water is the principal resource that has helped agriculture and society to prosper, and it has been a major limiting factor when mismanaged.

The most important issues related to water quality involve salinization and contamination of ground and surface waters by pesticides, nitrates and selenium. Salinity has become a problem wherever water of even relatively low salt content is used on shallow soils in arid regions and/or where the water table is near the root zone of crops. Tile drainage can remove the water and salts, but the disposal of the salts and other contaminants may negatively affect the environment depending upon where they are deposited. Temporary solutions include the use of salt-tolerant crops, low-volume irrigation, and various management techniques to minimize the effects of salts on crops. In the long-term, some farmland may need to be removed from production or converted to other uses. Other uses include conversion of row crop land to production of drought-tolerant forages, the restoration of wildlife habitat or the use of agroforestry to minimize the impacts of salinity and high water tables. Pesticide and nitrate contamination of water can be reduced using many of the practices discussed later in the plant production practices and animal production practices sections.

Another way in which agriculture affects water resources is through the destruction of riparian habitats within watersheds. The conversion of wild habitat to agricultural land reduces fish and wildlife through erosion and sedimentation, the effects of pesticides, removal of riparian plants, and the diversion of water. The plant diversity in and around both riparian and agricultural areas should be maintained in order to support a diversity of wildlife. This diversity will enhance

natural ecosystems and could aid in agricultural pest management.

Modern agriculture is heavily dependent on non-renewable energy sources, especially petroleum. The continued use of these energy sources cannot be sustained indefinitely, yet to abruptly abandon our reliance on them would be economically catastrophic. However, a sudden cutoff in energy supply would be equally disruptive. In sustainable agricultural systems, there is reduced reliance on non-renewable energy sources and a substitution of renewable sources or labor to the extent that is economically feasible.

Many agricultural activities affect air quality. These include smoke from agricultural burning; dust from tillage, traffic and harvest; pesticide drift from spraying; and nitrous oxide emissions from the use of nitrogen fertilizer. Options to improve air quality include incorporating crop residue into the soil, using appropriate levels of tillage, and planting wind breaks, cover crops or strips of native perennial grasses to reduce dust.

### Plant Production Practices

Sustainable production practices involve a variety of approaches. Specific strategies must take into account topography, soil characteristics, climate, pests, local availability of inputs and the individual grower's goals. Despite the site-specific and individual nature of sustainable agriculture, several general principles can be applied to help growers select appropriate management practices:

- Selection of species and varieties that are well suited to the site and to conditions on the farm;
  - Diversification of crops (including livestock) and cultural practices to enhance the biological and economic stability of the farm;
  - Management of the soil to enhance and protect soil quality;
  - Efficient and humane use of inputs;
- Consideration of farmers' goals and lifestyle choices.

## Sustainable Agriculture

Preventive strategies, adopted early, can reduce inputs and help establish a sustainable production system. When possible, pest-resistant crops should be selected which are tolerant of existing soil or site conditions. When site selection is an option, factors such as soil type and depth, previous crop history, and location (e.g. climate, topography) should be taken into account before planting.

Diversified farms are usually more economically and ecologically resilient. While monoculture farming has advantages in terms of efficiency and ease of management, the loss of the crop in any one year could put a farm out of business and/or seriously disrupt the stability of a community dependent on that crop. By growing a variety of crops, farmers spread economic risk and are less susceptible to the radical price fluctuations associated with changes in supply and demand.

Properly managed, diversity can also buffer a farm in a biological sense. For example, in annual cropping systems, crop rotation can be used to suppress weeds, pathogens and insect pests. Also, cover crops can have stabilizing effects on the agroecosystem by holding soil and nutrients in place, conserving soil moisture with mowed or standing dead mulches, and by increasing the water infiltration rate and soil water holding capacity. Cover crops in orchards and vineyards can buffer the system against pest infestations by increasing beneficial arthropod populations and can therefore reduce the need for chemical inputs. Using a variety of cover crops is also important in order to protect against the failure of a particular species to grow and to attract and sustain a wide range of beneficial arthropods.

Optimum diversity may be obtained by integrating both crops and livestock in the same farming operation. This was the common practice for centuries until the mid-1900s when technology, government policy and economics compelled farms to become more specialized. Mixed crop and livestock operations have several advantages. First, growing row crops only on more level land and pasture or forages on steeper slopes will reduce soil erosion. Second, pasture and

forage crops in rotation enhance soil quality and reduce erosion; livestock manure, in turn, contributes to soil fertility. Third, livestock can buffer the negative impacts of low rainfall periods by consuming crop residue that in "plant only" systems would have been considered crop failures. Finally, feeding and marketing are flexible in animal production systems. This can help cushion farmers against trade and price fluctuations and, in conjunction with cropping operations, make more efficient use of farm labor.

A common philosophy among sustainable agriculture practitioners is that a "healthy" soil is a key component of sustainability; that is, a healthy soil will produce healthy crop plants that have optimum vigor and are less susceptible to pests. While many crops have key pests that attack even the healthiest of plants, proper soil, water and nutrient management can help prevent some pest problems brought on by crop stress or nutrient imbalance. Furthermore, crop management systems that impair soil quality often result in greater inputs of water, nutrients, pesticides, and/or energy for tillage to maintain yields.

In sustainable systems, the soil is viewed as a fragile and living medium that must be protected and nurtured to ensure its long-term productivity and stability. Methods to protect and enhance the productivity of the soil include using cover crops, compost and/or manures, reducing tillage, avoiding traffic on wet soils, and maintaining soil cover with plants and/or mulches. Conditions in most California soils (warm, irrigated, and tilled) do not favor the buildup of organic matter. Regular additions of organic matter or the use of cover crops can increase soil aggregate stability, soil tilth, and diversity of soil microbial life.

Many inputs and practices used by conventional farmers are also used in sustainable agriculture. Sustainable farmers, however, maximize reliance on natural, renewable, and on-farm inputs. Equally important are the environmental, social, and economic impacts of a particular strategy. Converting to sustainable practices does not mean simple input substitution. Frequently, it substitutes enhanced management and scientific knowledge for conventional inputs,

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## Sustainable Agriculture

especially chemical inputs that harm the environment on farms and in rural communities. The goal is to develop efficient, biological systems which do not need high levels of material inputs.

Growers frequently ask if synthetic chemicals are appropriate in a sustainable farming system. Sustainable approaches are those that are the least toxic and least energy intensive, and yet maintain productivity and profitability. Preventive strategies and other alternatives should be employed before using chemical inputs from any source. However, there may be situations where the use of synthetic chemicals would be more "sustainable" than a strictly non-chemical approach or an approach using toxic "organic" chemicals. For example, one grape grower switched from tillage to a few applications of a broad spectrum contact herbicide in the vine row. This approach may use less energy and may compact the soil less than numerous passes with a cultivator or mower.

Management decisions should reflect not only environmental and broad social considerations, but also individual goals and lifestyle choices. For example, adoption of some technologies or practices that promise profitability may also require such intensive management that one's lifestyle actually deteriorates. Management decisions that promote sustainability, nourish the environment, the community and the individual.

### Animal Production Practices

In the early part of this century, most farms integrated both crop and livestock operations. Indeed, the two were highly complementary both biologically and economically. The current picture has changed quite drastically since then. Crop and animal producers now are still dependent on one another to some degree, but the integration now most commonly takes place at a higher level between farmers, through intermediaries, rather than *within* the farm itself. This is the result of a trend toward separation and specialization of crop and animal production systems. Despite this trend, there are still many farmers, that integrate crop and animal systems either on dairy farms, or with range cattle,

sheep or hog operations.

Including livestock in the farming system increases the complexity of biological and economic relationships. The mobility of the stock, daily feeding, health concerns, breeding operations, seasonal feed and forage sources, and complex marketing are sources of this complexity. Therefore, a successful ranch plan should include enterprise calendars of operations, stock flows, forage flows, labor needs, herd production records and land use plans to give the manager control and a means of monitoring progress toward goals.

The animal enterprise must be appropriate for the farm or ranch resources. Farm capabilities and constraints such as feed and forage sources, landscape, climate and skill of the manager must be considered in selecting which animals to produce. For example, ruminant animals can be raised on a variety of feed sources including range and pasture, cultivated forage, cover crops, shrubs, weeds, and crop residues. There is a wide range of breeds available in each of the major ruminant species, i.e., cattle, sheep and goats. Hardier breeds that, in general, have lower growth and milk production potential, are better adapted to less favorable environments with sparse or highly seasonal forage growth.

Feed costs are the largest single variable cost in any livestock operation. While most of the feed may come from other enterprises on the ranch, some purchased feed is usually imported from off the farm. Feed costs can be kept to a minimum by monitoring animal condition and performance and understanding seasonal variations in feed and forage quality on the farm. Determining the optimal use of farm-generated by-products is an important challenge of diversified farming.

Use of quality germplasm to improve herd performance is another key to sustainability. In combination with good genetic stock, adapting the reproduction season to fit the climate and sources of feed and forage reduce health problems and feed costs.

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## Sustainable Agriculture

Animal health greatly influences reproductive success and weight gains, two key aspects of successful livestock production. Unhealthy stock waste feed and require additional labor. A herd health program is critical to sustainable livestock production.

### The Economic, Social & Political Context

In addition to strategies for preserving natural resources and changing production practices, sustainable agriculture requires a commitment to changing public policies, economic institutions, and social values. Strategies for change must take into account the complex, reciprocal and ever-changing relationship between agricultural production and the broader society.

The "food system" extends far beyond the farm and involves the interaction of individuals and institutions with contrasting and often competing goals including farmers, researchers, input suppliers, farmworkers, unions, farm advisors, processors, retailers, consumers, and policymakers. Relationships among these actors shift over time as new technologies spawn economic, social and political changes.

A wide diversity of strategies and approaches are necessary to create a more sustainable food system. These will range from specific and concentrated efforts to alter specific policies or practices, to the longer-term tasks of reforming key institutions, rethinking economic priorities, and challenging widely-held social values.

### Main characteristic of agriculture and degree development sustainable agriculture in countries of the Carpathian region

The Carpathians cover an area of about 209 000 km<sup>2</sup> with a population of 17 million, most of whom live in rural communities. The Carpathian range extends from Austria to Serbia, covering most of Slovakia and Romania and parts of the Czech republic, Hungary, Poland, Ukraine and Serbia.

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### Agriculture in Poland

*Poland* is a country dominated by lowlands. Over 96% of the territory is situated below 350 m a.s.l and only 2,9 % lies above 500 m a.s.l. The total area of the Carpathian Mountains in Poland is 14 982 km<sup>2</sup>, or 5.9%. In total it is 4.8% of the whole country area.

A view of Poland territory:

- Rural areas account for 93,4% of the territory.
- Agricultural land constitutes 54 % of the territory whereas forests 28,5%.
- Permanent grasslands constitute 11,4% of the area of the country ( meadows 8,1%, pastures 3,3%), which amounts to 21,1% of the area occupied by agricultural lands.

Over 38% of the total population inhabit the rural area. 18% of the total number employees are employed in the agricultural, hunting and forestry sectors. A greater percentage of children and teenagers then in the cities.

Nevertheless, Poland remains one of the world's leading producers of rye and potatoes. Other principal crops include wheat and sugar beets. Most farming is mixed, and beef cattle, dairy cows, and pigs are raised throughout the country.

### Development of Organic Agriculture in Poland

There has been a major increase of land under organic management in Poland recently. The area of organically farmed land is up to 167 740 ha. The number of organic farms in Poland increased to 7183 (3670 in 2004). Poland has huge growth potential in organic agriculture and great opportunities in market development.

In the past, farms were mainly located near Thorn, where the regional Extension Service in Przysiek organized the first courses in organic farming. There are now many good organic farmers organized in a strong group of producers, connected with a water mill called "EKO", the pasta processing plant "Bio" and the fruit and vegetables processing plant "Bio Food".

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Nowadays organic farms tend to be located in the central part of Poland because of the shorter distances to big markets in cities like Warsaw, Crakow, Gdansk, Lodz and Silesia Region.

Most of the organic farms do not specialize in a specific type of production but are on the contrary mixed farms. They keep animals and produce grains, potatoes and vegetables in crop rotation. For the animals, they have grassland.

A few agriculture secondary schools and universities include organic agriculture in their curricula: University of Warmia and Mazury in Olsztyn, Agricultural University in Kraków, Warsaw Agricultural University (SGGW) in Warsaw.

### Agriculture in Ukraina

Traditionally, agriculture is one of the most important sectors of the Ukrainian economy. The agricultural sector produces 12.8% of GDP, employing a fifth of the working population. Ukraine's arable and farming areas comprise 42 million km<sup>2</sup>. Planted crops account for 54.5% of total agricultural output. Among the dominant crops are wheat, corn, sugar beet, sunflowers, legumes, tobacco, vegetables, and fruits. Livestock farming includes cattle, pigs, sheep, horses, etc.

The part of the Eastern Carpathians situated on the territory of Ukraine. Their length reaches 270 km, width: 70 – 100 km, total area including closely spaced territories – over 27 000 km<sup>2</sup>, or 10.5 % of the whole Carpathian highland system area. The share of Carpathians in the territory of Ukraine is significantly small – 4.4%.

### Development of Organic Agriculture in Ukraina

Organic agriculture in Ukraine is gradually increasing in importance. Particularly in recent years (2003-2004), organic production has developed rapidly. In 2004, the number of organic farms increased to about 80, managing a total of 255 000 ha of land.

Organic agriculture in Ukraine is characterised

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almost exclusively by vegetable production. Animal production is of far lesser importance. The most significant cultivated crops are grain, sunflower and buckwheat. However, cultivation of oil plants and pulse plants is presently increasing. The main focus of vegetable production lies with export products, as foreign demand for vegetable products (hard wheat, sunflower, buckwheat) increases.

An information and consultancy centre on organic agricultural production was also set up at the Illintsi Agricultural College within the framework of the Swiss-Ukrainian project, Ekolan-Ukraine. However, support for potential organic producers is limited by low numbers of specialists and a general focus on farmers involved in the project.

Thus, a serious problem hindering the development of organic farming in Ukraine is that farmers currently have very little or no access to qualified training and advisory services, due to a serious lack of trainers and advisory staff.

A potential organic farming boom in Ukraine will necessarily require favourable governmental policies and regulations. Like in other European countries, a major factor that could contribute to a mass conversion of farms, especially the small and middle-sized ones, would be governmental subsidies, such as a subsidy programme for conversion and certification, and an agri-environmental programme.

Finally, a major challenge facing Ukraine is the development of a co-operative management of the organic sector that will be capable of securing synergies between governmental policies and market forces as the basic mediators between producers and consumers.

### Agriculture in Slovakia

Slovakia may be called a real highland country. The area of mountains here equals 36 491 km<sup>2</sup>, or 74.4% of the whole country territory.

Agricultural land 2.441 million ha, arable lands and permanent crops 1.45 million ha of which 0.2 million ha are irrigated, grasslands 0.865 million ha,

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forests 1.921 million ha. Main crops include wheat (0.405 million ha), barley (0.199 million ha), maize (0.145 million ha), oil crops (0.160 million ha) and also potatoes, sugar beet, vineyards and fruit trees.

### Development of Organic Agriculture in Slovakia

The main objectives of organic agriculture in Slovakia include:

- Maintain and enhance soil fertility over the long term;
- Prevent environmental contamination from agricultural activities;
- Ensure a closed nutrient cycle;
- Employ sustainable development management principles and reduce applications of non-renewable resources;
- Produce quality organic foodstuffs for human nutrition;
- Make conditions for farm animals suitable for their physiological and ethological needs;
- Allow/support economic and social development for farmers and their families;
- Prevent a rural population exodus.

“Ecological farming” is characterized by a plant production system that uses special crop rotations, green and organic manures, permitted natural inorganic fertilisers, as well as mechanical, physical and biological methods of plant protection. In regards to animal husbandry, only fodder from organic farms is acceptable and the animals receive special veterinary care.

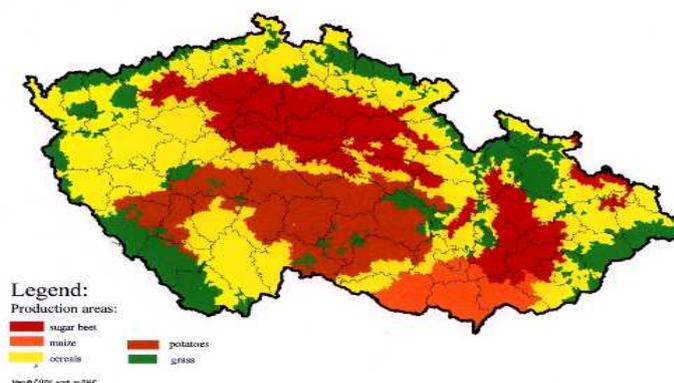
Currently, 82 producers of organic products apply ecological farming methods encompassing 58 706 ha of farm land, which represents about 2.4% of the total farm land in Slovakia. Ecologically managed land includes 20 706 ha of arable land, 37 782 ha of permanent grass cover, 95 ha of orchards and 35 ha of vineyards

### Agriculture in the Czech Republic

A third of the Czech territory (33%) is occupied

by forests and more than a half (54%) is agricultural. This country comprises only 3,4% of the Carpathian Mountains, or 8 613 km<sup>2</sup>.

AGRICULTURAL LAND PRODUCTION AREAS  
 IN THE CZECH REPUBLIC



Production conditions and exploitation of agricultural land from the viewpoint of soil and climatic conditions (irrespective of administrative borders) are characterized by the means of agricultural production areas. This categorization of the territory is useful for economics and statistics and also for measures of the state and regional agricultural policy. The new framework of the agricultural production areas was created in 1996 on the basis of evaluation of agricultural soils and consists of five agricultural production areas and 21 subregions

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### Development of Organic Agriculture in the Czech Republic

Under existing conditions there is no need to improve pasture resources. In the near future, there is no chance for better utilization of grassland, either, mainly in marginal and hilly areas. In the struggle to maintain the countryside, state subsidies for grazing and rearing of cattle and sheep are given by Ministry of Agriculture and partly even by the Ministry of Environment.

A suitable alternative to the conventional agriculture and a new opportunity for farmers is organic

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opportunity for farmers is organic agriculture. Areas which are managed in this way are increasing rapidly: at the end of 2000 some 563 farms were registered with more than 166 000 hectares (3.9% of all agricultural land) in this system. In organically managed farms grassland prevails (90%) and only 10% is arable land. Beef from these farms ("bio-beef") is sold nowadays even in supermarkets.

Most organic farms can be found in north and south Moravia. At the end of the year 2005 almost 255 000 ha were under ecological management in the Czech Republic, constituting almost 6% of the agricultural area. Most of the organic land is permanent grassland. The price premiums which organic farmers receive for their products are in the area of 10 to 15% for beef, 10 to 15% for milk, 40% and more for cereals, 60% and more for potatoes and up to 200% for some vegetable varieties.

The Pro-Bio organic farmers' association provides a special extension service programme for organic farmers. It is co-financed by the Ministry of Agriculture.

### Agriculture in Hungary

The potential agricultural area of Hungary is 9.3 million hectares, while the total agriculturally utilised area is around 5.8 million hectares. Hungary is still an agricultural country. In 2001, this sector employed 6.2% of the labour force and produced 4.3% of the gross domestic product (GDP) (FVM, 2003).

The total area of the Carpathian region in this country is 13 425 km<sup>2</sup>, or 5.2% of the whole Carpathian Mountains. There are three Carpathian regions which belong to South Hungary 7 243 km<sup>2</sup> and cover 14.4% of the total country area. The highland regions in Hungary, just as the country on the whole, are strong producers of agricultural goods.

### Development of Organic Agriculture in Hungary

Organic farming is practised in all regions. Most organic farms are situated in the North and South Alföld regions, as well as in the north of Hungary.

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Most of Hungary's organic land is located in the sub regions of Komárom and Baranya. The average farm size in Hungary is 23.56 ha.

Land use and production structure in organic farming is similar to that in Hungarian agriculture in general. Hungary has a high share of organic arable land and of organic grassland. The major part of the organic area is used for arable cropping (50%), followed by pastures and meadows (46%) and permanent crops (3%). Cattle farming and sheep production are the most significant types of organic animal husbandry. Organic poultry, however, has decreased in importance.

About 90% of organic products are exported. Historically, the first target market for Hungarian products was Holland. In the period from 1986 to 1990, Dutch traders started to import Hungarian organic goods to Holland and trade them to Germany, Great Britain and Scandinavia.

The most well-known higher education institutions are the Department of Organic Agriculture at the Szent István University of Gödöllő and the Department of Ecological and Sustainable Production Systems at Corvinus University in Budapest.

### Agriculture in Rumunia

Nowadays, Romania has the potential for profitable, competitive, high-yield agricultural production, and is considered as a typical agricultural country with 62% of its total surface devoted to agriculture, which contributes some 15 to 20% to GNP.

The area of Carpathian Mountains in Romania is 155 522 km<sup>2</sup>, or 65.3% of the total country area. Romania covers 60.7% of the total Carpathian Region. Of the 62% of Romania that is agricultural land (14.8 million ha), almost 63% is arable land, 2% orchards, 2% vineyards and 33% is pastures and meadows.

Consequently, Romanian agriculture can be characterized as two-tier: on the one hand there are smallholdings under-equipped and hardly viable for a full-time farmer who must hire the services of a

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machinery company (*Agromecs*); and, on the other hand, large farms with equipment and employees. As a result, only 4% of the new landowners use machinery; the others must rely on animal traction (36%) or manual labour (60%). Most of the machinery is now obsolete.

The National Strategy on Sustainable Development gives priorities to investments in infrastructure (irrigation), the development of green tourism, the creation of family farms of an “optimal size” (between 50 and 100 ha) and securing the food supply by developing agricultural production and relaunching industrial sectors related to agriculture such as farming machinery.

The implementation of organic farming practices has still to be achieved (strict control of “organic” and labelling) and economic incentives for organic farming do not exist. The appreciation of organic food by Romanian consumers is low. In fact, Romanian farmers practise organic farming due to a lack of funds for agrochemicals, but their products are sold on the local markets at a lower price than in stores. Great hope is put on external western European markets, but such markets are quite few.

### Agriculture in Serbia

Serbia has 5.734 million hectares of agricultural land of which 65.3% is arable land and gardens, 4.8% are orchards, 1.3% vineyards and 11.6% are natural grassland.

Conditions in agricultural production concerning organisation, production and economics vary from region to region. There are big inter-regional differences in the structure and intensity of agricultural production, and they are primarily caused by the relief of the soil. About 90% of the production of the industrial plants and more than a half of the cereal production is located in Vojvodina, where approximately 90% of the surface are lowlands. The central parts of Serbia have approximately 60% of the total milk and meat production, and they have the highest production of fruit and grapes. Kosovo-Metohija are representative areas of sheep-farming, grape production and production of

some fruit species.

### Development of Organic Agriculture in Serbia

The history of organic agriculture starts in the middle of 1980s. A key factor for the development of this new trend in agriculture were the lectures of the famous micro-biotic Micio Kusi, where he explained the need for the preservation of nature and the environment. Everything began with individual initiatives of the small farmers. The first bio-dynamic farm in Serbia was established in autumn 1992. It was called Sunny farmhouse, and it was situated on 50 ha of sandy terrain in Subotica-Horgos.

The total surface under organic agriculture is according to unofficial data about 18 600 ha, but as this land is not registered at the public institutions this figure does not represent official data. Despite this it is said that these 0.3% of the total agricultural surface, which is under organic agriculture could be immediately certified without period of conversion. So far no organisation is obliged to register the surface under organic production or the amount of products that is exported.

About 80% of the total agricultural area that is 4.96 million ha are under mixed farming systems with elements of ecological farming. Concerning farmers there are no exact data how high percentage of them are in organic farming or conversion.

There are three domestic organic certifiers who base their inspection and certification on the European Union and the IFOAM standards. These bodies are - TERRA'S: specialising in oils, plants, cereals and vegetables; NATURA VITA specialising in animal husbandry; MOC PRIRODE specialising in fruit growing

There is a big need for educated people - experts in organic agriculture and also for founding of institution for organic agriculture on a state level. Another important challenge is to improve animal husbandry, as there will be a big demand for organic fertilisers in the future.

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If the number of farms integrating plant production with livestock husbandry there will be lack of organic fertilisers in the future.

The next challenge is establishing organic agriculture in abandoned areas, mostly hilly or mountain regions. The extensive agriculture of these regions is caused by the emigration of the young to the big cities. By organising organic agriculture and establishing a network of producers the population of these settlements would be motivated to come back and to invest in these regions. The background for this strategic planning are not only empty villages, but also pure, untouched environment. As these lands have never been used for conventional agriculture, the most of them could go into organic production immediately, without large investments.

An interesting approach and challenge in organic agriculture is the establishment of multidisciplinary projects of eco-agro tourism. There is no need to mention that there are many parts, which are considered as ecological oases. The advantages of these areas are rare plant and animal species and special microclimatic conditions. The abundance of mineral and thermal waters can enable founding of spas, the heating of plastic houses and of green houses, irrigation systems etc. With the common work between governmental institutions and NGOs, the implementation of organic agriculture is making big steps forward. The consciousness of the domestic population about importance of healthy food is fastening the process and makes the conversion from conventional to organic agriculture easier.

### **Workshop: Natural and cultural heritage in Romania, a basis for rural tourism**

The beautiful scenery of the rural areas, the variety of landscapes, the multicultural environment and the uniqueness of natural and cultural monuments are all attractive assets for ecotourism. Romania has one of the most important folklore cultures in Europe, which varies considerably from region to region, for instance in traditional architecture, costumes or folk

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music and dances. In an unspoilt rural environment, Romanian village life provides both fascination and a restful time.

Traditionally, foreign guests were hosted in homes and there is a large potential for formalized rural tourism. The National Association of Rural Ecological and Environmental Tourism ANTREC (2,225 members and 30 local offices), founded in 1994 and a member of the European Federation of Rural Tourism EUROGITES, is the national organization for tapping the potential of rural tourism. There are 7 800 rooms in 120 localities on offer, classified according to their standard by Governmental Tourism Board inspectors. The food offered to the tourists is produced locally but not necessarily strictly “organic”.

Nowadays most such homes are located in Romania’s mountainous areas. The cradle of rural tourism is undoubtedly Bran-Moeciu in the mountains near Brasov in the vicinity of the ancient fortress of Prince Vlad Tepes, the historical Dracula. The Danube Delta is well-known throughout the world for its ecological specificity (fish and birds) and represents a unique potential for eco-tourism, which has just started to be explored.

There is great potential for the development of ecological tourism activities in many of Romania’s natural areas. Tourism can be developed to provide rural communities with additional sources of income while offering incentives to revive traditional practices that are sustainable or to create new ones. In no case can *agrotourism* be considered as a full solution to rural unemployment.

Based on the positive example propose development plan of rural community:

- Current state of affairs (economy, agriculture, population etc.)
- Potentials and plans for future sustainable development of community
- Short term and long term goals

## Sustainable Agriculture

### Case study 1. Organic agriculture in the Jeseniky Micro-Region, Czech Republic

The Jeseniky Micro-Region is a Protected Landscape Area established in 1969 in the Moravia Region. It comprises 74 000 ha of mountain area, mostly covered by spruce forest. 4 865 ha (equivalent to 43.5% of the agricultural land found in the protected area, or approximately 20% of agricultural land in the Moravia region) are managed organically. There is the largest number of organic farms in the whole of the Czech Republic in this region. Some projects related to minor crops and agricultural biodiversity have been proposed by the Union of Ecological Farmers PRO-BIO (Ecological in the Czech Republic means Organic agriculture - it is certified according to EC Regulation Nr. 2092/91) but in the Jeseniky Micro-Region the main focus is biodiversity conservation on organic farms

Non-intensive animal farming for slaughter and breed cattle is the principal activity of the organic farms, with only 0.3 cattle units per ha. Other production includes spelt wheat, barley, rye, triticale and milk. An interesting activity of the project includes the protection of semi-natural pastures and meadows used to obtain ancient varieties of seed material for sowing on the newly cultivated plots. During the last decade most arable land was converted to meadows and pastures with the aim to maintain and increase the local agrobiodiversity, minimize soil erosion and avoid external inputs.

### Case study 2. Organic agriculture and bird conservation in Muraviovka Park, Russia

Muraviovka Park for Sustainable Land Use is a private protected area located along the Amur River (far eastern Russia), the largest free flowing river in the world. It was instituted in 1994, when a Russian NGO (the Amur Programme of Socio-Ecological Union) received financial support from the International Crane Foundation (USA) and the Pop Group Corporation (Japan). This park was created in order to further the research into new strategies of environmental conservation and sustainable development through tech-

niques of sustainable agriculture, protection and improvement of wildlife habitat and ecotourism. The Park occupies an area of more than 5 200 ha of wetland and plateau lands surrounded by croplands. Muraviovka wetlands were also included in the Ramsar Convention of Wetlands of International Importance. Muraviovka Park and its buffer zone are a critical habitat for more than 200 bird species (nesting and migrating), sheltering the endangered red-crowned cranes (*Grus japonensis*, the second most endangered crane species in the world), white-napped cranes (*Grus vipio*), hooded cranes (*Grus monacha*), oriental white storks (*Ciconia boycians*), and many others. The high level of biodiversity is also demonstrated by the identification of more than 520 plant species.

This area offers excellent soil and climatic condition for crop growing, but the farming practices of burning straw and using large quantities of pesticides and herbicides have caused considerable damage to wildlife, human health and the economy.

A Demonstration Farm (460 ha) was developed by the Park in some tillable lands of the protected area, showing how sustainable agriculture fields near wetlands offer breeding, roosting and feeding habitats for birds. The principal crops are wheat, barley, soybeans and different varieties of corn. The use of traditional varieties, strict crop rotations, a fallow strategy and multiple cultivations has allowed the elimination of pesticides and agrochemicals (production is not certified as organic at this time). Yields obtained with these practices exceed those of the local conventional farmers around the park with only half of the production costs. This has convinced many farmers to change their agricultural practices. Corn is planted as a lure crop offering foraging for wildlife foraging, to keep cranes out of agricultural fields and therefore to avoid conflict between birds and farmers. As agricultural activities started to change and preservation of wetlands increased, the number of cranes and storks increased two to three times.

The management of Muraviovka Park also involves trimming trees to accommodate nesting storks, controlling fires and reforestation.

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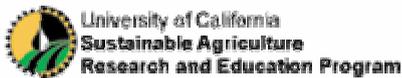
## Sustainable Agriculture

This Park represents an important source of income for the local population and provides financial support to hospitals, schools and other local structures.

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## Traffic and Transport in the Carpathian EcoRegion

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Development of transport sector started along with the development of industry and trade. It has been developing at the same extent as all other sectors, experiencing expansion during the XX century. Road, train and air transport, when once started, developed rapidly. Development of transport provides better communication and rapid transfer of people and goods from one part of the world to another.

Transport produces huge effects on environment and usually causes degradation of specific environmental components. A lot of different resources and energy are being used to produce various traffic means. Some studies from the USA have shown that 25% of total energy consumption refers to transport sector. Out of total consumption of energy by transport sector in European countries, 80% depends on road transport.

Transportation paths and other transportation constructions are great consumers of the ground surface. Those are mainly roads, railways, airports, garages, ports, depots etc. Also, gasoline stations, electricity network of cables, motels, parking places etc. All these constructions may have very negative effects on environment especially due to the fact that they are being built in the river valleys on the high-quality soils, though the forested area causing bad impact on biodiversity.

Transport is direct pollutant of the environment with, approximately 180 polluting components. Polluting gases from transport sector are directly causing degradation of ozone layer (cadmium and smoke-gases from burning of tires) and contributes to the global effect of climate changes. Polluting gases are entering directly into atmosphere and are distributed through the air all over the Earth surface. Some particular matters are spreaded near the roads, all over the cultivated and non-cultivated plant species. Also, gases and particles are spreading into the water, soil, plants and animals, eventually degrading the human health, as the final consumer (especially dangerous elements from the transport pollution of environment are: cadmium and lead).

Oil and oil derivatives that come leaking from the transport vehicles are washed away by the rain thus entering into the soil and watercourses. Some part of these substances evaporates along with the water and gets into the atmosphere. Often, accidents occur while oil, oil derivatives, chemicals etc. are being transported by different transport means. All these dangerous substances might enter the soil, water and cause degradation of their quality.

Noise, coming from transport in developed countries is much bigger than the one made by the industrial facilities. In the USA 19 million people are exposed to the noise greater than 65 dB, while in Europe the number of people goes up to 65 million. The most negative effects are caused by the noise of the airplanes.

As already mentioned above, transport also affects human health and emotional state.

According to the all negative effects of transport sector, it is necessary to take certain preventive measures such as:

- rational consumption of raw materials and energy, as well as rational use of space;
- in the process of production of energy fuels to eliminate by-products with negative effects on human health and environment (e.g. lead from oil), and turn the production towards bio-fuels;
- preserve, as much as possible, natural ambient near the traffic roads and construction of green surfaces along the roads to alleviate negative effects of pollution;

Economic, social and environmental aspects of development of transport possess a need to make this sector sustainable, which will make it acceptable in both, economic and social sense. This means providing better services within transport sector with more economic efficiency which will contribute to rational use of resources, and at the same time, to preserve the environment. At the first phase, it is recommended to decrease the use of individual transport vehicles and increase use of public transportation.

## Traffic and Transport in the Carpathian EcoRegion

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In the following text, you will find overview of the current level of development of transport sector in Carpathian. Also, there will be some measures proposed on how to improve the state and achieve satisfactory level of development.

Accent will be given to the following transport segments:

- Road transport (roads, municipal and railways);
- Water transport;
- Air transport;
- Pipeline transport;
- Integral transport.

### Road transport

*Road transport is ment for transport of people and goods from one place to another. For its development there must be a solid traffic infrastructure (road network) which, in many ways depends on landscape and position of economic, industrial and turistic objects.*

All Carpathian countries have enough potential for development of road transport due to the fact that they are not in total mountainous countries. Large and navigable rivers are passing trough some of these countries (Danube, Visla, Odra etc.) with huge highways passing trough their valleys. Currently all of these countries, besides Austria are middle developed countries, which lacks sufficient transport infrastructure. In some of these countries, this infrastructure is in bad shape. Main problem regarding construction and/or reconstruction of huge roads, such as those near great rivers, is in their transit capacities. Countries such as Serbia and Hungary are on the very good position in reference to transport. However, these countries do not have sufficient network of roads. This problem might be overcome by reconstructing the existing roads or construction of the new roads.

There are several main international corridors passing trough this region:

- ✓ Wien – Brno – Ostrava – Bielsko Biala – Krakow – Tarnow – Rzeszow – Przemysl –Lviv – (Kiev);
- ✓ Wien – Bratislava – Trencin – Zilina – Ruzemberok – Poprad – Presov – Kosice – Zahony/ Cop – Stryj – Lviv – (Kiev).
- ✓ Wien – Bratislava – Gyor – Budapest – Miskolc / Debrecen – Nyiregyhaza – Zahony/Cop – Stryj – Lviv – (Kiev);
- ✓ Wien – Bratislava – Gyor – Budapest – Szeged – Arad – Sebes – Sibiu – Brasov –Ploiesti – Bucuresti;
- ✓ Wien – Bratislava – Gyor – Budapest – Szeged – Beograd – (Thessaloniki);

As well as many national corridors:

- ✓ Presov – Barwinek/ Vysny Komarnik – Krosno – Rzeszow;
- ✓ Presov – Nowy Sacz – Tarnow;
- ✓ Ruzemberok – Trstena/ Chyzne – Rabka – Krakow;
- ✓ Ruzemberok – Banska Bystrica – Bratislava;
- ✓ Zilina – Cadca – Cesky Tesin;
- ✓ Zilina – Cadca – Bielsko Biala;
- ✓ Zilina/ Trencin – Prerov;
- ✓ Prerov – Breclaw;
- ✓ Brno – Bratislava;
- ✓ Budapest – Szolmok – Puspokladany – Oradea – Cluj-Napoca – Sebes
- ✓ Beograd – Zagreb.

## Traffic and Transport in the Carpathian EcoRegion

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Besides international and local corridors which provide transport service for social and economic needs, there is a good network of local roads that connect local communities and provide availability of turistic centers within Carpathians. This is a main precondition for further development of sustainable tourism of the region.

**Municipal traffic** is of the great importance in huge municipal agglomerations and deserves specific attention. Main purpose of this type of transport is transportation of people (citizens) from their home to their working places, schools, recreation places etc. One of the positive sides of this type of transport is in providing less crowd at the streets which may result in better and faster transport of passengers. Due to the fact that the municipal transport is partially conducted by the trains, trams, trolleybuses and busses, it leads to less consumption of energy and less pollution of the environment.

One of the problems of this type of transport is in the pollution from gasses that it produces. This problem is much more present in the non-EU countries such as Serbia.

For example, in Serbia, the vehicle depots of the municipal public transport services composes of very old vehicles. These vehicles have much larger consumption of energy and produce bigger pollution from gasses. This problem might be over bridged by introducing the EU standards which refers to the use of cleaner fuels (un-leaded petrol). Urgently, EU is considering introduction of the bio-fuels. In Serbia, there are very few vehicles with the E3 engines, while they are standard engines in the EU countries and there are plans for introducing the new generation of environmental friendly engines.

These problems might be solved by allowance of the development credits, modernization of the municipal public transportation services and by introducing the bigger municipal railway network.

**Railway transport** in Carpathian countries is very developed, especially in Romania and Hungary.

These are the countries that have big network of international rail roads of Europe: Warsaw-Berlin, Warsaw-Minsk, Warsaw-Gdanjsk, Warsaw-Prague, Prague-Berlin, Prague-Wiena, Prague-Bratislava-Budapest, Prague-Ninberg, Kiev-Warshaw, Kiev-Lavov-Budapest, Kiev-Prague, Kiev-Moscow, Vienna-Budapest-Belgrade, Vienna-Ljubljana-Belgrade, Budapest-Arad-Brasov-Bucharest, Budapest-Krajova-Bucharest, Bucharest-Constance, Belgrade-Krajova- Bucharest, Belgrade-Bar, Belgrade-Nais-Sofia-Instanbul.

These roads are, in most cases, transit, so that these countries have significant incomes from transit. Some of these directions connect west and east parts of Europe, and the others connect west and south parts of Europe.

Besides main railway directions, there is a very developed network of local railways connecting local communities.

Advantages of railway network in comparison to the road transport are numerous:

- Railway is a kind of environmental friendly transport. Energy coefficient of the use of railway transport in comparison to the road transport is 6:1;
- The electric railways do not have negative effects of harmful gasses on environment;
- Transport of goods and people, especially to large distances, is far cheaper.

Bad sides of the rail transport:

- Very expensive construction of the infrastructure, as well as its maintaining;
- Expensive transport costs at the short distances;
- Big consequences in case of accidents;
- Lack of possibilities of connecting all locations.

Current problems of railway roads in the region are lack of electrification and shaft ballast.

## Traffic and Transport in the Carpathian EcoRegion

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Many local railways are not electrified which represents a huge problem in sense of additional energy consumption, increase transport prices and presents negative effects on environment. Frequent shifts of locomotives on these railways cause additional transport expenses and prolong the total time of transport.

*E.g. Railway: Belgrade-Nais-Dimitrovgrad-Sofia.*

*One part of the railway from Belgrade (The Capital of Serbia) is electrified, while in Nais, the locomotive is being replaced with the engine with diesel fuel. This train than goes to the Serbia-Bulgaria border and than it is replaced once again on the opposite way.*

Many local railroads have low transpassing power due to old equipment. These railroads should be equipped with ARB – Automatic Rail Blocks (safety signal system which increase transpassing capacities of railways). Besides modernization, additional rail tracks should be billed on the extensively frequent railroads.

Majority of the railroads (in the flat plains) may bare low shaft ballasts (12-16 tons), while standard ballast per shaft goes up to 22.5 t. This, actually cases low transpassing capacities. Majority of these railroads might be found in Vojvodina (north Serbia).

### Water traffic

Countries of the Carpathian EcoRegion have huge potentials for development of water transport. The Danube, European largest river, is passing trough Austria, Hungary, Serbia and Romania. This river is navigable in most of its flow. Danube is flowing into the Black Sea, and also is connected with the North Sea by the Raina-Maine-Danube Canal. Due to the transit nature of the Danube river traffic, all of the mentioned countries receive sufficient funds from taxes. It also connects two important European harbors: Constance (Romania) and Rotterdam (Netherlands).

Very important river road is the river Dnepr

which flows into the Black Sea, and by the canal it is connected with the river Bug which enters the Visla river and, eventually, Baltic Sea. Besides the mentioned river roads of great importance are the also the following: Dnjestar, Tisa, Laba, Odra i Noisa. Odra and Visla are connected by part of the canal and by the river Nisla which flows into the river Odra.

- Advantages of the river transport:
- Low investments in infrastructure (harbors);
- Cheap transport of industrial and construction material (woods, stone, sand, rubble etc.);
- Ecological transportation (with neglecting effects of gasses).
- Disadvantages of the river transport:
- Very slow transport;
- In cases of oil outflow – heavy effects on biodiversity of the rivers and river banks.

Current problems, for better usage of the navigable river roads in the Carpathian Countries, are old boats and lack or insufficient number of harbors in some of the countries. Development of the river transport depends on the interlinkage of navigable river roads of Europe, development and improvement of harbors and purchase of new boats. Significant factor in development of the river transport is establishment of the free zones and centers of integral transport.

Danube river is very attractive turstic destination with insufficient toursitic capacities. In order to have more tourists on this river it is important to establish better marines. Current status of the existing marines infrastructure is not satisfying. Most of them being used as a winter shelter for boats. Prosperous marines should be renewed and relocated to the more attractive and suitable locations.

### Air Transport

In the countries of the Carpathian EcoRegion is very low developed transportation mean and do not meet people needs.

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In this part of Europe there are several important airports, such as:

Warsaw - Fryderyka Chopina, Prague – Ruzyne, Bratislava – M. R. Stefanik, Vienna – Schwechat, Budapest – Herihegy, Bucharest – Otopeni, Kiev – Borispol.

Besides bigger European airports, there are a lot of smaller airports for international and national traffic.

- Advantages of air transport:
- Very fast transport;
- Safe transport (very few accidents);
- Traffic that do not depend on the ground configuration.
- Disadvantages of air transport:
- Expensive on the short distances;
- Big noise in the airport surrounding;
- In case of accidents, a lot of human victims.

### Pipeline Transportation

Pipeline transport (oil pipes and gas pipes) is of a high importance for each of the countries. This type of transport is cheap, safe and has little impact on human health and the environment.

Countries of the Carpathian EcoRegion have very good developed network of pipelines, especially Poland, Hungary, Ukraine, Romania. These countries are situated on the crossroad of main pipelines between Russia and West Europe. Pipelines passing through these countries provide incomes from transit and construction of local pipeline networks contributing to the local economy. Carpathian countries possess their own oil and gas reserves, with biggest percentage in Romania.

The gas, also has very wide use for heating human settlements. It has better burning power than other fossil fuels resulting in less damage to the environment.

Biggest pipelines passing through Carpathian

Countries are:

- Smolensk – Minsk - Berlin;
- Smolensk – Minsk - Warsaw;
- Smolensk - Vienna;
- Kaluga – Kiev – Bratislava – Vienna;
- Kaluga – Kiev – Bratislava – Prague – Berlin;
- Kursk – Sumi – Bucharest .

All Carpathian countries have very developed local pipelines, and some of them are just being constructed:

- Constanca – Budapest – Ljubljana;
- Constance – Belgrade – Rijeka.

Advantages of the pipeline transport:

- Oil and gas are crucial for industry and this pipeline system provides safest and cheapest transport of energy resources;
- Cheap prices of transportation;
- Environment friendly transport with less effects on the environmental health;
- Less possibilities for accidents;

The only disadvantage of this transport is expensive and long lasting construction of the infrastructure.

### Integral Transport

Integral transport is new transportation mean which enables faster and simple transportation by using more than one transport systems. Transit position of the Carpathian countries, with network of roads, railways and rivers, require construction of transport stations for integral transport, terminals and distributive centers.

The majority of the centers overlap with envisaged construction of package terminals on rail network, harbors and transfer stations on main roads. Also, these centers contribute to development of regional development, and macro and micro

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Carpathian EcoRegion and new traffic-geographical conditions, there are significant market-transport potentials which require construction of the mentioned logistical centers, according to the existing ones in the rest of developed Europe.

### Conflict areas between the TENs and nature conservation

Case study: D47 motorway, Czech Republic

#### Summary:

There are plans to build a motorway leading from the city of Ostrava across the state border to Poland as part of the TEN-T network (corridor IV, branch B between Ostrava and Katowice). The previous arrangement when the Czech government granted the project without a tender to an Israeli construction company was dropped. Now the government's plans are to build the motorway by issuing government bonds and using funds from the European Investment Bank. If built according to the current plans, the construction would severely damage an Important Bird Area and proposed Special Protection Area in the region. It is understood that a motorway link with Poland in this area is a necessity, however the exact route and a preference of the part of the D47 motorway between Ostrava and the state border should be reconsidered, also taking into account the fact that an expressway (R48) is constructed nearby. The priority should be to avoid direct destruction of valuable habitats in the area (and also to make mitigation and compensation measures less expensive).

#### The sites affected:

An Important Bird Area (IBA) and proposed Special Protection Areas Hermansky stav-Struzka. Within the site, the construction would affect important breeding sites of the Corncrake, Spotted Crane, Marsh Harrier, Honey Buzzard, Kingfisher, as well as wintering grounds of the Common Merganser (it is also the only regular breeding site of the species in the Czech Republic), White-tailed Sea Eagle, and many other species listed in the Annex I of the Birds Directive. The planned route also leads through important breeding grounds of the European Fire-bellied and

#### Yellow-bellied

Toads, an area important for the Hermit Beetle and for the European Beaver (priority species of Annex II and Annex IV of the Habitats Directive).

#### The problem:

The proposed motorway, which is part of the TEN-T network corridor IV, branch B linking Ostrava with Katowice, has an environmental impact assessment for the site, which however fails to assess the impact on several important species and the fact that the area is an important wintering site of the Common Merganser and the White-tailed Sea Eagle. Moreover, the threats to the Kingfisher, another important Annex I species of the area, were not considered in the EIA.

There is an alternative route to the one planned, which was considered in previous negotiations but later it was turned down based on other, non-environmental considerations. This alternative route passes through industrial land and would have much less destructive impact on the important habitats and species in the area. The alternative route would also be technically less demanding and less expensive. As the construction of a highway attracts other investment (the use of adjacent land for services to motorists, planned industrial zone in the area) there is a considerable risk that subsequent development projects would lead to total destruction of the area as a habitat for the above-mentioned important species.

#### EU legislation and funding

According to the Birds (79/409/EEC) and Habitats Directives (92/43/EEC) EU member states have to establish a network of protected sites called Natura 2000, based on scientific criteria. Economic considerations may not influence the process of site selection and designation. Designated (and even candidate) Natura sites should be protected from plans or projects with a potential negative impact, including those where the effect might be cumulative. To avoid large-scale impact of plans and programmes a Strategic Environment Assessment should be carried out according to the Directive 2001/42/EC,

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which comes into force in 2004. The Directive 97/11/EC amending Directive 85/337/EC sets out the conditions for project-level environmental impact assessments.

The European Council highlighted the need for candidate countries to comply with EU environmental legislation for any new projects and developments already before accession. The Commission also emphasized that for new developments and projects potentially affecting “environmentally sensitive areas”, which include IBAs and statutory protected areas, accession countries should comply with Article 6 of the Habitats Directive.

### Recommendations:

- No EU or national funds should be made available to constructing the highway that would lead to destruction of important habitats of species listed in the Annexes of the Birds and Habitats Directives
- The less damaging alternative route should be reconsidered, taking into account relevant areas both in the Czech Republic and across the border in Poland.
- A new EIA should be prepared to take into account all important species occurring in the area, including the wintering bird species.

### Conflict areas between TEN and nature conservation

Case study: Danube-Oder-Elbe canal

### Summary:

There are plans to link up the Elbe and Oder rivers with the Danube, creating two massive canals and disrupting the natural water flow and hydrological regime of these and other rivers in the process. If built, the canals would have a devastating effect on at least 18 Important Bird Areas along the Oder, Morava and Danube rivers alone, as well as 61 existing protected areas. This venture would be impossible without a substantial injection of EU funds. Environmental NGOs demand no EU funds should be provided for the building of any parts of the canal until a strategic environ-

mental assessment and a cost-benefit analysis of the project is undertaken vis-à-vis other transportation modes. If it is found that the D-O-E canal can not be brought to comply with EU environmental legislation, it should be removed from the plans of the Trans-European Transport Networks (TEN-T) and from National Development Plans, Operational Programmes and relevant national policies of the respective countries.

### The sites affected:

According to the latest BirdLife International Important Bird Area (IBA) inventories there are at least 18 sites that lie along the rivers Oder, Morava and Danube in the region potentially affected by the proposed D-O-L canal (one in Austria, five in Germany, four in Poland, six in the Czech Republic and two in Slovakia). These sites hold internationally important numbers of breeding and migratory waterbirds, birds of prey (including White-tailed Eagle), globally threatened species such as Corncrake and Aquatic Warbler and other species listed in Annex I of the Birds Directive. It is expected that IBAs in the accession countries will form the basis for SPA designation and will eventually form part of the Natura 2000 network of protected areas. Based on an estimate by WWF, no less than 400,000 ha of 61 statutory protected areas may be affected by the canal. These areas include some of the remaining natural and semi-natural floodplain habitats in Europe. Compensation for the loss of some of these unique habitats may well prove impossible.

### The problem:

There are historical plans to link the Baltic and Black Seas through canals that connect the rivers Elbe, Oder, Morava and Danube in Germany, Poland, Czech Republic, Slovakia and Austria. The project has now been resurrected, in the hope of substantial EU funding, as part of the Trans-European Transport Network (TEN-T) plans. This plan foresees the canal linking two waterways: the E20 from Germany to Austria (Hamburg – Magdeburg – Pardubice – Prerov - Danube), and the E30 from Poland to Austria (Szczecin –

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Initial estimates suggest that the total cost of the project is about 6.5 billion Euros, which does not take into consideration the costs of mitigation and compensation measures. Some parts of the project are already included in regional development plans for which EU funds may be sought in the future.

The canal would divert water from sections of the Morava, Oder and Elbe rivers, whose water resources are already limited. Natural rivers would suffer from reduced discharge and become stagnant, which would exacerbate the eutrophication processes in the artificial canal and impounded water stretches. Disruption of the hydrological regimes will threaten floodplains, meadows, forests and wetlands that are dependent on river hydrology. It is expected that if built, the canal will cause irreversible damage to the habitats and species included in the 18 IBAs and 61 statutory protected areas mentioned above. Several of these habitats are irreplaceable, and therefore compensation in the spirit of Article 6 of the Habitats Directive will be impossible.

### EU legislation and funding

According to the Birds (79/409/EEC) and Habitats Directives (92/43/EEC) EU member states have to establish a network of protected sites called Natura 2000, based on scientific criteria. Economic considerations may not influence the process of site selection and designation. Designated (and even candidate) Natura sites should be protected from plans or projects with a potential negative impact, including those where the effect might be cumulative. To avoid large-scale impact of plans and programmes a Strategic Environment Assessment should be carried out according to the Directive 2001/42/EC, which comes into force in 2004. The Directive 97/11/EC amending Directive 85/337/EC sets out the conditions for project-level environmental impact assessments. The Water Framework Directive (2000/60/EC) requires Member States to prevent all further deterioration in water status and to achieve good ecological and chemical status through integrated river basin management by 2015. This applies also to transboundary rivers, where international river basin management plans should be

drawn up to achieve the same objective. These environmental objectives will deliver ecological quality improvements for freshwater ecosystems.

The European Council highlighted the need for candidate countries to comply with EU environmental legislation for any new projects and developments already before accession. The Commission also emphasized that for new developments and projects potentially affecting “environmentally sensitive areas”, which include IBAs and statutory protected areas, accession countries should comply with Article 6 of the Habitats Directive.

Given the enormous funding required for completing such a project, it is highly unlikely that the countries concerned will be able to fund it themselves. Although there is no information yet on EU subsidies or loans requested for the building of the canal, it is more than likely that such funds will be sought in the foreseeable future. It is also underlined by the fact that the D-O-E canal is included in the TEN-T maps in the Accession Treaty.

### Recommendations:

- No EU or national funds should be made available to constructing any part of the canal until a full strategic environmental assessment has taken place, and a cost-benefit analysis of all relevant options vis-à-vis other transport modes are evaluated;
- If, after the relevant assessment, it is found that the construction of the D-O-E canal can not be carried out without breaching EU environmental legislation, the project should be removed from TEN-T plans, national development plans, operational programmes and relevant policies;
- EU funds should be used for preparatory studies to develop ecologically compatible transport solutions that respects the provisions of EU environmental legislation, most notably the Birds and Habitats Directives and the Water Framework Directive;
- The requirements of the Water Framework Directive for no further deterioration in water status and the

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of Good Ecological Status via integrated river basin management and taking into consideration the specific value of wetlands for water management along the Oder, Elbe, Morava and Danube rivers must be implemented;

- Fully implement EU environmental legislation, especially the Birds and Habitats Directives in all countries concerned, including the full establishment and safeguarding of the Natura 2000 network of protected areas.

### Workshop

**According to the positive examples, participants should explore possibilities for development of their local community based on the potentials that they have available.**

### Example

Development of overall society led to development of transport as one of its' segments. Some transport roads were abandoned, such as famous "Sharganska Osmica" on the railroad from Belgrade to Sarajevo (Bosnia). The most interesting part of this road refers to the raising part up in the hills and mountains from "Mokrogorska Kotlina" to "Sharganski Prevoj". The famous "Sharganska Osmica" (representing number 8) was solution for this problematic path. Construction of this part of the railroad lasted for 5 years (1921-1925), and the altitude that was supposed to be over bridged was 300m high. The road loop "Sharganska Osmica" was 3,5 Km long with 20 tunnels, several bridges and viaducts. First train, called "Chira" started back in 1925. and the last of the trains traveled through this part of the rail road in 1974. when the rail road was canceled.

Instead of transformation of this railroad into the attractive tourstic path, it has been canceled and delivered to the poor local communities for further concern. This attractive path, alike to some other in Central and West Europe, was almost forgotten.

Public Railway Service of Belgrade started reconstruction of this railroad back in 1999. for touristic

purposes. Today, most of the "Sharganska Osmica" path has been revitalized with authentic surrounding and facilities. Also, the train/composition that once communicated through this railroads, has been reconstructed. This train and some renewed stations (Jatara and Mokra Gora) represent very prosperous touristic destination.

Besides "Sharganska Osmica", part of the forest rail road has also been reconstructed connecting famous picnic areas like Jatara in the Kamashina river, in total length of 2 km. In this picnic area, there is a summer theater, two restaurants and souvenir shops.

Both of the rail roads represent a kind of open museum representing history of the rail transport and cultural values of the local area. The railroad has been, for half a century, open door for Mokra Gora region into the modern world.

### Questions for discussion:

*What should be reconstructed in your local community?*

*Current State*

*What concrete measures should be taken?*

*Goal of this activity*

*Expected results*

**Envisaged time for this exercise: up to 30 min.**

### LITERATURE

Dr. Slobodan Vučićević (1999): Forests and Environment

## PROTECTION OF GEODIVERSITY

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At the beginning of 21st century the mankind is dealing with considerable challenges revolving to the protection of environment. The problem of protection and further improvement of environment was actualised after The Conference about protection and development held in 1992. in Rio de Janeiro when it was concluded that the only possible development is the one accorded with nature and it's laws. Many states confirmed the determination for preserved ten years later in 2002. at Johannesburg Sustainable Development Meeting. Sustainable development is impossible without integral approach in protection of nature. Geodiversity, who had been neglected and pushed aside for many years, is being given much more attention and about it's protection, integral approach and way of solving problems in protection of nature were made many different programs and plans in global.

The geodiversity is the geographical diversity of landscape, which is explained in geological structure and morphological elements and processes. Geodiversity includes rocks, geomorphologic elements and soils and also are recognized hydrological and climatologically processes under which pressure they modifies. It had being built during the history of the Earth and the geodiversity of particular territory depend on litological structure, tectonically processes and exogenic forces which influence after mentioned above. Different age

and structure of rocks are affect on soil which is one of conditions for life of plants and animals and finally a man. However diversity includes minerals and energetic resources which ensure the economic activity of human beings.

Geoheritage is geological, geomorphological, hydrological, pedological and specific archaeological values were founded during long-time forming of the Earth. The different epochs from geological history also as different processes which have been placed, affected on relief and form of the rocks. Nowadays they are in the dependence of phenomenon, rich heritage, from which one may know about climate, flora and fauna of the Earth in previous times. The facts from geoheritage can show the history of the Earth is the most important criteria for choosing the geoheritage sites which must be protected.

When we are talking about the geoconservation the main aim is the protection of the diversity and processes. In these terms the notion of the geodiversity is similar to biodiversity which is used to explain the common difference of genes, species and ecosystems. The protection of geodiversity is important because of geological structure, relief and soil are the base for all ecological processes (including biological) which is the subject of special interest of the majority



Pic.1. Babel (Romania)



Pic.2. Fossil fish – oligocene (Poland)

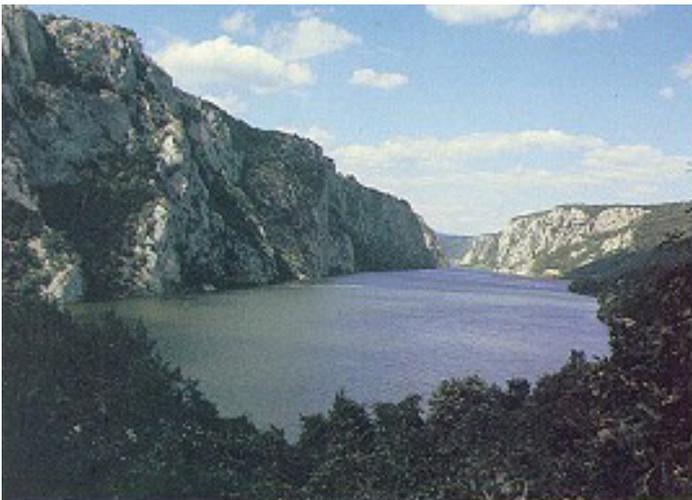
## PROTECTION OF GEODIVERSITY

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### FUTURE PERSPECTIVES OF IMPROVING GEOHERITAGE PROTECTION

For several years now, and particularly since the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992, the protection and enlightened management of the environment has been acknowledged as top priority by decision-makers, planners, scientists and the general public alike.



Pic.3. Iron Gates (Serbia – Romania)

If the Earth's environment is to be treated as it ought to be, a better understanding of the various natural, physical, chemical, biological and geological processes which have left their mark on the Earth's surface is necessary. These marks are still affecting humankind and will continue to influence our future. A good knowledge of geological heritage - and a healthy respect for all it represents - is an important factor in the holistic approach for sustainable development.

Knowledge of and respect for our geological heritage are vital to the holistic approach necessary for sustainable development. As a logical extension to WHL sites, UNESCO plans to launch Geoparks to increase international awareness of Earth heritage sites. The programme aims to enhance the value of sites while creating employment and promoting regional

economic development. The 'UNESCO Geopark' label will become synonymous with environmental protection and development. Some 20 territories will receive this distinction every year until, eventually, some 500 Geoparks will be recognised worldwide. A Geopark is: "a territory with well-defined limits that has a large enough surface area for it to serve local economic development. The Geopark comprises a number of geological-palaeontological heritage sites of special scientific importance, rarity or beauty; it may not be solely of geological-palaeontological significance but also of archaeological, ecological, historical or cultural value".

#### A UNESCO Geopark:

- Is a territory encompassing one or more sites of scientific importance, not only for geological reasons but also by virtue of its archaeological, ecological or cultural value;
- Will have a management plan designed to foster socio-economic development that is sustainable (most likely to be based on geo-eco-tourism);
- Will demonstrate methods for conserving and enhancing geological heritage and provide means for teaching geo-eco-scientific disciplines and broader environmental issues;
- Will be proposed by public authorities, local communities and private interests acting together; Will be part of a global network which will demonstrate and share best practices with respect to Earth heritage conservation and its integration into sustainable development strategies.



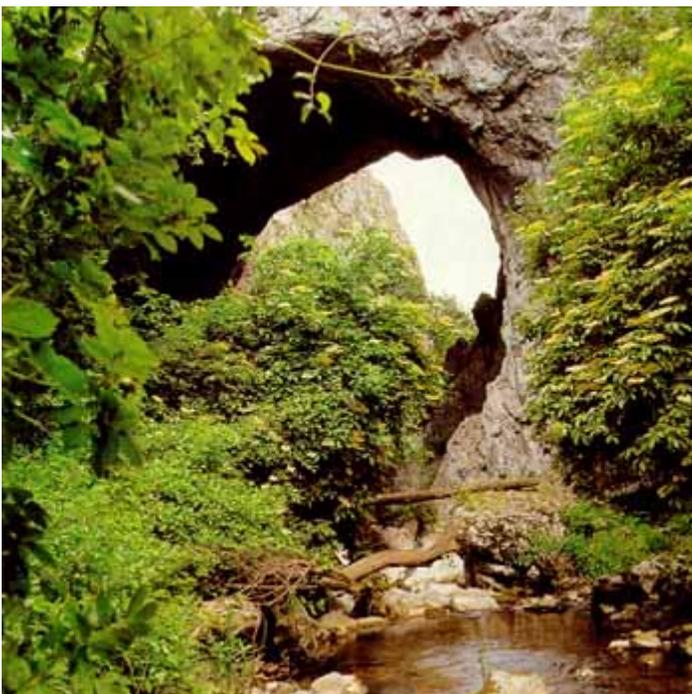
Pic.4. Lake Synevyr (Ukraina)

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In principle it will represent a terrain (a landscape), which is of sufficient size to generate economic activity – notably through tourism. Small outcrops, although scientifically important, will not normally have this potential. Also, would normally be of sufficient size to encompass a number of small sites (geosites) which taken together illustrate important geological features. Such a network in the context of a Geopark would serve to stimulate economic development. A Geopark would comprise a number of geological-palaeontological heritage sites of special scientific importance, rarity or beauty may not be solely of geological-palaeontological significance. Archaeological, ecological, historical or cultural features could also be represented and should be regarded as important components. Terrains which are of geological-palaeontological (and archaeological and biological) interest but which have no permanent population, or are too remote, to generate economic activity would also not normally be suitable as Geoparks.



Pic.5. Natural bridge, river Vratna (Serbia)

ple to their geological-palaeontological and geomorphological environment. and has also to support education on the environment, training and development of scientific research in the various disciplines of the Earth Sciences, enhancement of the natural environment and sustainable development policies .

The impact on the area is immediate, by improving human living conditions and the rural environment, strengthening identification of the population with their area and triggering cultural renaissance. Respectful of the environment, Geoparks stimulate, for example, the creation of innovative local enterprises, small business, cottage industries and new jobs, generate new sources of revenue (e.g. geotourism, geoproducts).

The geotouristic element plays an essential role to put geoconservation into practice and make it understood by the broad public and our politicians. 'Geotourism' came into common usage from the mid-1990s onwards. Geotourism might be best regarded as the provision of interpretative facilities and services to promote the value and societal benefit of geological and geomorphological sites and their materials, and to ensure their conservation, for the use of students, tourists and other casual recreationalists. In the Geoparks, geotourism is seen as part of a holistic management approach to the broad field of geological and landscape history, including its interconnection with flora and fauna, the cultivated landscape, present land use, environmental issues and actual economy. The finding of unique selling propositions is one of the basics for an effective regional marketing process and the development of a regional identity. Networking with stakeholders from authorities, industry, nature conservation, universities and other institutions assures sustainability and quality.

The Geopark concept is designed to relate peo-

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Pic.6. Dragobrat (Ukraina)

An example demonstrating this development is the Haute Provence Geological Reserve in southern France which attracts 100,000 visitors a year to the region which was, before the establishment of the reserve, very weakly frequented by tourists, and is expected to support 400 jobs by 2006. Such a strategy depends for its success upon the identification and conservation of its resource base, a knowledge and understanding of its visitor base and the development and promotion of effective interpretative media.

### CASE STUDY: THE WAY OF GEOHERITAGE PROTECTION IN SERBIA

The idea of the geoheritage protection in Serbia isn't new. The researcher investigations in the field of geoscience began to appear in the end of 19 century – the beginning of the 20 century. In the same time with the opening of Serbian natural treasure appeared also ideas, how to protect them. The first proposals was appeared in 1924 when Peter Pavlovic raised a question about the protection of Zlotska cave. The most interesting point is that in this year the first site was put under the protection in Holland. Serious steps were undertaken after established Institute for Nature Protection of Serbia. Since than there were protected 86 sites in Serbia.

Since 1948., a law regulation of nature protec-

tion and also the protection of geodiversity as integral part of it, was changing often. The site of geoheritage considered as “natural monument” or “natural reservation zone” in a sense of specific flora and fauna till 1991 (enabling a Law on environmental protection). From 1991. it can be put down under the protection as other type of protected natural element. The problem is, among all, that under the Law on environmental protection from 1991, among other protected, there are no category of geoheritage, but called “natural monument” which includes quite widespread group of objects. That's why it is necessary to adopt a new law, which would regards to the problems of geoheritage and would have basic criteria for determent the sites that must be put under the protection and rules under which a management and usage of these geoheritage sites would be regulated.

Nowadays, there are approximately 500 of objects in Serbia which are necessary to put under the protection. The main base for it is the list of protected sites and their monitoring. That's the only way to search for the changes and according to it to determine the level of protection. Also it is necessary to create the new law regulation on this problem, and besides all, it is important to develop financial and organizational level

### DUBASNICA - FUTURE GEOPARK IN SERBIA

Location(s): East Serbia Region (Dubasnica Region), including territories of municipalities of Bor, Majdanpek, Boljevac, Zagubica and Despotovac.

Dubasnica covers the region of East Kucaj mountain that covers around 80km<sup>2</sup>. It is a karst area with numerous nature rarities including huge geodiversity (especially speleological objects). So far researches have been conducted over 130 speleological objects. 15 of these objects fulfill all the conditions as potential turistic locations. Some of the most popular locations are: Gorge of the Lazar river, Vernjikica cave, Lazareva cave (the largest in Srbia), The Gorge of Zlotska river etc. These locations are even more valuable because of the specific and rare plant and animal species.

## PROTECTION OF GEODIVERSITY

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### Questions for Discussion:

- What could be understood as geodiversity?
- Why is it important to preserve geodiversity?
- What are the objects of geo-heritage?
- Are there any objects of geo-heritage in your near surrounding?
- What are the ways of protection of these objects?
- Who is responsible for protection of these objects?
- What can you personally do to protect and/or sustainably use the objects?

## SUSTAINABLE TOURISM

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In the last few decades, tourism has become an activity in which great number of people take active part, whether they directly work in this field or participate as visitors to different parts of the World. In great number of countries tourism represents if not leading than very significant economy branch. In Europe only 9% of population participate as tourist workers and 9% participate in expenditure, while in 38% of the world countries the tourism represents main source of budget incomes. In majority of the developing countries it represents main „tool“ to fight poverty.

1. Tourist values of the Carpathian EcoRegion
2. Development of tourism in the Carpathians
3. Role of NGO sector
4. EcoTourism

### Touristic values of the Carpathian EcoRegion

Tourism of the Carpathian Region depends on available physical and human resources. Human resources are not only people, but include all the touristic values that are made by people, e.g.:

- Art
- Architecture, monuments, museums
- Local tradition
- Food and drink
- Music
- Important historical of political locations



Picture 2. Souvenires on the Sesori festival (Ukraine)



Picture 1. Gorale-folk culture (Poland)

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Picture 3. Monastery-Carpathian Mountains

Physical resources are nature made values and include:

- Orography (beeches, mountains, rivers, lakes, glaciers etc.)
- Ecosystems (rain forests, old forests etc.)
- Climate and weather

problems such as road obstruction, waste generation, lack of parking places, erosion etc.

If given area has nature beauties that attract great number of people, than development of tourism must be carefully managed with less impact on environmental quality and local population. In this case certain infrastructure must be built in order to facilitate tourist activities – roads, pedestrian roads, ski passes, airports, hotels, guidelines etc. Some areas may attract even greater number of tourists than the capacities allow. This situation may lead to massive



Picture 4. Gasienicowa- Tatry (Poland)

## SUSTAINABLE TOURISM

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### Development of tourism in the Carpathians

Massive development of tourism have caused dangerous pressure on over the environment, especially in sensitive ecosystems. This pressure reflects in over use of natural resources and goods (water, woods, soil), generation of huge amounts of waste, increase of use of vehicles (cars, airplanes etc.) etc.

Also, lack of integration of environmental protection issues in planning processes as well as lack of awareness and knowledge have caused additional negative effects of development of tourism on the quality of environment. Major driving force was given to economic prosperity. Certain advantages and disadvantages of tourism are presented in the table below:

Advantages	Disadvantages
<b>Money</b> collected can be invested in improvement of education, health etc.	<b>Profit</b> goes to companies, such as tourist agencies and hotels rather than to local communities.
Tourism based <b>jobs</b> provides local population with new opportunities for professional improvements.	<b>Companies</b> may bring workers from outside local communities to deal with more complex jobs and local population may work on less complex/less paid positions.
<b>Construction</b> of new houses and business space for local personnel.	<b>Prices of houses</b> may go up and prevent local population to reach adequate living standards.
<b>Local infrastructure</b> improves, e.g. aqueducts, waste water systems, roads, busses, taxi services and airports.	<b>Important projects</b> for local communities may become irrelevant in comparison to infrastructure projects.
<b>Visitors</b> can learn more about specific culture of local communities.	In case that presentation of local culture serves only to amuse rather than enrich tourists, it can humiliate local population.
<b>Tourists</b> may enjoy beautiful nature and landscapes, wild plant and animal species. This can make them aware of fragile ecosystems and negative effects of environmental pollution.	<b>Environmental pollution and degradation</b> may be result of a large number of tourists.

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### Role of NGO sector

One of the main principles of sustainable tourism is that it has to be developed with help and support of local communities. Important role of local community is to monitor the effects of tourism on the state and quality of local environment. This requires better knowledge and awareness raising among local population especially in the field of nature protection, about problems and possible solutions on the principles of sustainability.

The role of NGOs is mainly as a kind of mediator between local government and local population. One of the reasons for this is the fact that local population express more trust in NGOs (as non formal structure) than in government (representing the state and political power).

Goals of NGO activities referring to development of sustainable tourism are:

- Initiating dialogues between all stakeholders
- Promotion of consultations in the process of tourism development and planning
- Improvements of the program of education and creation of awareness about tourism for all stakeholders
- Support to the responsible use of resources
- Analyzes of relevant experiences about sustainable development of tourism in different parts of the World
- Development of programs for support of integrity of local cultures and economy
- Support to the use of knowledge, skills relevant for preservation and sustainable use of resources and for promotion of activities directed to poverty elimination, protection of human rights and environmental protection in tourism.

Essential basis for involvement of NGOs in process of sustainable tourism development is establishment of dialogue between stakeholders. This means that all stakeholders should be consulted in the

process of preparation of plans for development of sustainable tourism.

### Ecotourism

In accordance with the above mentioned, it is necessary to make a shift in the planning of development of tourism in a way which will consider nature, needs of tourists and at the same time, contributes to cultural and economic development of local population. Preserved nature is a precondition for development of tourism, but at the same time, it is a kind of its results.

**Ecotourism** is ecologically responsible travel and visit to relatively preserved landscapes, with the purpose to enjoy nature (and cultural values) while taking into account protection of environment, minimum effects of visitors and positive effects on local population.

Many tourist destination may be damaged by the great number of tourists. In case of destruction, these destinations may be unavailable for future generations. Ecotourism should contribute to elevation of the effects of tourism upon environment. The idea is to provide tourists with all beauties of preserved environment, rare animal and plant species, culture of local population and, at the same time, to make them preserve environment, nature, culture and minimize negative effects on local population.

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Picture 5. Jachowka village (Poland)



Picture 6. Wolf



Picture 7. Church-Colochava village

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Ecotourism is a type of sustainable development. This approach considers:

- Tourism which does not abuse environment and local communities
- Clear and transparent planning of development of tourism
- Secure that the infrastructure provide benefits to local population rather than to the tourists alone
- Consult local communities in the process of planning development programs

Ecotourism requires from tourists visiting sensitive areas following:

- To protect the environment – to use marked pedestrian paths, avoid dispersal of waste and fire
- Do not disturb wild species – not to scare and not to feed animals
- To protect resources – elevate use of water, avoid use of air conditioners
- To support local communities – use local accommodation capacities and local food supplies
- Consume local food and drinks – avoid products produced in developed countries
- To respect local costumes and tradition – local population may be offended by the inappropriate behavior and dressing of tourists. Native people appreciate if tourists try to accommodate to their habits and characteristics.

### UPON THE PRINCIPLES STATED ABOVE PLEASE TRY TO ANSWER FOLLOWING QUESTIONS:

1. Tourism of a given destination mostly depends on local human and physical resources. What are human resources?

- a) tourist guides and other people providing services and make your vacation unforgettable.
- b) touristic values made by humans
- c) touristic values made by by nature

2. Tourism of a given area usually depends on physical nature values. What are physical/nature values?

- a) fighting sports such as boxing
- b) touristic values made by humans
- c) touristic values made by nature
- d) touristic values that are in movements such as trains etc.
- e) resources that may be useful for tourists such as libraries and informative centers.

3. Which of the following touristic values are not human type of resources?

- a) art
- b) monuments
- c) beeches
- d) food and drinks
- e) music

4. Which of the following touristic values are not physical resources?

- a) orography of a given area, e.g. lakes, rivers, mountains etc.
- b) ecosystems, e.g. rain forests
- c) weather and climate
- d) gardens

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5. Following text represents how human and physical resources can be effected by large number of tourists. Use the appropriate words in the empty space in the text.

manage  
 raise  
 environment  
 infrastructure  
 historical  
 obstruction  
 improve

When certain area has resources that attract large number of tourists, the tourism has to be \_\_\_\_\_ in a way that do not produce harm to \_\_\_\_\_ and local population. There must be adequate \_\_\_\_\_ and objects which will be in service of tourists – roads and pedestrian paths, airports, hotels, guides etc. Some places may attract much larger number of tourists than the local infrastructure can bare, and usually these are places of high nature values or of \_\_\_\_\_ importance. Massive tourism can cause problems such as \_\_\_\_\_ of roads, huge amounts of waste, lack of parking places or erosion on pedestrian paths.

6. Tourism is usually seen from the Government point of view as a vital source of budget income for development. See the list of advantages that tourism can provide to those countries and try to find disadvantage which is on the wrong place.

- Foreign money brought to the region may be invested in improvements of local education, health issues etc.
- Tourism that has provided new jobs to local population also gives them opportunity to develop new knowledge and skills that are important for tourist economy.
- Prices of houses may raise when foreign companies and investors start buying them
- Local infrastructure is increasing for tourist purposes, such as water supply and waste water systems, roads etc.
- Tourists are in the position to see interesting and

valuable landscapes, living world and thus they will learn about possible treats and harms to the environment and fragile ecosystems.

7. What can happen if to big number of tourists start visiting nature reserves and coral riffs?

- erosion of soil
- disturbance of habitats of wild plants and animals
- disturbance of habits of wild life
- all mentioned represent potential danger

8. Role of NGOs in development of sustainable tourism is of great importance. In the following text introduce words that are missing, and after that, please title three goals of NGOs in accordance to sustainable development.

Importance of NGOs, mainly is in the mediation role between \_\_\_\_\_ and \_\_\_\_\_. Important precondition for participation of NGOs in the process of development of sustainable tourism is to introduce process of \_\_\_\_\_ in sustainable tourism. This means that all interested counterparts should be involved in formulation of plans of activities for sustainable development of tourism.

Goals :

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

9. Goal of ecotourism is to attract tourists in the areas with extraordinary nature beauties, to introduce them with rare plant and animal species as well as with local culture and tradition, while at the same time providing preservation of environment and minimizing the negative effects on local population. Choose the words from the list and introduce them in the text about ecotourism.

sustainable  
 environment  
 initiate  
 consulted  
 harm  
 conveniences  
 beeches  
 Infrastructural

## SUSTAINABLE TOURISM

If over developed tourism causes negative impacts on nature values than it can lead to unavailability of these values for future generations. This is why tourism must be \_\_\_\_\_. This means that development of tourism must be strictly planned. \_\_\_\_\_ objects must provide benefits for local population and tourists equally. Local communities must be \_\_\_\_\_ during planning of the development strategies. Tourism must not be based on exploitation of local communities or \_\_\_\_\_.

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### PROGRAM FOR SUSTAINABLE DEVELOPMENT EDUCATION Strengthening Communication, Civil Participation and Democracy for Sustainable Living of Local Communities in Carpathian Eco-region



#### Summary

The idea of this paper is to support sustainable development of local communities in Carpathian countries through a Framework Program (hereinafter referred to as Program) as a practical tool for implementation of the sustainable development principles. Following this document it will be possible to build capacities of local communities for sustainable living and creating an open, democratic society that takes care about needs of future generations.

This Program is a part of a project conducted in two parts:

1. Organization of a three day seminar for Carpathian NGOs (CNGOs); Designing and preparation of the Program (for education for sustainable development); Drafting the Workbook for implementation of the Program in each of the Carpathian countries.
2. Implementation of the Program in each of the Carpathian countries through country-specific seminars (organized and conducted by participating organizations).

Implementation of the Program is envisaged through a number of seminars which will take place in “local communities” of each of the Carpathian countries. Seminars serve as a method for Program implementation. Target groups for these seminars can be found in the text below. However, local communities could be considered as general target group. As for this document, local community will be represented through participants derived from various stakeholders (meaning: representatives of schools, nongovernmental organizations, local self-government, industry, business, media etc.). Detailed instructions on seminar organization and implementation will be given in the final chapter of this paper.

#### Situation analysis

The state of the environment (including social, economic and ecological component) in Carpathian local communities is not satisfactory. Majority of local communities are under-developed. People are

leaving their settlements, abandoning traditional households and occupations and move to the big cities for a better life. Due to the brake down of big industries and political factories the remaining population of local communities have already exhausted their nature resources potentials or still make huge pressure on them (fish stock supplies, forests, minerals, water etc). This leads toward unsustainable trends in new economic development of the countries.

Developing the awareness on importance of nature and environment preservation on the sustainable development principles is a precondition for good environmental management and governance. It is also closely connected to sustainable management of resources and development of open, democratic society which respects rights, not only of present, but future generations as well.

Environmental and sustainable development awareness raising must be conducted trough the society in general. It must cover all possible target groups regardless of age as well as profession and must bring together all stakeholders on local, national, regional and international level. The society that is aware of sustainable development principles is empowered for making good decizions that take into consideration social, environmental and economic interests of all citizens of the communitiy.

This is why the existing Laws on Environmental Protection determine the rule by which all state institutions, scientific, educational, cultural, information and nongovernmental institutions ought to work on environmental and sustainable development education and awareness raising, with respect to their field of expertise. All this is in order to provide full participation and develop responsibility of each individual to work to achieve healthier environment and sustainability, especially at the local scale level.

Moreover, education and awareness raising in the field of environment and sustainable development represent obligation derived from many international agreements (Rio Declaration 1992, World Summit on Sustainable Development in Johannesburg 2002, Fifth Ministerial Conference – Environment for Europe- Kiev 2003, Strategy for Education for Sustainable Development - UNECE, Vilnius, 2005).

## **Sustainable Development**

There has been few hundred SD definitions of sustainable development invented so far. The most popular is the Brundtland's definition prepared for the World Commission for Environment and Development in 1987:

*SD is seen as development which meets the needs of the present generation without compromising the needs of future generations for their own development.*

The concept of sustainable development is complex and it is not universally understood across the world. Sustainable development is increasingly seen as a process rather than target looking at the integration of various “themes” or aspects in the policy process and consensus building amongst the stakeholders regarding development trade-offs.

Some of the other SD definitions are the following:

*Improving the quality of human life while living within the carrying capacity of supporting ecosystems* (IUCN/UNEP/WWF, 1991)

*...to equitably meet developmental and environmental needs of present and future generations* (Principle 3, Rio Declaration, 1992)

Definitions of SD mostly refer to the declining welfare of future generations, the needs of those who are less well-off, maintenance of the ecosystem's life-support functions, and the level of biodiversity, and, also, are directed towards changing societal attitudes and patterns of production and consumption.

Sustainable development is usually seen as the intersection between environment, society and economy, which are to be understood as as connected rather than separate issues. The economic dimension of SD usually include: macro economic development, economic growth, innovation, industrial development, trade etc. The social dimension includes: unemployment, local development, health, social cohesion, wealth distribution, gender equity, health of population etc. Finally, the environmental dimension includes: biodiversity, geodiversity, landscape diversity,, water, soil and air quality, climate changes.

This three-disciplinary concept of sustainable development (referred to as the ‘triple bottom line’) is typically presented in a following figure as three intersecting spheres representing the economy, society and the environment (figure 1).

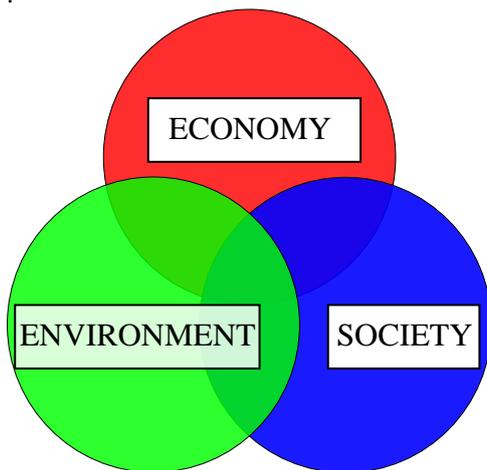


Figure 1. The triple bottom line concept of sustainable development

As it has been mentioned above, these three dimensions of sustainable development are not separate entities, and the separation of environment, society and economy might lead to a very narrow sectoral approach with scientific and technical character. It focuses on the individual parts of SD. The separation of sustainable development into environmental, economic and social dimensions emphasise potentially competing interests rather than trying to establish linkages and stipulate interdependencies between them, making the task of integration extremely difficult and promoting trade-offs, often leading to very negative effects on the environment.

Making sustainable development reality and putting it into force may be accomplished by taking into account the above mentioned SD model. Strong sustainability model assumes that certain forms of natural and man-made capital are not mutually substitutable. According to the model, the value of natural capital should not decline. On the other hand, the weak sustainability model creates conditions under which some forms of natural and man-made capital are completely substitutable.

Great numbers of the existing SD definitions, concepts , models and patterns highlights the need to select some kind of operational principles of sustainable development to guide the future development processes. The policy guiding principles help streamline policies supporting SD. The selection of SD policy guiding principles include:

*Inter-generational equity* principle refers to transfer of a respective capital on to the next generations or delivering to them an equivalent or greater resource endowment (taking into account the fact that the population is increasing).

*Intra-generational equity* principle represents a fair distribution of the available natural and man-made capital which will provide safeguarding basic human needs within the given society.

*Principle of carrying capacity* represents the maximum level of stress that the ecosystem can maintain while, at the same time, being exposed to certain stress. It is based on a system of threshold values of pollution load, which may lead to unfavourable or irreversible changes in the ecosystem.

*Principle of market correction* calls for internalisation of environmental and social externalities (e.g. the environmental and health impacts of leaded petrol should be quantified and reflected in the price of leaded petrol).

*Polluter pays principle* sets strict obligation for the polluters to cover all environmental rehabilitation and remediation costs of its activities, which cause negative environmental impacts or degradation of environmental components. This key environmental policy principle represents strong incentive to reduce and/or prevent pollution.

*User pays principle* refers to users of environmental services and natural resources and creates conditions for them to pay full costs of the service provision, including environmental externalities. This particularly states for environmental management in local communities.

*Precautionary principle* stipulates that activities that represent potential threat to the environment, human health or social integrity should be preceded.. This might be implemented trough the environmental impact assessments, sustainability assessment or trough the implementation of best available technologies.

*Principle of awareness raising* emphasizes the significance of information dissemination and education in increasing the understanding of sustainable development concept and related issues by the general public, and might lead to changing the public consumption/production patterns.

*Subsidiarity principle* creates conditions for decentralized decision making to the lowest possible level, from municipal levels to local communities. Competencies and responsibilities should be gradually transferred from the central government level to the regional and local levels.

*E.g. In the specific context of natural resources, it is generally understood that using natural resources in a sustainable way means ensuring their future availability, and reducing environmental impacts of their use. Hence, sustainable use and management of natural resources (both renewable and non-renewable) require application of three key principles:*

*The use of renewable resources should not exceed their renewal/regeneration rates.*

*The use of non-renewable resources should not exceed the rate at which substitutes are developed (should be limited to levels at which they can either be replaced by physically or functionally equivalent renewable resources or at which consumption can be offset by increasing the productivity of renewable or non-renewable resources).*

*Outputs of substances to the environment (pollution) should not exceed the assimilative (absorption) capacity of environmental media.*

## **The Carpathian EcoRegion**

The Carpathians cover an area of about 209 000 km<sup>2</sup> with a population of 17 million, most of whom live in rural communities. The highest peak of the Carpathians is Gerlach (2655m) in Slovakia. The Carpathian range extends from Austria to Serbia, covering most of Slovakia and Romania and parts of the Czech Republic, Hungary, Poland, Ukraine and Serbia.

The Carpathians represent a natural bridge between Western and Eastern Europe, allowing migration and genetic exchange for plant and animal species. They contain some of the least disturbed ecosystems (the largest European natural beech forest complex as well as vast tracks of mountain primeval forests).



They contain numerous endemic species (over 480) and threatened mountain plant species and communities, and harbour one third (3.988) of all European vascular plant species.

The region is also the last refuge in Europe for thousands of bears, wolves and lynx. (around 6000 bears, 3000 wolfs and 1500 wild cats).

The Carpathian landscape has largely been shaped by a long tradition of mountain agriculture and shepherding. These traditional occupations are now under decline due to economic changes (towards free market) and lack of economic and social incentive.

Although the Carpathians and some other, more developed European mountain regions have followed different paths of development, especially economic development, in the past, the common issues of nature conservation and sustainable development can be addressed by sharing knowledge and experience.

Carpathians nature ecosystems, as well as traditional life, are endangered now-days.

Mountain shepherding has been one of the pillars of Carpathian culture, though under Communist regimes the number of sheep, for example, fell by two-thirds.

Privatization of forests in Carpathian communities, since the collapse of led to over-logging.

Deforestation is thus occurring not only because of illegal and unplanned logging, but due to climate change as well, threatening wildlife habitat. In some areas, poaching is out of control and the traditional nature protection methods are not sustainable due to difficult economic situation faced by most Central and Eastern European (CEE) countries.

## SITUATION ANALYSES

## Setting up the Territorial Scope

*The Program will be conducted at the local scale level. Local community is a state area where people are mutually connected and legally obeyed by much more sensitive and interdependent relations than in some other cases.*

- Country political establishment/level of centralization (economy and social situation, state of political orientations etc.)
- A scope of local communities (what is considered as local community; country organization: municipality, county, region etc.)
- Interdependence between local community and central government (legal aspects – laws on local communities; determinants from national strategies and programs; descriptive part)
- Definition of the territory/surface/area to be covered by the Program (identifying local community/es; e.g. proposals on specific local communities that have urgent need for this type of programs and activities)

## Nature Conditions

It is important to describe natural conditions of a given territory, as well as endangerment/pollution of environmental components.

- Landscape, geography, geomorphology
- Biodiversity
- Water (surface and ground waters)
- Soil
- Forests/products picked up from forests, pastures, cultivated land

### • Large-Scale Protected Area Types in the Carpathians

	National Parks	National Parks / National Nature Parks	Protected Landscape Areas	Landscape Parks / Regional Landscape Parks	Area (ha)	Total
<b>Czech Republic</b>	0	0	3	0	195 610	3
<b>Hungary*</b>	3	0	7	0	161 113	10
<b>Poland</b>	6	0	0	12	525 321	18
<b>Romania</b>	10	5	0	0	597 308	15
<b>Slovakia</b>	9	0	11	0	787 942	20
<b>Ukraine*</b>	0	7	0	9	304 392	16
<b>Serbia</b>	1	0	0	0	63 608	1
<b>Total</b>	<b>29</b>	<b>12</b>	<b>21</b>	<b>21</b>	<b>2 635 294</b>	<b>83</b>

\* not including 7 Nature Conservation Areas in Hungary and 3 protected areas of high protective legal status in Ukraine, which could not be integrated in the present categories.

## Sectors

It is crucial to give a description of current state of specific sectors that highly affect local community (whether they are on the local scale or at the national level)

- Agriculture (territory covered, crops, pesticides used, type of agriculture – extensive/intensive/organic)
- Industry (types of industry, technologies used, relevance to the state economy)
- Transport and infrastructure (influence on nature and environment – positive and negative effects etc.)
- Energy and mining (effects on the environment, sustainable energy resources, future trends etc.)
- Tourism (effects on the environment; nature protection and tourism,; sustainability of tourism)
- Trade (trade of nature products; trade of raw materials; products and consumption-production patterns; trade of green house gases emission etc.)
- Manufacture (preservation of natural resources and rural heritage)

## **Human population**

Overview of human population is considered as Highly important for conducting the program

- Type of settlements
- Households (describe average households, classification of households, life conditions etc.)
- Distribution of population
- Density
- Ethnic composition
- Religions
- Culture and costumes
- History

## **Economy**

State of local economy produces highest effect on the approach to the Program implementation, as well as on specific activities and project derived from Program implementation.

- Average GDP
- Capital investments
- Taxes, subsidies and incentives

## **Education**

Structure of education on local scale is a useful data for estimation of amount of information to be delivered to the local community.

- Number of schools (primary, secondary, others)
- Type of schools (economy, grammar school, law, hand crafts etc. Estimation of pupils that find work immediately after school and of those that enroll at the university; Estimation of the job market and relevance of the schools for the job market )
- Universities (number of faculties and academic institutions in the local community, region or state; quality of environmental and sustainable development studies; idea and concept of “open university”-cooperation with other education, scientific and research institutions)
- Other types of formal education
- Non-formal types of education (number and structure; who conducts this type of education and estimation of level of compatibility with formal types of education)
- Effects that other institutions/organizations have on education (industry, church, local self-government etc. Existing programs or cooperation/involvement pathways)

## **Awareness raising**

Apart from education, it is essential to learn about most recent and current awareness raising activities.

- Campaigns and promotional activities (waste, air, water, soil pollution, nature protection, consumption-production patterns, cleaner technologies, recycle activities etc.)
- Number of nongovernmental organizations dealing with awareness raising
- State of local media (television, papers, radio etc.)
- Involvement of media, local self-government, schools, businesses, industry, NGOs (counting and describing activities that involved different stakeholders; what are the stakeholders involved)

## **State of legal acts**

Title down all possible legal acts that might serve as a basis for fostering implementation of the Program.

- Laws (environmental protection law, EIA, SEIA, IPPC, Law for Protection of Waters, Law on Air Protection, Nature Protection Law etc.).
- By laws, regulations, etc.
- Strategies and programs (Poverty elevation strategies, sustainable development strategies, energy efficiency strategies, biodiversity protection strategies, nature protection strategies, economic development strategies, education development strategies, national environmental programs, environmental action programs etc.)
- Action plans (Environmental action plans, environmental performance reviews, state of the environment reports etc.)

## **Data Collection**

Large volume of processed data is required to start the Program implementation. The analysis must rely largely on published and publicly available data, statistical data, the Environmental reports, official strategies, plans and programs relevant for environment and sustainable development, monitoring data, research papers, technical reports etc. Prior to collection of data, decision will need to be made by individual countries representatives (leading organization/institution and other national members) regarding the detailed selection of resources and issues to be collected and integrated into the Program implementation schemes.

## **COORDINATION**

### **Coordination authority**

- Existing coordination entities
- Establishment of a local coordination unit (nongovernmental organization, school etc.)
- Establishment of a national coordination unit (if necessary)
- Establishment of stakeholder forum/networking
- Nomination of members of stakeholder forums
- Delegation of duties and tasks

## Partnerships

- Provision of various types of partner relations (with local self-government, schools, media, industry, business, health institutions etc.)
- Development of local, regional, national and international partnerships (networking)

## Strategic approach

- Incorporating relevant policy objectives from sectoral national policy plans, strategies and programs.
- Incorporation of international obligations of a relevant Carpathian Country stemming from international agreements, conventions, bilateral agreements and, where applicable, the EU approximation process.

## Define all target groups/stakeholders involved

- Provide a check list of potential stakeholders and target groups
- It is necessary that representatives involved as stakeholders in seminars, must obtain certain knowledge on environmental and sustainable development issues, or at least, to express strong commitments for learning about these issues.

## Events

*Events that will follow the implementation of the Program*

## Websites

*Establish national websites dedicated to the Program implementation, where possible, or adding a page to the existing website of the CERI/or local NGO.*

## IMPLEMENTATION OF THE PROGRAM

*The Program is to be implemented through a set of country specific seminars, based on the content of this document. Content of the seminars is prescribed in this document as well as all organizational issues and logistics. Main differences between country specific seminars will be based on the part III "Situation Analyses". Each implementing authority is stimulated to take into account local circumstances during implementation of the Program and organization of seminars. Goals and outcomes should be similar for each, country-specific, program implementation.*

## Issues to be covered

- ✓ Environmental Problems,
- ✓ Sustainable Development,
- ✓ Project Preparation and Management,
- ✓ Environmental Policy and Sustainable Development;
- ✓ Environment and Sustainability Relations;

- ✓ Biodiversity and Sustainable Development;
- ✓ Genetically Modified Organisms;
- ✓ Sustainable Tourism,
- ✓ Sustainable Agriculture;
- ✓ Sustainable Economy;
- ✓ Sustainable Energy Resources;
- ✓ The Role of Administration in Sustainable Development;
- ✓ Nongovernmental Organizations and Sustainable Development;
- ✓ Transition Countries and Environment;
- ✓ Problems on The Road Towards Sustainability and Healthy Environment;
- ✓ Local sustainable initiatives (Local Sustainability and Environmental Action Plans);
- ✓ Sustainable Management of Natural Resources and Waste;
- ✓ The Aarhus Convention – Citizens and Environment;
- ✓ Creating Open and Democratic Society; Environment and Democratic Society;
- ✓ Poverty Elevation;

### **Achieving The main goal**

- To provide guidelines for initiating knowledge and information referring to environmental protection and sustainable development in order to define main environmental problems, prioritize them and find relevant solutions.
- To provide education and empowerment of future focal points for environmental and sustainability management on local scale level. This will build the sustainability capacity of the local communities.
- To help in analyzing certain environmental, social and economic activities and problems in the environment, making priorities, involving all local and other relevant stakeholders and proposing solutions.
- Enabling local communities to put their local environmental problems in much broader context, taking into account principles of sustainability.

### **Objectives to be reached**

- ✓ Establish a network of partners/stakeholders (nongovernmental organizations, administration, schools, business sector etc). to help coordination of the environmental and sustainability projects on the local community scale level.
- ✓ Communicate with representatives of local media in order to get full media coverage of the activities and possible side events regarding sustainable development.
- ✓ Establish team of experts for specific issues of sustainable development.
- ✓ Develop specific subjects/themes and seminars, according to the preliminary research of the specific circumstances and characteristics of the local communities.
- ✓ Arrange logistics (accommodation, transport, equipment etc.).
- ✓ Conduct activities to implement the Program e.g seminars - interactive lectures, presentations, case studies and workshops.
- ✓ Evaluate results of the activities, prepare reports, media announcements, open forums and lectures on the goals and outcomes.
- ✓ Initiate joint projects in cooperation with different stakeholders in each local community- final stage of implementation.
- ✓ Integrate sustainable development and environment topics into local schools – as optional or compulsory subjects (where applicable).

## Contribution to democracy, participation and decision making

*All important, big decisions that affect larger population of a community are made by the stakeholder forums through consultations and agreements. The examples of the local environmental action plans, local sustainable development plans, the national environmental action plans, are good examples where decisions were made through consensus of the stakeholder forum members.*

*According to the new, democratic laws on local communities, local authorities are obliged to establish stakeholder forums when discussing important issues relevant for the community.*

*Due to the period of recent and on-going transition, there is still lack of these forums on local scale levels.*

- ✓ The Program serves to stipulate the initiation of these forums across local communities, presenting the benefits of group problem solving and involving all relevant counterparts.
- ✓ Also, higher level of local population involvement in local communities.
- ✓ Higher level of sustainable development principles integration in local plans, policies and projects, as well as in the work of local administration, NGOs, business, industry and schools.
- ✓ Better presence of environmental and sustainable development principles in local media.
- ✓ Better integration of local NGOs, and other stakeholders, especially authorities.
- ✓ Introducing transparency in the process of decision making, especially regarding environmental issues and investments (pre-introduction of the Aarhus Convention principles).
- ✓ Contribute regional cooperation, facilitating share of information and experiences between local communities.
- ✓ Lead to development of joint projects which will contribute to the improvements of the state of environment.
- ✓ Creating solid basis for strong and close cooperation with officers (offices) of Local Environmental Action Plans.

*In those municipalities who still didn't start to build their Local Environmental Action Plans, the Program shall stimulate the process and foster active participation of local stakeholders.*

### Time frame for Program activities (seminars)

N	Activities	Month											
		1	2	3	4	5	6	7	8	9	10	11	12
1	Preparation of the seminar	■		■		■		■		■		■	
2	Conducting the seminar		■		■		■		■		■		■
3	Evaluation of the results of each seminar			■		■		■		■		■	
4	Promotion of the results, monitoring, networking, day-to-day operations	■	■	■	■	■	■	■	■	■	■	■	■

## **Financing the Program implementation**

Resources to start the implementation of the Program through a number of seminars should be provided by the performing/coordinating organization. The funds might be obtained from the donor community (national and international). Also, for the purpose of getting local self-government involved in the Program implementation, some local resources should be mobilized.

Resources might be obtained from the private companies and from industry, as very important stakeholders.

Getting funds from different stakeholders might provide better interest for the issues and might lead to a more integrative approach to the Program implementation.

For those local communities that already have budget lines determined for preparation of the strategic environmental or/and sustainability documents, this might be a very good piloting project to be financed through those funds.

## **Local Resources Mobilization**

The Program is aimed to the members of the local communities and the local community is the final beneficiary of the Program seminars. The potential of the local community lies among its members. The Program will use the potential of the local communities and upgrade it with concrete information, education and share of experience. The program, can, but not necessarily, search for additional funds in sense of knowledge and skills development from outside-community donors. All future actions and projects that are to be prepared and conducted by the local community are depending, in initial phase, on local resources. The community should attract investments in local communities and based on the specific knowledge and expertise, they should motivate local decision makers and other stakeholders to invest in environment and strive towards sustainable development.

The program itself should also rely on local support regarding logistics (media coverage, work space, communication, technique etc). Services of local partner organization and local administration will also be provided in order to make the program implementation more successful.

## **MONITORING AND EVALUATION**

The success of the achieved results should be evaluated through counting number of relevant activities per month, per year, as well as through conducting public opinion surveys in different time period. The main evaluation of the project activities shall be done by Program implementing organization/institution, namely the Program coordination unit.

After preparation and implementation of each seminar within the program, there will be evaluation of the results and feedbacks from the participants (according to the proposed forms – preparation of this form is obligation of the Program coordination unit). This will help in estimation of the performed activities, but at the same time, it will help in removing eventual mistakes and disadvantages of the seminar. The seminars of the program will also be evaluated by an *independent project expert* to be hired by the project coordination unit. This expert will have to be a person with relevant working experience in the environmental and sustainable development issues (minimum 10 years), to hold PhD diploma and have experience in working on regional and international programs and projects in the field of environment, sustainable development and education.

Permanent monitoring will be done through tracking the activities e.g. project proposals, prepared by participants in each of the seminars.

## **Time frames of the Program**

The Program is a long term policy vision and hence it is recommended that the time frame of the Program is 5 years. During this period the Program will be implemented in all Carpathian countries. Comments, updates and other kinds of remarks shall be submitted to the Program management authority (t.b.c.) after the implementation phase. New version shall be issued accordingly.

## **Progress monitoring criteria to be applied to monitor progress:**

- ✓ Are policy targets achieved or on track?
- ✓ Has education for sustainable development and environment been improved?
- ✓ Have the activities regarding environmental protection and sustainable development increased?
- ✓ Are priorities of the Program followed by sectoral programs or policies?
- ✓ Are seminars/subsequent actions implemented on time?
- ✓ Are actions developed into projects?
- ✓ Rate of commitment of financial resources.

It is a good practice to introduce specific reporting arrangements for regular Program progress implementation reviews. An institution (e.g. the coordinating organization/institution) should be tasked with regular implementation monitoring of the Program. When the implementation experience builds up, the update/revision of the Program should be considered.

## **Seminars**

- Provide participation of various stakeholders at the local scale level (local government, NGOs, schools, private companies, industry, media etc.)
- Establish strong multisectoral support to the Program implementation within local community
- Make sure to provide adequate room, equipment and accommodation for the seminar
- Concentrate on a given local community (taking into consideration local environmental, social and economic problems)
- Try to involve all the participants from the beginning of the seminar. Make them active and creative. - - Provide conditions for taking into account opinions of each of the participants of the seminars.
- Make the participants feel that the results of the seminar are their own property and responsibility
- Put an accent on action and sustainability.
- Try to organize all seminar activities within max. 3 days.

## **Important note!**

For the First 5 years, this paper, representing a frame Program for education for sustainable development in the Carpathian EcoRegion, will serve as a reporting format for each of the Carpathian countries.