



**Land Degradation in Central and Eastern
Europe: Proceedings of the Workshop on
Land Degradation/Desertification in Central
and Eastern Europe in the context of the
UNCCD**

**8 – 9 May 2000
Brussels, Belgium**

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Table of Contents	Page number
1. Introduction	5
2. Opening Statements	5
3. Agenda Item 1: Election of the Chairman and Rapporteur of the Workshop and Adoption of the Agenda	
4. Agenda Item 2: State of Land Degradation and Desertification in countries of Central and Eastern Europe	
5. Agenda Item 3: Major Issues Related to the Implementation of the UNCCD in Countries of Central and Eastern Europe and Linkages and Synergies with other Environmental Conventions	
6. Agenda Item 4: Instruments of the EC on combatting land degradation and desertification.	
7. Consideration of Agenda items 2, 3 and 4 at the Plenary meetings	
8. Considerations of Agenda items 5 and 6 in the Working Groups	
9. Adoption of the Conclusions and Closing of the Workshop	
Annex I Agenda and Programme of Work	
Annex II Statement by Dr. Rainer Gepperth, Head of the Institute for International Contact and Cooperation, Hanns Seidel Foundation, Munich Germany.	
Annex III Statement by Mr. Hama Arba Diallo, Executive Secretary, UNCCD.	
Annex IV Statement by Mr. Christoph Bail, Head of Unit Development and Environment, Directorate General Environment, European Commission, Brussels Belgium.	
Annex V Statement by Dr. Fritz Holzwarth, Federal Ministry of	

Environment, Nature Protection and Nuclear Safety, Federal Republic of Germany

Annex VI

Statement by Mr. A.F Marques de Carvalho, Portuguese Presidency of the European Community, Brussels Belgium.

Annex VII

Background Paper on “Soil Degradation in Europe” by Dr. Anna Rita Gentile, Project Manager for Soil and Contaminated Sites, European Environment Agency.

Annex VIII

Background Paper on “State of Land Degradation in Central and Eastern Europe” by Dr. Ryszard Debicki, Institute of Earth Sciences, University of Maria Curie Skłodowska and Institute of Agrophysics, Polish Academy of Sciences, Lubin Poland

Annex IX

Background Paper on “Major Issues Related to the Implementation of the UNCCD in Countries of Central and Eastern Europe” by Dr. Joachim Woiwode, Head of Division, Federal Ministry for the Environment Nature Conservation and Nuclear Safety, Germany

Annex X

Statement by Mr. Philip Dobie, Director, UNSO.

Annex XI

Background Paper on “EU Policies and Instruments in the field of Land Degradation/Desertification especially in the CEEC and NIS” by Ms. Constance Miller and Mr. Dominik Meier, Miller & Meier GbR.

Annex XII

Statement by Ms. Ria Oomen-Ruijten (MEP), European Parliament.

Annex XIII

List of Participants.

Annex XIV

List of Scientific Institutions Involved in Research on Land Degradation.

1. Introduction

The Workshop was organised by the Secretariat of the United Nations Convention to Combat Desertification (UNCCD) in cooperation with the European Commission and the Hanns Siedel Foundation, with financial support from the European Commission, Governments of the Federal Republic of Germany and Finland and from the Hanns Siedel Foundation. The Workshop was held in Brussels, Belgium from 8 to 9 May 2000. The Workshop was attended by about 50 participants including representatives from 20 countries of Central and Eastern Europe and from the Federal Republic of Germany and from Portugal, UNSO/UNDP, the European Commission and the European Parliament, the Hanns Siedel Foundation (for the list of participants see Annex XIII).

The main purposes of the Workshop were to:

- Review problems of land degradation and drought mitigation in Central and Eastern Europe in the context of the UNCCD, taking into account its linkage and synergy with other environmental conventions;
- Assist countries of Central and Eastern Europe in the process of their accession to the UNCCD and raise awareness among the countries of the region of the benefits, which could be gained from participation in the Convention;
- Strengthen regional cooperation between countries of Central and Eastern Europe on the issues of land degradation and drought mitigation; and
- Promote environmental legislation in Central and Eastern Europe.

2. Opening statements

The opening ceremony was chaired by Mr. Hama Arba Diallo, Executive Secretary, Secretariat of the United Nations Convention to Combat Desertification (UNCCD). Opening statements were delivered by:

- Dr. Rainer Gepperth, Head of the Institute for International Contact and Cooperation, Hanns Seidel Foundation, Munich;
- Mr. Hama Arba Diallo, Executive Secretary, UNCCD Secretariat, Bonn;
- Mr. Christoph Bail, Head of Unit Development and Environment, Directorate General Environment, European Commission, Brussels;
- Dr. Fritz Holzwarth, Director, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Federal Republic of Germany, Bonn;
- Mr. A.F Marques de Carvalho, Portuguese Presidency of the European Community, Brussels.

For the texts of the statements see Annexes II-VI.

**3. Agenda item 1:
Election of the Chairman and Rapporteur of the Workshop and
Adoption of the Agenda**

Mr. Samvel Baloyan, Deputy Minister of Nature Protection, Republic of Armenia was elected as the Chairman of the Workshop and Mr. Dariusz Jan Stanislawski, Advisor to the Minister, Ministry of Environment of Poland was elected as the Rapporteur. Agenda of the Workshop as adopted is contained in Annex I.

**4. Agenda item 2:
State of land degradation and desertification in countries of
Central and Eastern Europe**

The item was introduced by Dr. Anna Rita Gentile, Project Manager for Soil and Contaminated Sites, European Environment Agency and by Dr. Ryszard Debicki, Institute of Earth Sciences, University of Maria Curie Skłodowska and Institute of Agrophysics, Polish Academy of Sciences, Lubin Poland

Dr. Anna Rita Gentile presented her background paper on "Soil degradation in Europe" (see Annex VII) summary of which is reproduced below:

Summary

Why is soil important for Europe?

Preservation of the soil resource is an important issue at the local, national, European and global levels. Soil is not only the basis for 90% of all human food, livestock feed, fibre and fuel, but also provides more than productive functions. Europe's soil forms the spatial dimension for the development of human settlements: the building of houses and infrastructures, recreation facilities and waste disposal. It forms an essential part of the landscape, it conserves the remains of our past and is itself a relevant part of our cultural heritage.

At the European level, the diversity and multi-functionality of soil contribute to Europe's cultural and natural diversity. Protecting soil helps to preserve Europe's identity and its ability to cope with change.

At the global level, combating soil degradation will help offset greenhouse gas emissions, will provide a better environment, will guarantee more food to an increasing population and will contribute to the economic progress of future generations.

However, soil is a limited and not renewable resource, and unlike air and water, damage to soil is not easily recoverable. On soil multi-functionality is based the soil paradox: its relevance to a wide range of human activities makes it more vulnerable to damage and depletion from many sides. Its buffering capacity, its resilience and its capability to filter and absorb contaminants mean that damage is not often perceived until it is far advanced. Now, after many years of misuse, warning signs are appearing more clearly and responses are required, both corrective (costly and sometimes not fully feasible) and preventive, so that we do not continue to transfer problems to future generations.

What's happening to Europe's soils?

Europe's soil resource is being lost and degraded as a result of the development of economic sectors, including agriculture, households, industry, transport and tourism, as well as climate change and land use change.

In some part of Southern and Central-Eastern Europe the degradation is so severe that it has led to the reduction of the soil's capability to support human communities and to desertification. Very serious problems of desertification occur in neighbouring regions, especially in Northern Africa and Central Asia.

Pressures are coming from the concentration of population and activities in a small space. There are increasing and often conflicting demands on the soil resource coming from nearly all economic sectors. This is in particular evident in coastal zones especially in the Mediterranean, where urban and recreation areas, agriculture, industry, commercial activities and tourism are in competition in the same "patch" of land in many cases.

Major soil problems in Europe are summarized below and include: loss of the resource due to erosion, sealing, flooding and large mass movements; soil local and diffuse contamination especially in industrial and urban areas; and soil acidification.

Desertification, as a gradual and progressive reduction of the capacity of soil to support vegetation, animal communities and human activities such as agriculture and forestry, is threatening parts of Southern and Central-Eastern Europe. Extensive areas in the Mediterranean region have become so severely degraded that they are no longer capable of supporting any profitable cultivation, resulting in land abandonment and depopulation. Very serious problems occur in Central Asia, mainly due to changes in land use. Soil erosion. Soil erosion by water and wind is a major problem in Europe, especially in the south. On-site impacts: loss of soil organic matter. Off-sites impacts: contamination and loss of soil's capacity to sequester atmospheric carbon.

Soil sealing: The rates of real soil loss due to surface sealing through growth in urbanisation and transport infrastructure (roads, airports, railways, ports, etc.) are large and consistent in several EU countries. Soil contamination. There is no wide-spread (diffuse) pollution of Europe's soil (except soil acidification) but contamination is high in hot spots (urban areas and industrial compounds). Almost without exception, it is extremely difficult and practically or economically impossible to restore soil multi-functionality in full. Current remediation strategies aim to restore soil to perform only some of its functions.

Soil acidification is a continuing problem, but it is not expected to increase further, except in central and eastern European countries, due to the success of policy in place developed over the past 30 years. Data on soil has been gathered by different organisations for different purposes (soil has many users). There are, however, important data gaps and access to relevant data and information is difficult. Little data can be used directly for policy purposes and most only covers small geographical areas.

The way forward

Soil loss and deterioration will continue and will probably accelerate if proper and prompt measures are not taken to de-couple the progress of economic sectors and their pressures on the soil resource through the integration of soil protection measures into sectoral policies.

Some initiatives with an effect on soil have been undertaken at the local, national and European levels; few are direct, many are indirect and not all are protective. However, a European policy framework on soil protection, similar to those already in place for air and water, does not exist. Moreover, there is no mechanism in place to assess whether existing measures are leading to improvement of soil conditions and what is the level of implementation of existing legislation.

The effects on soil of the implementation of existing measures need to be analysed and monitored. Ideally such results should be communicated on a regular basis through, for example, a soil reporting mechanism based on a European soil monitoring and assessment framework. This would require a closer collaboration among administrations in order to improve access to data and data comparability, and to avoid duplication.

Conclusions

As soil is a cross-cutting issue, soil assessment approaches and soil protection policies need to incorporate a wide perspective. A correct response to the problem would involve different levels of actions, at the local, national and the global level, and the integration of environmental policies in sectoral policies. In the decades to come, sustainable use of soil and land will be a great challenge, comparable and closely interrelated with the global concerns about changes in climate and biodiversity.

Dr. Ryszard Debicki presented his background paper on "State of land degradation in Central and Eastern Europe" (see Annex VIII). In his presentation he focused on the state of land degradation in Central and Eastern Europe. He mentioned that there exist no uniform criteria and evaluation methods for the soil status in the countries of Central and Eastern Europe, and he pleaded for the development of a uniform methodology. Nevertheless, the majority of governments in this region collect data and have compiled reports on land degradation for various purposes. According to Dr. Debicki, there is a strong desire in the countries of transition, especially among the young population, to reach a living standard equal to the one in Western Europe and therefore, economic development has a higher priority than environmental problems. Finally, Dr. Debicki expressed his concern that the process of adopting Western techniques and methods of resource management in the countries of Central and Eastern Europe would lead to the loss of traditional, more sustainable approaches which still exist in this region.

5. Agenda item 3:
Major issues related to the implementation of the UNCCD in countries of Central and Eastern Europe and linkages and synergies with other environmental conventions

The item was introduced by Dr. Joachim Woiwode, Head of Division Federal Ministry for the Environment Nature Conservation and Nuclear Safety, Germany. A background paper on "Major issues related to the implementation of the UNCCD in countries of Central and Eastern Europe" prepared by Dr. J. Woiwode is contained in Annex IX. According to Dr. Woiwode, soil protection is becoming increasingly prominent on the international agenda. There is a general recognition that soil provides the basis for a wide range of human needs, such as food, infrastructure, urbanisation, raw materials etc., and a rising acceptance for the global dimension of land degradation, desertification and drought can be observed. This development has been underlined by the creation of the European Soil Forum in 1999. Since the UNCCD constitutes an adequate instrument with a strong potential to protect soils, Dr. Woiwode pleaded for an intensified use of the existing instruments and institutions instead of creating new ones and for integrating soil protection aspects into all relevant policies.

Introductory statement on the agenda item 3 was also made by Mr. Philip Dobie, Director, UNSO (see annex X).

In his statement Mr. Michael Hamell, European Commission focused on the integration of environmental concerns into agriculture. Even if the European Union has no direct competencies in the field of soil and as a consequence no directives or regulations dealing directly with soil, many measures at the European level have implications on soil. According to Mr. Hamell, there exists a European soil protection policy as far as the practical level is concerned. Due to growing political pressure, agricultural policy has to increasingly include environmental considerations. In order to take into account these developments, the European Union is drawing up standard codes of good agricultural practices and plans to give soil protection more importance in the sixth Environmental Action Programme to be adopted by 2001.

6. Agenda item 4:
Instruments of the European Commission on combatting land degradation and desertification

Participants had before them a background paper on " EU policies and instruments in the field of land degradation/desertification, especially in the CEEC and NIS" prepared by Ms. Constanze Miller and Dominik Meier, Miller und Meier GbR (see Annex XI).

Introductory statement was made by Ms. Ria Oomen-Ruiten, Member of the European Parliament (see Annexe XII).

7. Consideration of Agenda items 2, 3 and 4 at the Plenary meetings

The participants from Bosnia and Herzegovina, the FYR of Macedonia, Russian Federation, Azerbaijan, Belarus, Ukraine, Hungary, Slovakia, Poland, Czech Republic, Romania, Georgia, Republic of Moldova, Slovenia, Croatia, Latvia and Armenia delivered presentations on the actual situation of land degradation in their countries. Written presentations were also received (after the Workshop from Bulgaria, Estonia and Lithuania). Short summaries of these statements, as prepared by Dr. Eckehard Fleischhauer, consultant of the UNCCD Secretariat, are reproduced below.

Bosnia and Herzegovina

The country is characterised by a hilly and mountainous relief that occupies more than 80 % of the total area of 5 112 900 ha. About 50 % of this area can be described as agricultural land and 48 % as forestland. The total population amounts to 4 million, so 0.58 ha agricultural land and 0.36 ha arable land respectively fall to one inhabitant.

Severe processes of land degradation took place in the last decades characterised by growing urban settlements and industrialisation. Main reasons for negative impacts on land resources have to be seen in opencast mining with insufficient rehabilitation of the exploited land, deposition of overburden material from mining activities, disposal of industrial wastes, uncontrolled utilisation of land for settlements and infrastructure projects and erosion caused by deforestation and improper methods of agriculture. The opencast mining area occupies 15 000 ha. Further 3 600 ha are used by the deposition of overburden material, fly ashes and wastes. The total area affected by mining activities is 330 000 ha.

Secular processes of deforestation in connection with climatic changes led to vast karst landscapes denuded of soils and vegetation. The area amounts to 500 000 ha. Water erosion causes every year serious damages on 8 250 ha. Up to 20 cm topsoil are lost on this area.

For people and the environment the minefields remaining from the recent war are an extreme burden. 330 000 ha or more than 6 % of the total area are not usable. It is estimated that it will take 40 years to remove all mines from the land.

The hydrological pattern and drought proneness differs remarkably between the regions of the country. For the southern part annual rainfall of 2000 mm on average are characteristically. But also the flowing off is high with 1400 mm annually so that the ratio of usable precipitation to evapotranspiration is about 0.67. In the other regions despite of lower rainfalls (1000 mm in the central region and 800 mm in the northern region) proneness to drought is lesser due to smaller amounts of flowing off. Only 15000 ha agricultural land is under irrigation. The area that could be irrigated is estimated to be up to 200 000 ha.

Measures aimed to combat land degradation must therefor focus on reforestation, reclamation and natural restoration of land damaged by industrial and mining activities, cleaning up of minefields, erosion control, restoration of

drainage and irrigation systems enhancement of legal and administrative provisions in order to protect and monitor the use of fertile land. The following projects will be carried out with the aim to establish a reliable basis of information:

- an inventory of land and soil resources on a scale of 1:25000
- elaboration of a map showing polluted and damaged land with a scale appropriate for reclamation measures.

Urbanisation will continually alter landscapes. In the war and post-war period migration of people lead to extended settlements in valleys with the most fertile soils. This process is still going on.

The FYR of Macedonia

The FYR of Macedonia is a landlocked country that has an area of 25,713 km² with approximately 80% of its entire territory in mountainous regions. The population of the country is around 2 million people, of which about 60% live in urban areas. Nearly half of the total area of the country is used for agriculture, which is split equally between cultivated areas and pastures. Forest cover plays an important ecological function in terms of watershed protection and soil conservation. About 37% of the total territory of the Republic is classified as forestland, which is high in comparison to other countries in Europe.

Soil erosion

There is no cadastre of degraded soils in the FYR of Macedonia. The biggest problem is soil erosion. Poor arable farming, grazing management and deforestation in the past have contributed to erosion, which is widespread all over the country. Due to the report of the European Environment Agency, the FYR of Macedonia, together with Yugoslavia and Albania performed 'red zone of water erosion in Europe'.

96% of the total area is under processes of erosion. An amount of 9,423 km² or 36% of the total state territory is encompassed by stronger categories, extremely high, high and medium erosion processes. The total annual production of erosive deposits on the whole territory is about $17 \cdot 10^6$ [m³/year] or 685 [m³/ km² year] of which $7.5 \cdot 10^6$ [m³/year] or 303 [m³/ km² year] are carried by rivers.

A significant part of these deposits, about $3 \cdot 10^6$ [m³/year] is not carried through the downstream sections of the rivers to the exit of the state territory but lies as sediment in natural lakes and artificial reservoirs. Annual soil losses represent an annual average loss of arable soil layer of 20cm deep on an area of 8,500ha. The economic cost of erosion impacts is thus considerable.

Exactly 1,539 torrents are registered over the whole country territory. Their total catchment area is around 18,000km² (70% of the state territory). Torrential flows endanger infrastructure facilities (roads, bridges etc) and they cover agricultural land with sterile sediments (stones, gravel etc).

There are 106 different irrigation schemes in the country with a capacity to serve 124,000 hectares (ha). However, due to inefficiencies in the systems, not more than 80,000ha are irrigated. About 40,000ha of irrigated land is subject to erosion, with an annual average loss of about 308,000m³ of very fertile soil.

Measures to control erosion were initiated in the early 1900's aimed mostly at protecting rivers and reservoirs. Following the Law on Financing Melioration Systems, these measures were strengthened, and as of 1985, 285 basins were regulated. Given likely budgetary constraints over the coming years, it would be advisable to prioritise these investments.

Measures to control erosion on deforested barren lands have also been under way since 1945, when restrictions were placed on nomadic breeding of goats and sheep in forests. This measure, though unpopular, led to a recovery of degraded forest and scrubland. As part of the erosion control programme a Rural Afforestation Fund was established in 1970. Through these measures a total of 164,340 ha were reforested which was 260% more than the planned growth. Since 1990 afforestation has declined by 66%, mainly because of budget constraints. There are conflicts in certain areas between afforestation of barren lands and preservation of pastures, even though it is of poor quality. The best way of addressing this issue is through close consultation with farmers and adoption of an integrated approach to watershed management.

Impact of Chemicals on Land and Soil Quality

The data indicates that fertiliser use has been declining over the last 10 years and there were rapid declines in the 1990-1993 period because of the phasing out of input subsidies, import constraints and the financial difficulties faced by farmers. Nevertheless, fertiliser use remains quite high. From 1983-1993 it averaged 3.38kg/ha but on ploughed land it was as high as 102kg/ha.

Organic fertiliser satisfies about 30% of total fertiliser demand. There has been little thorough analysis of the impact of fertiliser use on soil. Pesticide consumption has declined dramatically over the past 10 years, from 2,706 tons in 1983 to 659 tons in 1993. Herbicide consumption has similarly declined. Analysis suggests that there are few problems in the FYR of Macedonia regarding retention of pesticide chemical residuals in vegetable products, partly because pesticide use is much lower than in Western Europe and partly because standards are respected. About 11 000ha of soil are classified as saline. These soils could be leached and brought back to higher yielding production. Studies should be carried out to assess the feasibility of their restoration.

Impact of Industrial and Municipal Waste on Soil Quality

There are no regulations regarding solid waste management in the country. As a result, there is no uniform policy on the collection, transportation, storage or treatment of wastes. In smaller towns and villages, wastes are disposed in an unplanned manner at different locations around the town. Quite often these wastes are disposed near lakes, rivers and streams and as a result they pollute the surface water.

However total area occupied by 25 landfills is about 120ha but total area under the several hundred “wild” landfills is more than 200ha. The capacity of official landfills is 70-100% used, so they would be re-cultivated. New landfills will be constructed and new agricultural or forestland will be covered with waste.

Industrial and Hazardous Waste

Large quantities of industrial and hazardous wastes are generated in the mining metallurgical, fertiliser and chemical industries as well as from power plants. Soil pollution from industrial waste has been a serious issue. Annual production of ash and slag averaged at 1.2 million tons in the 1990-1995 period. Managers of mines have not always discharged their responsibilities regarding adequate disposal of industrial waste. The regulations specifying merely that waste should be discharged on site are not clear and lead to environmental concerns. Monitoring and regulation of industrial waste is inadequate. Soil analysis in the Veles area has indicated excessive levels of lead and zinc in surrounding soils leading to contamination of vegetables.

The Rzanovo mine presents a negative example where the landfill wasn't re-cultivated. This landfill belongs to the Blastica River and Tikves Reservoir Catchment area. On the mouth of the Blastica River to the reservoir, depths of deposits are 18m. More of those deposits came from the landfill (mining railing).

There is no exact data on area degraded by industrial and hazardous waste. Evaluations are that at least this waste contaminates 6,000ha. We are not able to assess the consequences from NATO's war against Yugoslavia. Our capital, Skopje is 15km far from the border to Yugoslavia (Kosovo). The mouth of the Lepenec River (95% of its catchment area is in Kosovo) joins the Vardar River, which is located in Skopje. Caused by erosion processes, a lot of contaminated sediments produced in Kosovo are transported to the FYR of Macedonia. It is logical that surface water and groundwater are contaminated. There are arable lands along the Lepenec River in the FYR of Macedonia and farmers use water from the river for irrigation. It is probable that those lands are contaminated by groundwater and irrigation water.

Risks for the future

Like a consequence of inadequate forest logging in the past (from the 13th to the 14th century) there is a big semi-desert “Krivolak”, 25,000ha formed in the central region of our state and a lot of forest ground has been destroyed or degraded. Due to the foreseen global temperature increase in the next century and global desert expansion in Africa to the north, a lot of the FYR of Macedonia's territory has a potentially high risk of erosion.

Russian Federation

In the Russian Federation the territory of arid, semi-arid and dry sub-humid area is about 600,000 km². The basic arable lands and pastures are situated in these areas. A majority of agricultural products is produced in these areas.

In Russia 300,000 km² of arable lands are eroded by water and 79 000 km² by wind. In the Northern Caucasus almost all arable lands are eroded or subject to erosion. In the Volga River territory, South Urale and Western Siberia at least 25% of arable lands are subject to erosion. Each year the territory of eroded lands is being increased by 4,000 - 5,000 km². Out of 135.1 million ha of arable lands are salinized. In the Kalmikiya and Astrakhans, region vegetation cover is degraded in the territory, by more than 60,000 km². As a result productivity of pastures is reduced by 40 - 60%. In semideserts 15-20% of pastures are completely degraded.

Socio-economic consequences of desertification in Russia are aggravated by the fact that the arid areas of this country are characterised by winter temperatures below zero and a short vegetation period. Large territories of Russia are subject to drought consequences of which in the steppe areas are especially dangerous since fertile soils are concentrated in these areas. For example, in steppe and forest-steppe regions of the Russian valley (6% of the total territory of Russia, which are subject to desertification and droughts) 40% of country's agricultural products are being produced. Due to regular droughts productivity drops by dozens of percent and sometimes even more.

In Russia due attention was always paid to combating desertification and droughts. New agricultural technologies were developed, etc. Scientific capacities are well known. From 1978 to 1991 about 800 persons attended special training courses from 64 countries. At the same time it should be noted that until now it was not possible to stabilise the situation with desertification and to rehabilitate the degraded environment.

Russia actively participated in the preparation of the UNCCD. The country is not yet a Party to the Convention but its provisions are being implemented at the national level. At the initiative of Kalmikiya an Association of 19 affected by desertification and drought regions was established. The Inter-department Scientific Board on combating desertification and droughts was also established. The National Action Programme to combat desertification is being prepared. At the level of regions such programmes have been prepared in 8 regions. The problems related to migration are being studied. The UNEP-Russia project on assessment, monitoring and early warning system is being implemented.

With active participation of the UNCCD Secretariat a draft of the new regional implementation annex to the Convention for Central and Eastern Europe has been prepared. It helped decision-makers and civil society to understand the ideas of the UNCCD. Measures are being undertaken to decide on the country's accession to the Convention as soon as possible.

As a result of decisions taken in Rio a system of environmental conventions was established. There is a task at present to ensure co-ordination between the conventions in order to save scarce national and international financial resources and avoid duplication. In 1997 the General Assembly at its special session invited countries to strengthen co-ordination of actions at

intergovernmental level and to strengthen co-operation between the Conferences of the Parties to the Conventions. Resolutions of the General Assembly -53/186, 53/242 and the most recent 54/217 - contain relevant recommendations to the Conferences of the Parties and to the Secretariats.

There are other decisions and actions taken by the United Nations Economic Commission for Europe and by the Conferences of the Parties. But the outcome of these actions is still low. It seems that the General Assembly should give a political impulse to strengthen synergies between the Conventions.

Azerbaijan

Azerbaijan became a Party to the UNCCD in 1998 when the problems related to desertification became very urgent. The territory of Azerbaijan - the place of origin and development of the human race and agriculture - has been for thousands of years under anthropogenic pressure. Due to this factor the process of desertification, accompanied by erosion and land degradation, has been developing for centuries and was sharply intensified in the twentieth century. The major anthropogenic factors are the following:

- Destruction of vegetation cover and soil layer as a result of industrial activities, irrigation works etc;
- Degradation of vegetation cover is a result of overgrazing;
- Destruction of vegetation cover by deforestation;
- Decrease of land productivity due to wrong agricultural practices and use of extensive technologies;
- Secondary soil salinity and growing up of natural solonchaks as a result of inappropriate irrigation systems and irrational watering;
- Chemical contamination of soil as a result of uncontrolled use of pesticides

At present 3.7 million ha of land is eroded. Three million ha are subject to water erosion, 0.3 million ha. - to irrigation erosion and 0.4 million ha.- to wind erosion. Preliminary estimates show that about 0.7 million ha of agricultural lands to a total value of US\$ 1 billion are almost degraded. More than 1.2 million ha of soils are salinized, 30 000 ha of soils are destroyed as a result of extraction of mineral resources and other technogenic processes. Another factor leading to land degradation is chemical and heavy metals contamination.

During many years, scientific and research activities aimed at combating desertification have been undertaken in Azerbaijan. At present they have been stopped due to the processes of socio-economic restructuring.

The accession of Azerbaijan to the UNCCD and preparation of the National Action Programme will give incentives to combat desertification. At present the country is at the second phase of the implementation of the National Environmental Plan of Action, which includes some concrete measures related to combating desertification.

One negative factor should be noted i.e. that almost 20% of the territory of the country is occupied on which 264,000 ha of forests are practically destroyed. Presence of about 1 million of refugees adds to ecological pressure in the places where they live.

Belarus

The total area of Belarus is 20,759 hectares. 45% is agricultural land, 40% is forestland and 4% is used for settlements and infrastructure facilities.

The main features and trends of land use in Belarus are the following:

- High specific share of ploughed field (0.61 ha per capita)
- Growth of forest covered territories (annual main use cutting on the area of approximately 24,000ha, reforestation on 29 000ha).
- Low-productive agricultural lands are transferred for forest growing.
- A high percent of the territory is occupied by specially protected areas – about 8%

According to the large-scale studies, eroded and erosion-endangered lands in Belarus currently occupy 1.7 million ha or 30% of total arable area. Moreover, 440,000(8%) ha of soil are subject to wind erosion.

As a result of the Chernobyl disaster, 1.8 million ha of agricultural lands are severely contaminated by long-lived radioactive substances. Out of these, 256,000ha have been totally out of use due to the high density of soil contamination by radioactive substances.

Degradation of soil cover in the most arid southern part of the country (Polesye) worsened by the consequences of large-scale land reclamation of this territory. Polesye (Polesskaya Lowland) is a wide territory in Central and Eastern Europe mostly lying in the Prypyat River basin.

Bogs and marshy lands in Belarusian Polesye used to occupy over 44% of the region's area. Hydrotechnical reclamation in Polesye goes back to 125 years ago. It was most actively conducted between 1965 and 1985. Current total area of reclaimed bogs and marshy lands in the Polesye zone amounts to 3.6 million ha including over 2 million ha in Belarusian Polesye.

In a number of cases, the drainage was applied to sandy and sandy-loam soils underlain by sands with unsustainable water regimes and unfavourable agronomical qualities. Such degraded lands in Belarusian Polesye occupy over 300,000ha. Misuse of reclaimed peat soils caused a great number of ecological problems (active peat layer depletion, deflation development, arid droughts etc).

The country's climate has undergone substantial changes in this century, including those induced by large-scale land reclamation in Polesye. Among the negative consequences of Climate Change are:

- General increases of aridity is caused by a change in plant cover and is accompanied by an active penetration of steppe and forest-steppe types into the boreal zones;

- Increased possibility of ecological emergencies (droughts, hurricanes, heavy snowfalls, excessive precipitation etc) resulting in soil degradation, direct damage to forests or inducing reproduction outbreak of forest pests;
- Deteriorated water supply conditions resulting from a general drop of the ground water level in a considerable area due to a combined impact of anthropogenic and climatic factors.
- Slowing down of peat deposit growth in forest bogs.

The development of three severe droughts (1992, 1994 and 1999) in Belarus serve as an example of negative consequences of climate change. They led to intensive reproduction of the eight-toothed bark beetle (*Ips tipographus*) causing deterioration and even loss of forests (fir of all fur-woods), on a considerable area. Another negative impact of climate warming is a drop in precipitation levels in the southern part of the country and consequently, a decrease in the moisture supply of crops.

Though Belarus is not yet a Party to the United Nations Convention to Combat Desertification, it actively moves towards rational land use and prevention of soil degradation. A number of programmes are currently under implementation in Belarus, such as the State Programme of Land Protection and Rational Use, the National Programme on the Rational Use of Natural Resources and Environmental Protection for 1996-2000, the Reforestation and Forest-Growing Programme, the National Strategy and Action Plan on Conservation and Sustainable Use of Biological Diversity in the Republic of Belarus, the Republican Programme "Conservation and Use of Reclaimed Lands for 2000-2005" and the National Sustainable Development Strategy of the Republic of Belarus.

Belarus supports a Regional Annex to the Convention for the countries of Central and Eastern Europe. Due to their transition-driven specific social and economic transformation, special status of these countries for a certain limited period is reasonable with respect that they are undergoing hard social and economic changes with negative impacts on the state of their land resources.

Another principal remark of the Belarusian side concerning the Regional Annex to the Convention regards the interrelation between the terms *degradation* and *desertification*.

The problems of land degradation and regeneration of disturbed lands are quite pressing in the Republic of Belarus (consequences of large-scale reclamation in Polesye, chemical and radioactive contamination, humus imbalance, water and wind erosion etc). However they are caused not so much by droughts as by other natural and anthropogenic factors which are not sufficiently defined in the priorities of the Convention and its Annexes. The same situation is observed in a number of Eastern European countries. Thus, the text of the Regional Annex to the Convention for the Countries of Central and Eastern Europe should emphasise the diversity of forms of degradation intensified by droughts.

After these two principle amendments are included in the Regional Annex to the Convention for the Countries of Central and Eastern Europe, the Republic of Belarus will be ready to reconsider its attitude towards this Convention.

Ukraine

State of the Art with Land Degradation in Ukraine

The total area of the Ukraine is 60.4 million hectares. It's doubtless to say that soil is the main national property of the Ukrainian people.

Today in Ukraine, all land suitable for cultivation has been ploughed. Lands which fall in the agricultural category occupy 70% (41.8 million ha), arable lands cover 56% (33.2 million ha), pastures and meadows – 12,6% (7.6 million ha) of the whole territory of Ukraine. Compared to land use structure of European countries, Ukraine occupies 5.7% of the entire European territory, 18.9% of its agricultural lands and 26.9% of total European arable lands. Agriculture annually uses 10.9 billion cubic metres of water or 36.4% of its general consumption.

Current land use in Ukraine does not meet the requirements of rational nature use. The main problem is that the ecologically accepted proportion between areas of arable lands, pastures and forests was neglected. Moreover low productive plots, including river meadows, marginal lands and slopes were also reclaimed into crop production.

Dried lands (Polissya region of Ukraine) suffer from uncontrolled decreases of ground water table and organic substance. Irrigated lands (South of Ukraine) are periodically flooded, soils become salted and black soils are degraded. 14.8% of total area of irrigated lands are eroded, 1.5%- are over moistured, 4% - are degraded to salt marshes. For 20 years (1961 to 1981) the total amount of humus in Ukrainian soils decreased from 3.5% to 3.2%.

Ukraine is very quickly losing its potential. For instance, 13.9 million ha of agricultural lands or 33.2% of their area suffer from water and wind erosion. Annual surplus of eroded land in Ukraine comes to 80-90,000 ha. These lands include 4.6 million moderate and severely unveiled lands, counting 68,000 ha of those fully lost humus layers. Soil in Ukraine annually loses 11 million tons of humus, 0.5 million tons of nitrogen, 0.4 million tons of phosphorous and 0.7 million tons of potassium. Total ecological and economical damage from soil is estimated at about 4 billion USD.

Activities on land conservation and restoration were seriously depressed in the last years. Introducing chemicals in acid and salted soils decreased by ten times, anti-erosion works, like planting shelter belts and terracing slopes have been almost stepped back. Territory of irrigated lands has been decreasing due to the low technological level of their maintenance. There is a lack of ecological impact assessment at designing and constructing those systems.

Perspectives for Improvement of the Land.

Based upon the General Direction for land policy, requirements of land conservation, sustainable use and restoration, it is widely recognised in Ukraine that:

- Planting shelterbelts must be continued to protect soils against wind erosion.
- Ploughing the slopes, rivers, streams and other water bodies' protective strips should be stopped. The lands have to be converted into meadows to protect them from water erosion.
- Widely introduce special "no till or limited tillage" technologies, especially in dry steppe regions with high risk of windstorms.
- Optimise land use structure, withdrawal of sufficient parts of lower productive lands and those playing a protective role from intensive agricultural and other uses.
- Rearrange old-fashioned high water consuming technologies into modern ones with water turnover.
- Introduce the programme of landscape and biodiversity conservation in agricultural landscapes.

Legal background for Land Protection and Restoration

On the 3rd of December last year the Presidential Decree on "urgent activities concerning acceleration of reforming the agrarian sector of economy" was issued. It aims at fostering the land privatisation processes, the changes in forms of collective properties on land, supporting private farm agricultural economies and expanding the financial and technical infrastructure. The new Land Code of Ukraine has been presented to the Supreme Council (Vekhovna Rada) of Ukraine. It has already passed through all Ministries, Cabinet of Ministers and will soon be evaluated and approved by the Supreme Council. The Code includes revolutionary positions on land purchasing and selling and what is more important – it provides broader scope for land protection and conservation.

The decree of the Supreme Council of Ukraine #439 of 12 May 1997 on "the concept of Conservation of Biological and Landscape Diversity of Ukraine" envisages several key directions tightly connected with land conservation: to develop a National Programme on Land Protection, adopt legal normative acts for natural resource use and introduce international ecological standards in resources sustainable use etc. Amendments are to be made to Forest, Water, Land Codes, Code on Underground Resources, Law on Animal World, Law on Nature-Protected Fund etc.

Decree of the Supreme Council of Ukraine on "General Directions of State Policy of Ukraine in the Domain of Environment Protection, Natural Resources Use and Provision of Ecological Safety" 1998 highlights the following main perspectives:

- withdrawing low-productive agricultural lands, at first in regions with a high degree of land ploughing
- making integrated evaluation and planning of land use
- introducing and implementing National Programme for Land Protection to 2010

- Prepare and implement sector schemes for conservation and restoration of land, water, biological and other natural resources.

The newly adopted Law of Ukraine on “Land Melioration” deals with integrated problems of land conservation, use and restoration. The ecological requirements are:

- sustainable use of land, water, forest and raw material resources
- protection of land from degrading wind and water erosion
- soil protection from exhaustion, salination, swamping, saturation with harmful substances etc
- Securing protection of plant, animal and fish stock from negative impacts of melioration.
- Conservation of nature landscapes, territories and objects of nature protection fund of Ukraine, wetlands of international importance and other territories under special protection.

Hungary

Hungary is rich in soils of good quality because it's located in the central part of the Carpathian Basin. Although Hungary is a small country with a total area of 9.3 million ha, approximately 65% of it is used for agriculture and 18% for forestry. Settlements, industrial and military territories, infrastructure and mining as parts of the built environment account for the remaining 17%.

As it has been characteristic in many European countries, the ratio of the agricultural area has been decreasing for decades. During the last 50 years the agricultural area of Hungary has reduced by 1 million ha.

Hungarian water resources are limited. Consequently, their efficient use is one of the key issues of agricultural production, rural development and environment protection, and proper soil moisture control has particular significance.

The average *annual precipitation* shows extremely great territorial and temporal variability - even in micro scale. Under such conditions a considerable part of the precipitation is lost by surface runoff, downward filtration and evaporation. The non-uniform distribution of atmospheric precipitation is one of the reasons of *extreme moisture regime*: the simultaneous hazard of waterlogging or over-moistening and *drought-sensitivity* in extensive areas, sometimes in the same places within a short period. The other two reasons of extreme moisture regime are the relief (including the microrelief of the “flat” Hungarian Plain) and the unfavourable hydrophysical properties of some soils. Most of the limiting factors of soil fertility and undesirable soil degradation processes are related to the soil moisture regime.

Speaking about the degradation of agricultural lands the nation wide assessment shows that 2.3 million ha are endangered by water erosion, which are roughly 30% of the agricultural territory. Water erosion can cause a loss of a 1-3 mm deep soil layer on sloping lands in Hungary as a yearly

average. The erosion causes, not only soil loss in the mountains and hills but further damage is produced on 200,000 ha of surrounding valley bottoms and lowlands by sedimentation and flooding. Erosion increases the real risk of eutrophication and pollution of surface water. The thinning or, completely destroyed humic horizon is not able to perform the filtering and buffering functions.

Wind erosion prevails mainly on loose sands and on peat land ranging in total, 1.5 million ha. Unfortunately, wind erosion was recently observed on chernozem soils of originally good structure as a result of wrong, shallow, rotation tillage technology. Too large fields (500-1,000 ha) as well as the lack of windbreaks and soil coverage also contribute to the wind erosion hazard.

Soil acidity is not so serious a problem in Hungary as in many European countries, because of the relatively high buffering capacity of the soils.

Salinisation is one of the most investigated problems in the Hungarian Great Plain. Salt affected soils can be found on approximately 600,000 ha, where the high salt and exchangeable sodium contents are limiting factors. Salinisation of originally non-saline, non-salty soils took place due to rising salty ground water as a result of human activity (e.g. large-scale irrigation)

Soil compaction is a real problem in many agricultural areas, but there are no figures about its national scale.

Drought is a returning natural phenomenon and disaster also in Hungary like in many other countries in the Carpathian Basin. During the last decades drought came back more often and lasted longer than in previous periods. The damages were caused mainly in agriculture.

There are some regions in Hungary, which are temporarily endangered by drought. The ratio of precipitation and potential evaporation is less than 0.65 as a yearly average and during some dry vegetation periods this value can be under 0.5. Therefore Hungarian specialists in water management, agriculture and agro-meteorology have been deeply involved in the evaluation of the effects of drought events and to determine reasons and circumstances in which severe drought occurs.

The main issues of concern in soil protection policies in Hungary are the same in Hungary as they are in many other countries in Europe, however the importance of each can be different and characteristic in close connection with the natural conditions and human activities. In the National Environmental Program of Hungary (adopted by the Parliament in 1997) the following problems are mentioned:

- the ground and soil pollution as well as the pollution load caused by settlements, industrial, military, agricultural and commercial activities,
- deterioration of the physical and chemical quality of the soil because of degradation processes such as acidity, salinity, compaction, sealing,

decrease of biological activity, soil fertility as well as erosion caused by water and wind,

- The lack of a comprehensive land/soil environmental protection policy on polluted soils and uniform legal regulations.
- The legal background of the soil/land protection policy is the Act on Environmental Protection and the Act on Arable Land.

The Act on Environmental protection deals with the soil/land as an environmental element. There are only a few special provisions about soil/land protection. The general rules have much more importance.

The Act authorises the Government to issue ordinances/decrees to regulate the detailed rules that do not require statutory regulation. On this basis there has been recently prepared a governmental ordinance on the protection of groundwater and soil/land against pollution as well as on the rules of the redemption of the polluted sites.

The Act on Arable Land gives provisions on soil protection. The Act defines the tasks of the state e.g

- Developing and operating the system of record keeping of soils in accordance with quality.
- Operating of a measurement, observation, control and information system for monitoring the quality changes of soils
- Defining the national conception and programme of soil protection.

The Act regulates the responsibilities of the soil protection authority and states that several professional requirements of soil protection are contained in the standards and technical guidelines and/or as defined by the Minister of Agriculture in ordinances.

In order to prevent the pollution of soil, the land user shall protect the arable land from materials foreign to the soil and impairing the quality thereof.

Hungary joined to the United Nations Convention to Combat Desertification in those countries experiencing serious drought and/or desertification, and this obliges us to do our best for the realisation of the national and international measures which can help us to minimise drought damages in the future. Therefore an active organization is going on now under the guidance of the Ministry of Agriculture and Rural Development, but with the active and promoting participation of the Ministry for Environment and the Ministry of Transport, Communication and Water Management as well, for the establishment of the National Drought Commission, in which all organizations concerned in drought mitigation will be represented, and the main task of which will be the work out and realisation of the National Drought Mitigation Strategy.

Slovak Republic

The total area of the Slovak Republic territory is 49,035 km². Global climate change may change the mild and humid Slovakian climate. Several studies on this have been carried out in Slovakia during the past years. It can generally be assumed that a gradual increase of average air temperature and decrease of water surpluses occurs in Slovakian territory. Visible effects from climate change are expected around the year 2025 and later.

The Slovak Republic is divided into three main catchment areas: Danube, Tisa and Dunajec. The total population of the Slovak Republic is 5.3 million with an average density of population of 108 people per 1 km². The capital of the Slovak Republic is Bratislava (442 000 inhabitants).

The structure of land use in Slovakia is as follows:

- Agricultural land: 2 446 000 ha of which 1 483 ha is arable land.
- Non-agricultural land: 2 458 000 ha of which 1 991 000 is forest area and 94 000 ha is water area. Urbanised and others constitutes 373 000ha.

Large-scale farming dominates Slovakian agriculture. Co-operative farms or other kinds of enterprises use more than 95% of agricultural land. Only 5% of agricultural soils are in the hands of family farms. The quality of Slovakian agricultural soils is following about 1/3 of total area with high production potential, 1/3 with medium productivity and 1/3 with low yields. Animal production decreased significantly after the eighties. Specific regimes of land use must be applied on 189,500 ha inside of water protection areas and 352 290ha inside of national parks and wildlife preserved territories.

Land degradation in Slovakia is a real situation due to:

- Negative influences of large scale farming systems and improper land management
- Emission and other impacts of non-agricultural human activities (industry, traffic, urban)
- Specific natural conditions (geogenic pollution, erosion) and disaster (floods, ravines).

“Human impacts” as causes for land degradation in Slovakia are estimated in the order of magnitude of 50% for soil erosion, negative soil use, floods, ravines and 80% for soil pollution from industrial and agricultural sources (additional 20% are of geogenic origins).

Water erosion is a serious problem in Slovakia due to the mountainous character of the territory and for the fact that sloped fields are used as arable land. About 45% of agricultural land is not (or marginally) affected by water erosion, 20% with medium intensity and 35% with high and very high intensity.

Total loss of agricultural soils by water erosion in Slovakia was estimated at 2.8 – 3.0 million tons a year. Decrease of yield was estimated at 20% in case of low eroded soils, 40% after the medium intensity of water erosion. Yield lost from strong and extremely eroded soils can achieve about 70% and more.

Due to soil erosion processes, high contents of sediments were determined in surface water sources. National limits (thresholds) of soil losses by erosion adopted (1999) in Slovakia are as follows:

- 4 tons of soil matter a year for shallow soils (depth less than 0.3m)
- 6 tons of soil matter a year for medium soils (depth 0.3 – 0.6m)
- 10 tons of soil matter a year for deep soils (depth more than 0.6 m).

Wind erosion in Slovakia is more an accidental (local) than a general problem. About 6.5% of agricultural land is more or less permanently affected by wind erosion, mainly in regions with shallow soils (southwestern part of Slovakia). Soil compaction due to the use of heavy machinery, improper crop rotation and deficiencies in the return of organic manure. This result is very significant mainly because of incorrect usage of medium and heavy soils, which are inclined to compact. Most sensitive are Luvisols (mainly heavy forms) which are compacted with strong support of humus degradation as well. The first estimation of the extent of compaction in Slovakia was officially published in 1991 and can be observed in about 700,000 ha (28% of agricultural land of Slovakia).

A survey on soil pollution in Slovakia was started about 15 years ago. Meanwhile a detailed database and GIS about polluted land in Slovakia has been created. Everybody who needs the information can use it.

Due to the emission situation in Slovakia in the last decades, almost all soil pollution is caused by heavy metals. Pollution by organic substances (e.g. PCB, PAH) is not a serious problem in Slovakia.

The problem of Soil Acidification of agricultural land lessened considerably during the last decade on account of the rapid decrease of CO₂ emissions. Due to the geographic properties about 33% can be described as not resistant to acidification.

Legal and other measures in soil protection policy are based on several laws. The Act no. 48/1959 "About Soil Protection" focussed mainly on the obligations of farmers to farm properly and to save the quality of soil. Already, the renewed Act no. 124/1976 "About Soil Protection" implemented strong measures against losses of fertile land to other uses. It was a strict act for soil protection in the new history of Slovakia. The concrete losses had to be compensated by the reclamation of other land, usually with low soil fertility.

Now the Act no. 307/1992 "About Soil Protection" defines soils as an agricultural natural and environmental source that has to be strictly protected against uncontrolled alteration to other purposes. The Regulation of the Slovak Republic Government No. 19/1993 on mandatory charges in cases of the alteration of the use of agricultural land puts up considerable financial barriers to those changes.

Land use policy in Slovakia has been extremely influenced by the land reform since the transition period started in 1990. Most important is the regulation of

the Government of the Republic No. 869/1993 "About Soil Ownership in Slovakia". Under its provision a comprehensive re-privatisation of agricultural land was carried out. Now the ownership of all agricultural land in Slovakia is identified. Also the land of state farms and co-operatives is re-privatised. Large-scale farming has continued in Slovakia but with clear ownership of the land. It seems to be favourable for the development of an efficient agriculture.

Poland

Poland lies on the border of the maritime and continental temperate climates and is one of the water-deficient countries. The mean annual precipitation as calculated from a long-term period is low (about 600 mm); the total surface water resources as measured by the annual runoff from the country's territory are also limited (58.6 billion m³ on average). Annual precipitation variations relative to the annual mean calculated from a long-term period fall within the range from 60% over to 15% under the mean values. The precipitation distribution in the country also differs. In the plains the mean annual precipitation reaches 450-650 mm, whereas in the mountainous areas it is as high as 1000-1500mm.

In the years 1951-1990, 13 drought periods were distinguished, lasting from 2 to 19 months and affecting the underground water zone. At that time, in at least 20% of the country's territory, the table of the first horizon of underground waters was more than 50 cm deeper than the long-term mean. The regions of Poland where drought phenomena are most frequent include the Great-Poland Lowland, Pomeranian Lakeland, Silesian Lowland, Sudety Foreland, Mazovian Lowland, Podlasie Lowland and Mazurian Lakeland. Frequent water deficiencies occur in Poland over the area of about 120,000 km².

The area of the lowest precipitation lies leeward of the Lakelands, on the valleys of the Middle Vistula and the Middle Warta Rivers and, the Upper Noteć River. In this area, the ratio of annual precipitation to evapotranspiration is close to 1, indicating substantial water deficit, but still far from the limit value which, in accordance with the Convention, is characteristic of arid, semi-arid and dry sub-humid areas. The aforementioned region, consisting mostly of Great Poland, is to a large degree devoid of forest and therefore particularly vulnerable to, soil degradation resulting from drying and wind erosion. For several dozen years the process of steppe development has been observed there, according to the *Atlas of resources and values of the geographical environment in Poland and hazards to it*, the process affects a surface area of about 60,000 km².

The reasons for soil degradation in Poland as manifested by the steppe development have been fairly well identified. The most important reason is the excessive deforestation in the central part of the country, disturbing the water regime in this region, which suffers from natural precipitation deficiency. The environmental policy implemented in recent years in Poland regards soil protection to be one of the principal directions of action, aimed above all at stopping the degradation processes. The key role is ascribed to forest policy

and management, as forest resources are the main factor to ensure equilibrium in the natural environment. The afforestation programme under way leads to a continuous increase in the forest cover in the country. The forest cover is now 29.9% and the target rate in the mid-20th century is 33%. The forest cover is enhanced by planting forest on agricultural land which is not viable in terms of production or uncultivated (abandoned). The afforestation of watershed areas and the areas along watercourses and around water reservoirs is of particular significance for improving the natural retention properties of these areas.

Legal grounds for actions to implement the provisions of the Convention

At present, in Poland there are good and sufficient legal grounds for implementing the provisions of the Convention to Combat Desertification. They include:

- the Act on the Protection and Management of the Environment
- the Act on Nature Conservation
- the Act on Spatial Planning
- the Act on Forests
- the Act on the Protection of Agricultural and Forest Land
- the Act on Water Law
- the Act on Geological and Mining Law

as well as the relevant enabling ordinances (Regulations) for these Acts.

Indispensable actions to implement the provisions of the Convention in Poland

The adoption of the Convention to Combat Desertification by Poland will require the following commitments to be met:

- Development of the national action programme, following the principles laid down in the Convention;
- Entering into international co-operation in the field of combating desertification and mitigating the effects of drought;
- Collection of data as well as analysis and exchange of information concerning land degradation in the affected areas in the format laid down in the Convention – soil monitoring.
- Establishment of a system for education and raising the awareness of the public in respect of actions to combat desertification and mitigate the effects of drought.

One needs to emphasise the significance of the development of the Annex for Central and Eastern Europe. This significantly contributed to ensuring the decision-makers' approval and accelerated the launching of the process of our country's accession to the United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa.

International co-operation in the field of combating desertification and mitigating the effects of drought.

Actions in this range should include:

- financial assistance to the affected developing countries Parties, particularly in Africa,
- facilitation of access for the affected countries, particularly the developing ones, to appropriate technologies, knowledge and know-how,
- co-operation in developing and implementing action programmes, and those aimed at raising the public awareness and education level,
- scientific and technical co-operation in the field of combating desertification and mitigating the effects of drought.

Czech Republic

Although the Czech Republic is a part of Central and Eastern Europe and shares the same political, economic and environmental problems, the problems of land degradation are more similar to those which faces "Western Europe". These problems are completely different from the large scale land degradation in e. g. the Russian Plane or the Black Sea region. The most serious problems connected with land use are:

- *Erosion*
The problems of land degradation in the Czech Republic are mostly limited to water and wind soil erosion. Over 50% of agricultural land is potentially endangered by water erosion and 10% is threaten by wind erosion. The actual extent of erosion is not known. Some analysis estimates that about 40% of the arable land is affected to a certain degree by erosion and requires some form of protection.
- *Abandonment of agricultural land*
Transformation of agriculture after 1989 from huge state or co-operative-owned farms towards small (family size) farms and more extensive production is very slow. Until now, intensive agriculture, which doesn't take into account the role of agriculture for the landscape character prevails. Because of the market situation the very few existing small farms are in a difficult situation and farming in mountain regions is on a rapid decline. Unofficial estimates state that 300,000 ha (7%) of agricultural land has been abandoned.
- *Depletion of soil nutrients* due to a decrease in both manure and synthetic fertilising. The use of fertilisers decreased enormously during the last decade and reached pre-war levels.
- *Deterioration of the soil and landscape regime*
The deterioration of the water regime has a number of causes: climatic change, excessive cultivation, elimination of stabilising hedges and scattered verdure, drainage systems in spring areas, increasing soil density, decrease in the water-control function of forests.

- *Excessive cultivation of the land*
About 74% of the land is cultivated, which is an extremely high amount. This level of land cultivation is to be found e. g. in Hungary, which has a higher proportion of agricultural land and less mountains than the Czech Republic. However, this problem dates back to the 1930's.
- *Land devastation without subsequent reclaiming*
The area of land devastated by mining or other human activities requiring subsequent reclamation reached 9,500 ha, most of it being situated in Northern Bohemia and Northern Moravia, but to be also found in many other regions. Only a small proportion of agricultural land devastated by mining will be eventually returned to its original use. The devastated land reclamation is much slower than the process of reclassification of agricultural land for other purposes and devastation of further land by mining. The problem is caused by uncertainty about the future of the mining industry.

Land degradation phenomena, which DO NOT represent a threat to the soils in the Czech Republic

- There are no considerable problems caused by drought. Our situation is substantially better than that of the Balkan region. Droughts which occur in some years are never as serious as e. g. in the Mediterranean region
- Drinking water is usually not affected by droughts or land degradation, except in a few local cases
- Salinisation does not represent a major threat
- Accumulation of persistent toxic substances in soils and the food chain are rare and limited to a small number of mining and industrial areas and waste deposition localities. There is no extensive regional contamination resulting from human activities. However, it remains a potential danger requiring preventative measures.

Possible solutions

- Monitoring, information collection, analysis and exchange, research, technology transfer, capacity and awareness building are needed. The soil monitoring system in the Czech Republic is of a good standard and linked to the neighbouring countries (most of all Austria and Germany).
- Measures to protect soil must be accepted, At present, a new Soil-protection law is being prepared
- Better planning of land use management, investments into land reform and rural development are needed. The potential of countryside development in other than agricultural direction (small workshops, traditional local production etc.) must be recognised and enhanced
- Creating permanent grasslands at selected locations would help to prevent soil erosion.

Romania

The geographical space of Romania is structured in large relief units as follows: 30% mountains, 37% hills and 33% plains. The climate is moderately to extremely continental. Characteristic for the Romanian climate is a high frequency of droughts, particularly in the low lands of the south, southeast and east of Romania where the annual mean temperature is 10.5 to 11.3⁰C and the mean rainfall is below 500mm per year. The period of 1982 – 1994 became the driest in the history of the country.

Romania has a total of 23.8 million ha of which 14.80 million ha is agricultural land and 6.37 million ha is forest. The rest of 2.63 million ha consists of water areas, settlements, communication lines and others. The agricultural land is composed of 9.3 million ha of arable land, 3.4 million ha of grazing fields. 1.5 million ha of hayfields, 0.3 million ha of vineyards and 0.3 million ha of orchards.

More than half of the country's forests are of specific ecological importance for the protection of water, soil, climate, gene pool etc.). The losses of forest area and its weak condition are, to a great extent, responsible for the increasing frequency of floods, landslides and other forms of land degradation.

The degradation processes of the land are affecting more than half of the total area of the country. Land with serious erosion, i.e. surface erosion, deep erosion, landslides and wind erosion, amounts to 7.262 million ha (30.6%). The regions with the highest percentage of water eroded land including landslides are situated in the east, south and central-north-east of our country. Wind erosion is occurring in the far northwest, west, south, southeast (i.e. Black Sea shore and the Danube Delta) and the east for part of the country. Land subjected to aridity is located in the southern and eastern parts, regions that are also threatened by wind erosion.

The most serious form of land degradation/desertification is a result of these processes and drought. According to the definition of the Convention to Combat Desertification (CCD), about 2.2 million ha (10 percent of the country area) show less than 0.65 ratio of annual precipitation to potential evapotranspiration. This area is mainly located in the southern, southeastern and eastern regions.

Future actions for combating desertification and drought effects are focussed on:

- Identification and zoning of desertification processes and drought at the regional level
- Measures to or prevent or indicate land degradation and drought effects.
- Rehabilitation of severely degraded lands
- Prevention of soil and groundwater pollution
- Firm application of sustainable management rules in private forests
- Monitoring and forecasting of land changes and meteorological patterns
- Dissemination of knowledge and information for the public.

Actions that aim to prevent land against degradation and desertification and to rehabilitate this natural resource, are part of the following national and sectorial strategies:

- Middle term National Strategy for Economic Development of Romania.
- National Strategy for Sustainable Development
- National Plan for Agriculture and Rural Development
- Action National Programme for Environment Protection
- Sustainable Development Strategy of Romanian Silviculture
- Strategy for Combat Drought and Desertification in progress.

The National Report on the implementation of the UNCCD in Romania shows in detail the financial requirements from national budget and external assistance for the ecological re-building programme. It can be found on the Internet at web site www.mappm.ro.

In conclusion, Romania's accession to the Convention to Combat Desertification is considered as an important step for the development of the economy, conservation of the environmental resources and Romania's integration in the international community.

Georgia

The main policy document in Georgia that determines the country's short-term development strategy is "The Indicative Plan for Social and Economic Development". The Indicative Plan for 2000 included (as part of the agricultural sector development programme) the implementation of projects on "Protecting the Soil from Erosion" and "Improving Soil Fertility"

The National Environmental Action Programme for a five year period, addressed soil erosion as the main environmental problem associated with Georgian agriculture. Soil erosion is caused mainly by poor agricultural practice, such as development of steep slopes; deforestation of mountains; overgrazing and irrigation leading to washing away of topsoil. In recent years practically no means for fighting soil erosion have been deployed since no funds have been available.

Considering that mountainous areas account for about 54% of the country's territory and foothills for another 33% it is easy to see how rapidly and easily irresponsible human activities can destroy the balance of extremely fragile environments.

Erosion is affecting most of the landscapes and climatic zones in the country. The negative socio-economic effects of landslides, avalanches, mudflows, coastal and lakeshore erosion, flooding, glacier slips and soil desertification caused by water-induced erosion are very significant. The entire territory of the country is located in the seismic zone. In 1991-1992, earthquakes caused landslides and mudflows throughout the country, with some 20 000 recorded land and rock slips. Degraded and threatened areas reached a total of 1

million hectares in 1976, 3 million hectares in 1981 and 4.7 million hectares in 1987 – 1995.

About one third (1 million hectares) of all agricultural land in the country suffers from erosion including 378 000 hectares of arable land and 650 000 hectares of grassland. Further use of these areas without preceding rehabilitation measures will worsen these harmful trends. 218 000 hectares (7.3%) are affected by salinization and alkalisation and 109 000 hectares (3.9%) are affected by recurrent waterlogging due to inadequate drainage. The irrigation system is damaged; 175 000 hectares are threatened by desertification.

The energy crisis and need of fuelwood, has led to uncontrolled cutting of hedges causing an increase in wind erosion. About 50-70% of all hedges have been destroyed. About 200 000 hectares of arable land has already been degraded by wind erosion and the rate is increasing every year.

There are 450 mining sites in Georgia. Of the 18 000 hectares allocated to these and other purposes, 15 000 have been degraded. 7 000 hectares have been reclaimed, 5 000 are awaiting reclamation and 3 000 are not restorable for recultivation.

The arid and semi-arid regions of the territory of Georgia are in the south-east and east part of the country. There is only incomplete information regarding the scale of animal use of this area as winter pastures and their intensity. A study for the socio-economic assessment of arid and semi-arid ecosystems in eastern and south eastern regions of Georgia is under preparation by an NGO.

Georgia ratified the United Nations Convention to Combat Desertification (UNCCD) in 1999. The first National Action Programme (NAP) will be developed in 2000 with internal assistance. The implementation of the NAP needs active participation of all stakeholders, particularly NGOs.

However, cooperation with the local population often faces difficulties; local NGOs still lack information and expertise as well as funding to facilitate the process. The ratification of the UNECE Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters by the Georgian Parliament made a step further in the direction to provide necessary information to the public.

The process of elaboration and implementation of the NAP will considerably gain from overlapping activities in adjacent sectors of environment protection. Up until now, consultation and co-ordination between activities of the three Conventions (UNCCD, UNFCCC and the Convention on Biodiversity) are not yet sufficiently organized.

The NAP process will help to review the existing legislation and institutional framework for the comprehensive implementation of the Convention in Georgia. The NEAP recommends:

- A demonstration programme for the application of the Best Agricultural Practice.
- Establishment of a system of barriers to soil erosion (windbreaks, perennial vegetation, terracing and engineering measures for fighting erosion etc).
- A National Programme for Soil Protection.

This provides a detailed description of the current state and trends in the soil degradation process by using GIS.

An ongoing project financed by the global Environment Facility “Conservation of Arid and Semi-arid Ecosystems in the Caucasus”, started in December 1999. The objective is to protect arid and semi-arid ecosystems from degradation through sustainable management of natural resources.

Republic of Moldova

A major strategic policy document in the field of environmental protection is the Long-term Complex Programme of Environment Protection and Rational Nature Resources Utilisation Programme up to 2005. The major task of the Programme is to minimise anthropogenic pressure on nature, to increase the stability of natural and industrial geosystems and to improve the living standards of the population. Among it's major priorities are maintenance of the soil's fertility by implementing the hydrotechnical anti-erosion measures, eroded lands fertility rehabilitation, forestry protection, stabilisation and rehabilitation of the landslides. Eighty-one percent of arable lands are subject to erosion. About 30% of all financial resources allocated to environmental protection will be used for land protection and its rational use.

As a follow up to decisions taken in Rio, National Strategy Programmes and National Plan of Actions in the field of nature protection were prepared with financial assistance from the World Bank respectively in 1996 and 1997. Each year the eroded lands are increasing by 0,86%. That is why special attention in the Programme is being paid to the land conservation and rehabilitation that is directly related to combating desertification.

The National Strategy and Plan of Action to conserve biodiversity include measures aimed at sustainable development of agriculture. The National Strategy to develop agroforestry also directly relates to combating desertification.

In 1999 The Republic of Moldova became a Party to the UNCCD. A National Commission to combat desertification was established, which coordinates its activities with the Coordinating Boards on the Conventions on Climate Change and Biodiversity. In 2000 the Government of the Republic approved a National Action Programme to combat desertification.

At present there are about 200 ecological non-governmental organizations in Moldova. Mass media is actively involved in awareness raising campaigns on issues of combating desertification.

Slovenia

The total area of Slovenia is 20.3 thousand km². Two thirds of the country is classified as LFA (hilly and mountainous). Agricultural land amounts to 42.6% but only 14.6% is arable land.

Water and wind erosion

Almost 48% of the area of the country is exposed to erosion, which leads to soil loss of 2.5 million m³ per year. The total area affected by landslides is almost 7290km².

Chemical Degradation

- The monitoring of soil pollution has been introduced for the detection of polluted areas in 1987. Soil pollution data for around 8% of the territory is available.
- Some limited areas are polluted with heavy metals (Pb, Zn, Cd – industrial areas). Along the main traffic roads, higher concentrations of Pb are found.
- Organic compounds (pesticide residues) were detected locally in samples from the agricultural land, but did not show any substantial concentration in soils.

Loss of Agricultural Land

In the last five years, the trend of agricultural land change has increased by 613%

Data of agricultural land changes in 1995 – 1998 (ha).

YEAR	AGRIC LAND
1995	163 ha
1996	283 ha
1997	1188ha
1998	884 ha

Legislation in Slovenia

- *Agricultural Land Act* stipulates that agricultural lands must be used in accordance with their purpose of use and that it is necessary to prevent them being polluted or otherwise degraded and to prevent the contamination or hindrance of plant growth.
- *The Decree on the Input of Hazardous Substances and Plant Nutrients in to the Soil* (Ur. 1. RS, No. 68/96) and
- *The Decree on the Limit, Warning and Critical Emission Values of Substances in the Soil* in 1996, which in accordance with the principle of prevention are aimed at protecting the soil as a natural resource to the greatest possible extent.
- *The National Environmental Protection Programme* defines measures in the area of soil protection for the period 2003 with the preparation of the programme for cleaning up degraded soils and the implementation of sustainable use of agricultural land. This area is also connected to the development of agriculture, which is defined in detail in the *National*

Agriculture, Foodstuffs, Forestry and Fishing Development Plan for 2000 to 2002.

Slovenia's Reason for Accession

- Given that the ratification of the UNCCD is in accordance with Slovenia's long-term and short-term policies in the areas of both environmental protection and agriculture.
- In accordance with the principle of sustainable development Slovenia has already joined United Nations campaigns for reducing degradation and pollution of the environment, preserving biodiversity and sustainable development in farming and in line with this supporting international co-operation at all levels, particularly in the areas of collecting and exchanging information, research, transfer of technology, institutional strengthening and raising awareness.

Programme of Work

The programme will be prepared on the basis of the existing soil data:

- Soil map in 1:25000
- Cadaster data in 1:5000
- Ortophoto data for the actual land use and slope data in 1:5000
- Agricultural LFA in 1:25000 for each cadaster community
- Hydrometeorological data
- Soil pollution monitoring data

Preparation of the programme is envisaged for 2001

Annex IV or V

Slovenia is geographically oriented towards Mediterranean countries. Also the problems of degradation of agricultural land are similar (erosion in Alpine area, degradation of karst, water availability problems) and interregia cooperation in Alpe-Adria and Arge-Alp countries has already been established.

From Slovenia's point of view the Convention also has an expressly political nature in the sense of solidarity towards the developing countries directly affected. Through the involvement of its experts on the Science and Technology Committee, Slovenia can actively participate in the flow of knowledge and technology to countries where such assistance is required.

Croatia

Croatia supports and follows the initiatives of the United Nations Agencies, (FAO, UNEP and UNESCO) for the protection of the land since the Stockholm Conference.

State of land degradation.

Croatian territory has been divided into three large natural geographical zones: Continental (Pannonian), Alpine (Hilly – Mountain) and Mediterranean.

The data on the level of damage of the land has been collected sporadically on the occasion of research carried out for various purposes. Unsustainable plant production, particularly narrowed crop rotation usage of agro-chemicals

and heavy machines, as well as specialisation of production are the most important causes of land damage. Furthermore, the industrial production causes pollution of the air and acid rains by its emissions into the environment, inappropriate waste disposal, transportation and recently – the war.

Erosion is certainly one of the most dangerous processes of land degradation in Croatia. Over 90% of its territory is exposed to erosion processes. The 1.3 million ha of land in the Mediterranean zone is just bare rocky ground.

In Alpine (mountain) zones, greater dangers are: acid rain caused by long distance pollution and erosion and landslides caused by inappropriate woodcutting. In the past, competition between agriculture and other pretenders to the land mostly ended up to the disadvantage of agriculture. Between 1965 and 1987, Croatia “lost” 16 441 ha of agricultural land or nearly 20ha daily through the change of land purpose of utilisation of the land.

Degradation of land by intensive plant production on ploughed fields is the most widely spread. The greatest amount of study has been dedicated to this land:

- Irrigation systems have been installed on approximately 5,790ha (only 0,28% of the cultivable land).
- 234,490 ha of land are unprotected from floods.
- In 1996, about 29 000ha of forests in coastal areas have been destroyed by 3 129 fires.
- Effects of the war have a huge and long-term negative consequence for the quality of life of the population, the quality of soil and water resources, biodiversity and landscape. Croatia has 4,500km² of minefields.

National action needed to bring land degradation to a halt and alleviate drought effects.

Since becoming independent, the Republic of Croatia has participated in global environmental protection activities, acceding to a number of international agreements, regional and bilateral agreements, as well as accepting the attitudes on the need for global protection expressed in Rio.

At the national level, many Acts and Regulations, e.g. Environmental Protection Act, Regulation of Environmental Impact Assessment etc, have been elaborated. Several government administrative bodies and expert association have passed documents on the basis of Environmental Protection strategies and programmes at the international level (Convention for the Protection of the Mediterranean Sea against Pollution; Convention on Biological Diversity and the Convention on Long-Range Transboundary Air Pollution).

Latvia

The Northern part of Europe is suffering more and more from wetlands and bogs rather than from deserts. Deserts can be found only in the subtropical

climate around the Caspian Sea and the Mediterranean. Nevertheless land degradation is an essential factor in all countries as agriculture still is a part of the economy rather far from sustainability. That's important when adopting the idea of importance of the UNCCD in this region. The idea to combat land degradation is more important for Europe and more understandable for the population including farmers.

Preconditions for agriculture in Latvia

The proximity of the Atlantic Ocean and the Baltic Sea in particular determines the climate, i.e. moderately warm summers and moderately cold winters compared to inland areas at the same latitude, and frequent storms. The sum of positive temperatures is a little above 2000 degrees during the vegetation period and frosts can appear even in May or already in August. Precipitation exceeds evaporation twice, resulting in a percolation of the moisture regime in the soil and in podzolization of soils.

The ability of precipitation reflects in many lakes and bogs with around 10% of the territory suffering from humidity even if the rivers in general drain the territory very well. Land reclamation is a number one precondition for agriculture and forestry. The history of hydraulic structures goes back to medieval centuries. Nevertheless the territory is not dried and water balance has not changed so much in Latvia as land reclamation with closed drainage is successfully complemented by establishing many new big reservoirs and small ponds, as well as by preserving wetlands.

Soils and utilisation of land

Of the 64,600 square kilometres of total area 39.3% is cultivated, including 26.5 % arable land and 12.3 % of meadows and pastures. 61% of agricultural land is drained and approximately 75% is closed drainage.

The most widespread soils are light to moderate sandy clays with low natural fertility. Only 7% of soils consist of productive luvisols. Both mineral and organic fertilisers are essential to maintain productivity and soil fertility. Nevertheless the use of mineral fertilisers has dropped almost 20 times between 1990 and 2000 and the use of organic fertilisers has halved (due to a strong decrease in livestock). At the same time, thus leading the soils to a reduction in organic matter (humus) and putting the soils under the risk of degradation as the content of humus is a precondition to combat wind and water erosion.

The structure of land use has changed drastically during last 70 years:

- Agricultural lands have decreased from 60 % in 1930 to 39 % in 1999
- Forests have increased from 26 % in 1930 to 45 % in 1999
- Population in the countryside from 65 % in 1930 to 31 % in 1999
- Employment in agriculture from 54 % in 1930 to 17% in 1999

Due to integration in the European Union a further decline in agriculture is expected by a decrease of employment in agriculture to the level less than 10% from the total number of employed people.

There are regional differences in agricultural structure and production in Latvia:

- Lowlands with precipitation of 600 mm/year are favourable for crops such as wheat, barley, sugar beet, fodder crops (alfalfa, clover), but not for potatoes and rye. Fruit and vegetables are also grown.
- The western, central and Eastern Highlands with precipitation of 800 mm a year are less fertile and with more difficult relief. They should be used mainly for cattle breeding and dairy production.

Since 1989 the land has been redistributed firstly to users and later to the former owners, by 1997 more than approximately 300,000 private farms replaced 600 former collective farms. Many of these farms lack working capital, so technical requirements are rarely met and cereal yields are low. The majority of the new farmers are thought to have too little knowledge about entrepreneurship and environmental issues.

Agriculture was an important sector in Latvia with 23% of GDP in 1990, but this share shrank to 8% in 1996. Some new beginnings in agriculture are connected with biological agriculture, clean production and trends of new production. Big farms are finding new industrial methods. These who are not so successful are thinking about afforestation and production of energy woods.

Land degradation in Latvia

Erosion does not seem to be the main concern for agricultural soils in Latvia. However, heavy machinery and crop rotations unsuitable for the soil's characteristics, physical relief and climate conditions are leading to soil degradation, as the big portion of soil is vulnerable to water wind erosion. According to reports by agricultural scientists, 14.7% of arable land is threatened by wind erosion and 24.3% by water erosion. Nevertheless the values are not so strictly limited and therefore one cannot say this land is already degraded.

Runoff from agricultural lands is the main source of diffuse pollution in Latvia and contributed 68% of nitrates and 37% of phosphates between 1960 and 1980.

To protect the environment from agricultural pollution and water in particular the coastal protection belts, legislation was already in 1987 and limits the use of fertilisers and pesticides around inland waters. Even more strict limitations are set around the Baltic Sea and the Gulf of Riga, which limits agriculture mainly to combat the coastal erosion.

Armenia

Armenia is a mountain country and it occupies the southern part of the Transcaucasus. Its territory is about 30,000 km² with the average altitude of 1,800 meters above sea-level. More than 40% of the territory lies 2,000 meters above sea-level and is not being used for agriculture. The natural and climatic conditions in the Armenian plateau were formed 10-12,000 years ago.

The Armenians who have been living on the present territory since the 9th century B.C. were occupied with agriculture and cattle-breeding.

A sharply continental climate, aridity of the area and fragmentation of relief forced the population to fight for the conservation of land resources: to build irrigation and drying systems, to terrace steep slopes in order to prevent land removal, erosion processes and, finally, to combat desertification.

The territory of Armenia includes the following natural soil zones: semi-desert -7.9% (236,000 ha), dry steppe -8.1% (242,000 ha), steppe -26.8% (797,000 ha), forest -23.9 (712,000 ha) and highland meadow -24.1%(629,000 ha), and the rest of the lands - 12% (358.300 ha) are represented by mother ores and water surface. The agricultural land amounts to 46.8%, forests - 11.2% and the rest - 42%.

The major part of the territory is subject to desertification processes. Almost 50% of the land is eroded, some 60% of the territory is subject to landslides, mudflow and other exogenous processes. Some 40% of land is represented by stony soils, while saline soils amount to 30,000 ha. The population of Armenia is about 3.5 million. People density is 120 persons per 1 km² and 70 % of population lives in cities.

Land privatisation began in Armenia in 1991 and was substantially accomplished in 1994. Mass privatisation of lands is a progressive step towards introduction of market relations. At the same time it created a lot of new problems. New legislation should be developed.

20% of cultivated lands were left in the state reserve fund. The rest is being divided between the communities taking into account the number of peasants. As of 01.01.98, 457,700 ha of cultivated lands have been privatised. Pastures are not being privatised and are in general use. At present, only 5% of pastures are not degraded.

In accordance with some calculations 80% of cultivated lands require irrigation. At present the use of pesticides and fertilisers is not being controlled. Privatisation leads to some legal, logistical, financial and other difficulties in organizing land-reclamation, irrigation, combat against erosion and salinization.

An energy crisis in the beginning of the 90's resulted in massive deforestation, which activated, *inter alia*, erosion of lands, landslides, mudflows and other exogenous processes.

Due to these facts Armenia participated actively in preparation of the United Nations Convention to Combat Desertification and became a Party to the Convention. A National Action Programme (NAP) to Combat Desertification in Armenia is presently being formulated and it is expected that it will be presented to the Government for approval before the COP-4.

Armenia supports adoption at the COP-4 of a new regional implementation annex to the UNCCD for Central and Eastern Europe, that will give an impetus to development of international co-operation at all levels.

Bulgaria

Bulgaria is a small country with a territory of about 111,000 km², with a temperate continental climate. It is distinguished by a vast variety of soils and biodiversity. It has scarce mineral resources. Due to relief, only 42% of the total territory of the country is being used for agriculture.

Due to intensification of industrial and agricultural production, urbanization and some other factors the quality of air, water and soil has deteriorated. At present active agricultural population is being decreased. Fertile lands are abandoned, irrigation systems are destroyed, and in many places vegetation is degraded. There are many factors in Bulgaria, which demonstrate that the processes of desertification are taking place.

Eighty percent of the total territory of the country is subject to erosion. One hundred regions of the country are affected by water erosion and they account to 72% of arable land. Twenty-five regions (29% of arable lands) are affected by wind erosion. Each year 130 million tons of fertile soil is being lost due to the water erosion and 30-60 million tons - due to the wind erosion. During the last years irrigation erosion is being reduced.

Forests covers one third of the territory of the country. As a result of anthropogenic activities 3% of this territory is completely eroded. These lands should be recultivated as soon as possible otherwise they will remain deserted forever.

Many watersheds are subject to erosion processes. A lot is being done for combating erosion and for forestry protection. New projects are being prepared. Unfortunately, due to the lack of financial resources there is no possibility to undertake necessary studies and to collect needed information.

It should be noted that mountain forestry ecosystems are also subject to climatic and anthropogenic pressure. These processes are being monitored; a National Strategy and Plan of Action to Conserve Biodiversity were prepared in the country.

Seven percent of arable lands are affected by salinization. About 1.5 million ha are soured. Bulgaria is rich in mineral resources and their extraction contribute to environmental deterioration. Chemical contamination of land, mainly due to heavy metals, is also a disturbing factor for the health of people and contributing to soil fertility destruction.

Only 0.78% of arable lands are contaminated due to industrial activities. The problem is that in some regions, territory of contaminated lands exceeds that of non contaminated land. In this regard the policy of the country is to

minimise the emission of heavy metals to control the quality of water used for irrigation.

As far as the land is concerned, the main task of the Ministry of Environment and Water is to effectively protect land resources from physical and chemical degradation, destruction and contamination. National legislation is being improved taking into account European standards.

In order to stop the processes of land degradation large scale studies should be undertaken and information collected. All this demands considerable financial resources. Taking into account all factors it should be noted that the processes of land degradation in Bulgaria have not yet reached a critical stage and that they are still reversible if necessary protective measures are taken at the right time.

Estonia

The area of Estonia is 45,227 sq km and the total population (according to the census of 1989) is 1,453,200. The density of population is 32.6 people per sq km. Estonia has 3794 km of coastline. It is a flat country with the highest point only 318 m above sea level.

The whole territory of Estonia is situated in the watershed of the Baltic Sea. There are 420 rivers which are mainly short (Pärnu River, 144 km, is the longest). There are more than 1,500 lakes the majority of which are also small.

The temperature in Estonia is temperate, frequently changeable with warm summers and quite mild winters. The average annual precipitation amounts to 500-700 mm.

One of the main targets of the Estonian Environmental Strategy and National Environmental Action Plan (approved by the Government in 1998) is to protect surface water bodies and coastal seas. It is the aim to bring the main municipal and industrial wastewater treatment indicators (BOD, phosphorus etc.) in line with the recommendations of the Helsinki Commission (HELCOM).

Since 1993 the organic matter, nitrogen and phosphorus concentrations in Estonia's rivers have remained fairly constant. The levels are little above background levels normally expected for unpolluted rivers.

Land use and land degradation

Concerning land use, 22% of the territory is covered with agricultural land and 7% with natural grasslands. 48% of the territory is covered with forest and woodland (approximately two million hectares) and 20% with mires (bogs, raised bogs, and waterlogged areas). There are hundreds of mires where the thickness of the peat layer extends to more than 5 m.

Biological diversity is one of Estonia's most important natural treasures with a large number of wildlife species. Due to extensive agricultural system biological diversity has survived. Estonian landscapes are diverse, capable of rehabilitation, and their structure is relatively good. During the last decade the territory under protection has gradually increased, forming ca 10% of the total territory.

The policy on the maintenance of landscapes and biodiversity aims to improve the protection of landscapes and the existing network of nature reserves in accordance with the EU recommendations.

Arable land

The share of arable land in Estonia is approximately 22% of the territory. By the year 1998, the production volumes of agriculture had largely decreased and the harmful impact of agriculture on the environment has significantly weakened. However, during intensive agricultural production of the past decades, new virgin soils were cultivated, including drained bogs. Due to cultivation of peat and sandy soils, wind erosion became more intensive. Ploughing of steep slopes caused vast water erosion and heavy machinery damaged the structure, bio-life and moisture conditions of soil.

Mining industry and hazardous waste effects

The main mineral resource of Estonia is oil shale the large deposits of which are located in northeastern Estonia. The area disturbed by oil-shale mining amounts to 24,000 hectares (including 11,000 ha disturbed by opencast oil-shale mining of which 9,000 ha have been reclaimed). In the future, the primary task is to improve the quality of reclamation. In addition to the maximum restoration of soil fertility, the mined areas must also regain acceptable aesthetic quality.

Although oil-shale mining has decreased it, as well as oil shale chemistry and power production, are the main generators of waste (95% of hazardous waste) (oil-shale ash, semi-coke).

After phosphoric mining near Tallinn was closed down, reclamation of surface mines (6.36 sq km) was left unfinished and the unrestored area has developed into wasteland from where hazardous compounds are leached into the water.

Past pollution

The most severe and long lasting environmental pollution and damage problems are connected with the Soviet troops. The damages are estimated to amount to approximately 4 billion USD. There were 1,565 military objects in Estonia. The total area in their possession was some 87,147 ha, i.e. 1.9 % of Estonia's territory.

The different kinds of pollution left behind are as follows: oil pollution in an area of 4100 ha; iron, steel and non-ferrous metals - 158,000 tonnes on 2600 ha; mineral construction waste - 365,000 t on 700 ha; wood - 19,700 t on 500 ha, domestic waste - 52,00 t on 300 ha.

Environmental legislation and international co-operation

The National Environmental Strategy, approved by the Parliament in 1997 and the National Environmental Action Plan, approved by the Government in 1998, present the main environmental problems and goals to be achieved together with measures necessary to reach these goals.

Estonia has developed bilateral co-operation with its neighbours as well as other countries. In the next years, one of the priority areas is preparation for accession to the European Union. As of 1999, Estonia has signed and is implementing more than 30 bi and trilateral agreements in the field of environmental protection and acceded to more than a dozen environmental conventions. Including: 1971 Convention on Wetlands of International Importance Especially as Waterfowl Habitat, the Rio de Janeiro 1992 Convention on Biodiversity, the New York 1992 United Nations Framework Convention on Climate Change.

Lithuania

Lithuania is the most southern of the three Baltic States, bordering Latvia to the north (61.0 km long border), Belarus to the east and south (720 km), Poland (110 km) and the Kaliningrad region of the Russian Federation (303 km) to the southwest. The Lithuanian coastline is 99 km long with a surface area of 65 301 km². Lithuania is the largest of the three Baltic countries. The country forms part of the great North European Plain and the landscape alternates between hilly areas and flat plains. There are two elevated regions: the Aukštaičiai Highlands and Žemaičiai Highlands, which are 290 m above sea level; and three plains: the Pajūris Lowland, the Central Plain and the Eastern Lowland.

Lithuania has 785 rivers longer than 10 km. There are 2 834 lakes larger than 0.5 ha, covering a total surface of 87 643 ha. Forests cover 30 per cent of the territory. Forest cover has increased over the past 50 years, from 21.8 per cent in 1937 to about 30 per cent in 1997. However, it is lower than in Latvia (41.7 per cent), Estonia (39.2 per cent) and Belarus (34.6 per cent). Most of Lithuania's forests are in State hands. At present, private forests make up about 5 per cent (91,400 ha).

Lithuania applied for EU membership on 8 December 1995. As a result, its environmental policy became subject to considerable influence from the EU. Lithuania has already ratified several environmental conventions. Lithuania signed the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 and ratified it in 1995. The National Committee for the Implementation of the UNFCCC and a country team to prepare a national implementation strategy for the Convention was established in 1994.

Lithuania signed the 1992 Convention on Biological Diversity in 1992 and ratified it in 1995. In 1993 Lithuania ratified the 1971 Ramsar Convention on Wetlands. In 1996 Lithuania ratified the 1979 Berne Convention of European Wildlife and Natural Habitats. It entered into force on 1 January 1997.

Lithuania intends to become a party to more. However, it has problems meeting the conventions' obligations because of its economic difficulties and financial constraints.

Agriculture uses 54 per cent of the land, two thirds of which is arable. Bogs and marshlands now cover 7 per cent of its territory. Most are in the west, the south and the east. Some 77 per cent of wetlands have been drained for agricultural purposes. Over the last few decades the intensification of large-scale agriculture, the cutting of forests and the draining of bogs have contributed to erosion and loss of soil productivity. At present, about 15 per cent of the country's farmland is severely eroded.

Soil quality varies considerably. Good quality agricultural soil is found on only 34 per cent of the agricultural area. The measures taken to combat soil erosion such as reducing crop cultivation on eroded areas, sowing perennial grasses on fragile soils and planting trees on the steeper slopes are not sufficient to solve the problem.

Three main regions can be identified by soil productivity: the lowlands in central Lithuania have the most productive soils, followed by the low, deeply washed carbonate soils in west Lithuania. The wooded moraine hills and interspersed sandy plains in east Lithuania have relatively low agricultural productivity. The most characteristic soils are turf podzolic loam and gley. The Karst Zone (Biržai and Pasvalys districts, Northern Lithuania), one of the most environmentally vulnerable areas of Lithuania, is known for both its water pollution and soil erosion problems.

8. Consideration of the Agenda Items 5 and 6 in the Working Groups

Two working groups have been established. Working Group I considered agenda item 5, "Co-operation between donors and recipients for combatting land degradation and for the mitigation of drought". Mr. Philip Dobie, Director UNSO, facilitated the discussion in Working Group I. Results of the discussions were summarised and the conclusions prepared. The conclusions were then submitted to the Plenary for consideration.

Working Group II considered agenda item 6, "Policies and land management practises, including local community participation in natural resources management". The Introduction was made by Dr. Andrej Steiner, Executive Director of "Environmental Training Programme (ETP)", a Non-Governmental Organization from Slovakia. Results of the discussion were summarised and conclusions prepared. The conclusions were then submitted to the Plenary for consideration

9. Adoption of the Conclusions and Closing of the Workshop

At its last Plenary meeting, the participants having considered the results of the Workshop, adopted the following conclusions:

I. Participants from Central and Eastern European countries which took part in the Workshop,

Having reviewed a broad range of issues related to land degradation and drought in Central and Eastern Europe in the context of the United Nations Convention to Combat Desertification (UNCCD), and expressing concern over their impact on the ecological and socio economic conditions of the affected countries in the region;

Acknowledging that land degradation and drought are problems of transboundary nature and that the UNCCD offers a welcome framework for those joint action of relevant countries which are needed to complement national efforts in the combat against land degradation/desertification and drought;

Noting that the UNCCD has entered into force on 26 December 1996 and that by 9 May 2000 one hundred sixty three countries and the European Union had become Parties to the Convention;

Bearing in mind that wide participation of countries in this Convention is essential for fruitful international cooperation to combat land degradation/desertification and drought and to address the challenges of land degradation and poverty at a global level;

Recognizing the need to prevent land degradation through an integrated approach promoting improved practices for agriculture, land use and water management ;

Welcoming the preparation of a fifth regional implementation annex to the Convention for Central and Eastern Europe; and inviting the Conference of the Parties to adopt it at its fourth session;

Having taken note of potentials for strengthening the cooperation in the management of natural resources at the regional level within, *inter alia*, the framework of a new regional implementation annex to the Convention for Central and Eastern Europe;

Aware of the need for the Secretariat to coordinate UNCCD's activities with the secretariats of other relevant international bodies and conventions.

Taking note of benefits, which could be gained from participation in the UNCCD:

Have come to the following conclusions:

1. There is a need to ensure wider participation in the Convention of countries of Central and Eastern Europe since the Convention provides a sound basis for national and joint regional actions of all affected countries to combat land degradation and drought on a flexible and participatory basis. Countries of Central and Eastern Europe that have not yet done so are invited to accede to the Convention, as soon as possible, so as to improve the effectiveness and co-ordination of actions aimed at combating land degradation and mitigating effects of drought.
2. At the national level, efforts to combat land degradation/desertification and drought should be considered as an integral part of the national policies for sustainable development of the affected countries that are now put into place in the context of an evolving legislative and normative framework. Governments are encouraged to finalise National Action Programmes (NAPs) as soon as practicable through consultative participatory processes. Interested research institutes, NGOs and the affected population, including local communities and authorities are invited to participate in an integrated manner in the preparation, co-ordination and implementation of NAPs.
3. Regional cooperation may extend not only to the elaboration and implementation of such National Action Programmes but also to improved linkages between other national plans of actions in relevant fields of environment and sustainable development, which impact on activities to combat land degradation/desertification and mitigate effects of drought.
4. While the UNCCD must be implemented primarily at the national and local levels, in complement of such efforts, it offers concrete opportunities for the strengthening of international cooperation particularly in the fields of scientific research, data management and information exchange, transfer of technologies and training. Possible areas for cooperation, taking into account the present state of economies in transition and other specific conditions of Central and Eastern Europe, may include:
 - a) Drought mitigation and disaster preparedness;

- b) Socio- economic aspects of land degradation including its impact on rural livelihood and migration;
- c) Rehabilitation of lands degraded due to industrial activities and nuclear wastes; and reduction of the consumption of fertile soils caused by urbanisation;
- d) Awareness raising, ecological education, including the promotion of information systems;
- e) Exchange of technologies and know how;
- f) Monitoring and early warning systems including the needed standardisation of necessary data and indicators;
- g) Use of transboundary water resources and monitoring of their usage;
- h) Rehabilitation of natural resources and cultural heritage, restoring of indigenous knowledge systems;
- i) Combatting environmental degradation and improvement of public health;

Direct socio-economic benefits should accrue to the population of affected areas in the context of the national programmes of participating countries while environmental benefits should have a lasting and global impact.

5. Public awareness building should continue in each country and involve decision makers, the scientific community, NGOs and users of natural resources at the grassroots level. In this context the special role of the UNCCD Secretariat is recognised.
6. The UNCCD Secretariat is encouraged by the countries-participants to enhance its efforts and look for new possibilities of joint action and greater synergies within the framework of "Rio-92" related Conventions.
7. The UNCCD Secretariat, UNDP, UNEP, FAO, WMO, UNESCO and the United Nations Economic Commission for Europe are welcome to lend technical and financial support to the preparation process of National, Sub-regional and Regional Action Programmes.
8. The international donor community including the United Nations family, the OECD, the European Union, the multilateral financial institutions such as the World Bank, the European Bank for Reconstruction and Development and bilateral donor agencies are also welcomed to provide to the affected countries of the region necessary resources for the implementation of the Convention.
9. The European Union is invited to address the related issues of land degradation, soil protection and desertification in its forthcoming sixth environmental action programme to be adopted by 2001 and to strengthen its support to country Parties of the UNCCD affected by land degradation.

II. Participants at the Workshop express their appreciation to the European Union, to the Governments of Germany and Finland and to the Hanns Seidel Foundation for the sponsorship of this Workshop.

III. Participants recommend to consider, in the light of the forthcoming decisions of COP-4 and of the status of the accession process of the countries of the region to the UNCCD, the possibility of convening a second meeting of countries of Central and Eastern Europe with a view of strengthening regional cooperation.

IV. Participants endorsed the following conclusions prepared by the two Working Groups:

Conclusions prepared by Working Group I on: “Cooperation Between Donors and Recipients for Combatting Land Degradation and for the Mitigation of Drought”

Participants from Central and Eastern European countries that took part in Working Group I.

Mindful of the need of the countries of the region for longer term environmental cooperation and predictable mechanisms for partnership building;

Having discussed issues of co-operation between donors and recipients for combatting land degradation and for the mitigation of drought;

Have come to the following conclusions:

1. Access to information on possibilities of donors, their priorities, special conditions and limitations should be improved.
2. Co-ordination among the institutions of the recipients at the level of ministries, institutions and non-governmental organisations should be strengthened.
3. Co-ordination among the donors should also be strengthened with a view to increase the efficiency of financial assistance and to avoid duplication.
4. On the other hand country recipients, in preparing their projects, should clearly identify priorities. Programmes should be clearly and fully integrated into national priority programmes of development.
5. National and/or regional conditions should be adequately taken into account by donors to avoid using a single approach to the countries of Central and Eastern Europe.
6. Both donors and recipients should, after completion of the development of strategies and the preparation of programmes, pay special attention to possible follow up. Finance for follow-up activities should be included in national, local or NGO budgets.

7. Special attention should be paid to development and implementation of inter regional and transboundary projects.
8. Accession to the UNCCD of countries of Central and Eastern Europe should result in additional income of financial resources to those countries through the Global Mechanism established under the Convention.

Conclusions prepared by Working Group II on: “Policies and Land Management Practices Including Local Community Participation in Natural Resources Management”

Participants from Central and Eastern European countries that took part in Working Group II.

Having discussed the need for sound watershed management in tackling complex problems connected with altering rainfall patterns and hydrological systems and the impacts of severe changes in land uses during a period of economic transition;

Aware of the tasks to eradicate threats to human health and the environment arising from contamination of soils, waters and food chains with hazardous substances caused by improper agricultural, forestry and industrial practices and military operations;

Conscious that uninhibited consumption of agricultural and forest land and particularly virgin land with indispensable ecological functions can irreversibly disturb the natural balance;

Recognizing the efforts to improve the economic and social situation of people in rural areas and to promote an environmentally friendly agriculture including measures to avoid depletion of soil fertility due to erosion, soil compaction and losses of humus;

Considering the links between land degradation and the preservation of sinks for greenhouse gases, habitats for endangered species and for biological diversity;

Reaffirming that all measures for improving the management of agricultural, forest and urban lands should be embedded in an approach to accomplish sustainable development;

Have come to the following conclusions:

1. Governments of the region have to be encouraged and assisted by scientific and public institutions to implement national policies and action programs aimed to combat land degradation in its various forms focussing on appropriate measures to avoid further deterioration of the natural vegetation, to halt soil erosion, to maintain water and to enhance the water retention capacity of the land and to stabilize the groundwater table and mitigate effects of drought in various areas.

2. It is desirable to complete land reform with economically reasonable and fair social objectives as soon as possible. There is also an urgent need to improve income opportunities, education and social security systems for people in rural areas in order to establish preconditions for sustainable rural development, land management in agriculture, forestry and other land based industries, e.g. tourism.
3. State and communal authorities are urged to develop efficient methods and measures for regional and communal land use planning based on a comprehensive national policy for sustainable land management which includes strengthening co-operation between the institutions concerned in the process and the involvement of local people as well as the non-governmental organizations in it. The aim of limiting the consumption of fertile and ecologically valuable land for uses that reduce the functions of land in the natural balance has explicitly to be pursued in this context.
4. Governments are also invited to implement policies and administrative measures for avoiding and controlling air, soil and water pollution and for safe waste management according to the state of obtainable technical standards.
5. Governments are also strongly encouraged through broad public awareness, to enhance the preparedness of governments to commit to international agreements that require and promote stronger environmental protection, better land conservation and sustainable land management - such as the UNCCD - in order to achieve a holistic approach for environmental protection and sustainable development. In this context it is of great importance that the public have free access to all relevant information.

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The Workshop was declared closed.

AGENDA AND PROGRAMME OF WORK

Monday 8 May, Plenary

9.00 – 9.30	Registration of participants
9.30 – 10.10	Welcoming Remarks - Dr. Gepperth, Hanns-Seidel Foundation Opening statements of - Mr. Hama Arba Diallo, UNCCD Secretariat - Mr. Christoph Bail, European Commission - Dr. Fritz Holzwarth, Federal Ministry of Environment - Mr. A. F. Marques de Carvalho, Portugal
10.10 - 10.20	1. Election of the Chairman and Rapporteur of the Workshop and adoption of the agenda
10.20 – 10.50	2. State of land degradation and desertification in countries of Central and Eastern Europe – presentations by: Dr. Anna Rita Gentile Project Manager for Soil and Contaminated Sites European Environment Agency Dr. Richard Debicki Institute of Earth Sciences University of Maria Curie Sklodowska and Institute of Agrophysics Polish Academy of Sciences, Poland.
10.50 – 11.00	<i>Coffee Break</i>
11.00 – 13.00	Statement by Ms. Ria Oomen-Ruijten, European Parliament Statements by countries
13.00 – 15.00	<i>Lunch</i>

Plenary

15.00 - 16.00	Statements by countries (continuation)
16.00 – 16.10	<i>Coffee Break</i>
16.10 – 18.00	3. Major issues related to the implementation of the UNCCD in countries of Central and Eastern Europe and linkages and synergies with other environmental conventions – presentations by: Dr. Joachim Woiwode Head of Division Federal Ministry for the Environment Nature Conservation and Nuclear Safety – Germany Statements by Mr. Michael Hamell, European Commission Statements by international organizations 4. Instruments of the EC on combatting land degradation and desertification. Discussions of agenda items 3 and 4.

Tuesday 9 May, Plenary

9.00 – 11.30 Continuation of discussion of agenda items 3 and 4

11.30 – 11.40 Coffee break

Working Group 1

11.40 – 13.00 5. Co-operation between donors and recipients for combatting land degradation and for the mitigation of drought.

Discussion

Working Group 2

11.40 – 13.00 6. Policies and land management practises, including local community participation in natural resources management – introduction by:

Dr. Andrej Steiner

Executive Director of NGO

Environmental Training Programme (ETP) - Slovakia

Discussion

13.00 – 15.00 Lunch

Plenary

15.00 – 18.00 Consideration of the reports of WG1 and WG2
Adoption of the conclusions of the Workshop and closure of the Workshop

Statement by Dr. Rainer Gepperth, Head of the Institute for International Contact and Cooperation, Hanns Seidel Foundation, Munich Germany.

Dear Excellencies, Dear Ministers, Ladies and Gentlemen,

On behalf of the Hanns Seidel Foundation, I have the pleasure of welcoming you to the premises of the Hanns Seidel Foundation in Brussels to the "Workshop on Land Degradation & Desertification in Central and Eastern Europe" which is jointly organised by the United Nations Convention to Combat Desertification (UNCCD) and the Hanns Seidel Foundation, with the financial support of the European Union, the Federal Republic of Germany and Finland and I would like to express my gratitude here.

Desertification and Land Degradation - these words may at first make you think about Africa and its large desert zones, especially the Sahara, which year after year regains territory on what once was fertile ground and takes away the vital basis of life for millions of people.

There are various causes, but especially mankind and its activities have a major impact on this development. Some time ago, the dry zones recovered rather quickly after longer periods of dryness or aridity, but nowadays these dry zones become deserted through intense or over exploitation of pastures, the deforestation and insufficient water distribution. Economic and social pressures, ignorance and also wars or crises are responsible for that.

But Desertification and Land Degradation are not only problems of the African continent. Also Asia, America and Europe have more and more regions, which can no longer be utilised because of environmental pollution and which are not profitable anymore for people living there.

One example for that is the Aral Sea which has largely turned from an abounding fishing ground and an important source of income for several thousands of people into a desert. I feel very upset every time I see those pictures on TV.

For these reasons, the Hanns Seidel Foundation did not hesitate to pick up the suggestions of the UNCCD and has the great honour to co-operate in this important workshop on Desertification and Land Degradation in Central and Eastern Europe. Your numerous and high-ranking presence shows that you consider this topic as important as we do.

Before I give the word to my esteemed successor on this panel, let me please mention some more details on the Hanns Seidel Stiftung. This Foundation has been created in 1966 with the mission to provide political education and to promote the active participation of the population in political life. This has first (and is still) been applied to Germany and has since 1973 through the creation of the "Institute for International Contact and Co-operation" been extended to other countries. The goal of our foreign activities is to assist each partnership country in developing a sustainable political, economical and

social development, which enables the population to live a decent and self-determined life, free of harms and needs.

This concerns also the protection of environment and natural resources and the Hanns Seidel Stiftung attends to take these matters into consideration within its activities.

One example is for instance an environmental project in Indonesia, whose aim is to support the Indonesian State in the creation of an efficient environment protection agency. This project is run with the co-operation with the ASEAN Secretariat General.

In Egypt, we run a project in co-operation with the government to promote regional development through the creation of new and attractive settlement areas in order to relieve the Valley of the Nile, which suffers from a surplus of inhabitants. This project permits to conserve the Nile arid fertile zones as the lifeline of the country.

As a third activity in this field, I would like to mention a re-forestation project that the Hanns Seidel Foundation runs in co-operation with the European Union in the Democratic Republic of Congo, Former Zaire, in Mampu, where the Foundation has improved it into a settlement project for urban unemployed citizens, which receive their own part of land, that they can cultivate, and sell their profits for their own and the community's welfare. On one hand they use the forest but on the other hand they also are in charge with the re-forestation by currently replanting new trees. This project is essential to the prospering of several hundreds of people.

Excellencies, Ladies and Gentlemen, I wish this workshop a lot of success and I hope that you will take with you much information and many useful ideas for the future work in your home countries,

Thank you very much.

Statement by Mr. Hama Arba Diallo, Executive Secretary, UNCCD

Excellencies,
Distinguished Participants

I am very pleased and honored to have this opportunity to address the Workshop on the Land Degradation/Desertification in Central and Eastern Europe in the context of the United Nations Convention to Combat Desertification. At the outset let me convey our gratitude to the European Union and Hanns Seidel Foundation for their contributions to the organization of the Workshop. I would also like to extend my appreciation to the Governments of Germany and Finland for their role in sponsoring this important meeting. I salute all the participants who, as I hope, will make a decisive contribution to the success of our common efforts to combat land degradation and to mitigate the effects of drought.

As you have noticed in the Programme of work the major objectives of this Workshop are to review problems of land degradation and drought mitigation in Central and Eastern Europe in the context of the UNCCD, to raise awareness among them of the benefits, which could be gained from participation in the Convention. I do hope that, through this Workshop, you will become more familiar with the range of challenges and opportunities offered by the CCD process.

The United Nations Convention to Combat Desertification was one of the major achievements of the Rio Summit. With its entry into force on 26 December 1996 following that of the Conventions on Climate Change and Biodiversity, the CCD took its place with its sister conventions. Now it is widely recognized that the CCD captured the wisdom of the time and presents a broad based methodology, which can serve to meet the multiple priorities of the international community in addressing land degradation. The Convention is not dealing with abstract or simply long-term issues. It is in the frontline of the fight against poverty. It deals with fundamentals of today, linked to all aspects of sustainable development. Seen in its full scope, the Convention can be a tool for inter-governmental cooperation leading to development, stability and peace.

The Road to Rio was a long one. Now we look where the road is taking us from Rio. We continue to deplete the ozone layer with chloroflurocarbons. We continue to cause atmospheric warming by an excess of greenhouse emission. We further threaten the fragile land based ecosystems affected by soil loss, drought and desertification. These trends are persisting within individual countries and at the international level. Economic and ecological issues must be tackled together by the state in partnership with the civil society. This is what this Convention is all about, more than any other instrument of this kind.

The Convention differs from previous initiatives in the area, in a number of respects:

- the Convention is legally binding instrument with a global aim;
- the Convention establishes institutions and processes with a permanent vocation;
- it adopts an integrated approach which addresses all aspects of the problem, including socio-economic dimensions such as poverty, migration, health and education issues;
- the Convention adopts a “bottom-up” approach emphasizing the need for popular participation and recognizes the role of non-governmental organizations;
- the Convention also prescribes a pragmatic approach to achieve its objectives; it encourages potentially affected countries to prepare and carry out National Action Programmes to combat land degradation, with the active participation of bilateral and multilateral donors and other relevant organizations. In this regard, I would like to note that in your region national programmes are being prepared by Armenia, Azerbaijan, Georgia and Romania. Moldova has just completed preparation of its programme and, as we hope, will soon start its implementation with the assistance of the international community. We have reviewed with interest the content of National Reports that highlight the challenges and potential of the UNCCD implementation process at this juncture of the transformation of their respective economies and societies.

Among its provisions, the Convention calls for innovative participatory approaches to address sustainable human development. These include a new generation of bottom-up country-driven National Action Programmes in the countries affected by drought and land degradation, to be supported through partnership arrangements. Other action programmes are also being promoted at the sub-regional and regional levels. The CCD also calls upon affected countries to put in place policy frameworks that address holistic drylands development that is in consonance with the preoccupations of the affected communities, through a participatory and bottom-up approach. Within the context of the integrated and sustainable management of natural resources, the conservation of biodiversity has also its rightful place in the Convention.

The challenges for the development of ecologically threatened areas are clearly spelt out in the Convention. The key issues of protection of soils from all types of degradation, protection of biological diversity, development and use of the appropriate technology including biotechnology, the protection of water resources, maintenance of stability of ecosystems, constitute some of the basic concerns that need attention. It is clear that the availability of suitable technologies for the sustainable development of drylands is often lacking, and the added challenge in this respect is to address technological innovation.

The main objective of the Convention is to combat land degradation and mitigate the effects of drought through effective action at all levels, supported by international cooperation and partnership arrangements, in the framework of an integrated approach consistent with Agenda 21. I would like to dwell a little on the specific problem of land degradation and desertification.

Over the years, various studies that have been undertaken have clearly established that desertification affects about one sixth of the world's population, 70 per cent of all dry lands, and one-quarter of the total land area of the world. The scourge of desertification has profound impacts, of which in addition to the widespread poverty, the principal and most obvious one is the degradation of 3.3 billion hectares of the total area covered, by the world's rangelands. This degradation is manifested in the general decline in soil fertility and soil structure, degradation of irrigated land, erosion of biological diversity, eventually leading to the diminution of the affected land's biological potential to sustain life. Thus the process of desertification is responsible for reduction in the regenerative capacity of the affected ecosystems, by directly undermining their resilience. This has of course an impact on current livelihood systems and resource use such as agriculture and pastoralism. Needless to say, droughts exacerbate such difficulties.

All the above issues that I have touched upon, and that address the development of dryland areas, have been very well articulated in the CCD which calls for among others, the integrated and sustainable management of natural resources as well as the development and use of technology to help in uplifting the livelihoods of people in dryland areas that are affected by drought and desertification.

In this Convention definition of desertification is linked climatically to arid zones, but in general the Convention aims at combating all other forms of land degradation. *Mutatis mutandis*, its provisions are helpful to combat land degradation under other climatic conditions. Soil protection is necessary for sound ecological balance and sustainable land use. Consequently, there is an urgent need for closer scientific, institutional and legal cooperation in this area. In this regard the CCD provides necessary framework for the exchange of experiences on measures to protect soil and water resources and to develop sustainable forms of land use between countries which are not affected by long periods of serious drought and desertification. The Convention provides rules and mechanisms for technical and financial support to attain these goals. Its instruments have been developed mainly for dry areas, but with the application of the Convention it becomes evident that they can be used also for combating land degradation and promoting sustainable land use in other geo-climatic regions, including Central and Eastern Europe.

I would like to report to you that, as at present there are 164 Parties to the UNCCD. Many country Parties are taking part in the exchange of experiences on measures to protect soil and water resources and to develop sustainable forms of land use, are not affected by long periods of serious drought and desertification. If we look at the situation in Europe we will find that all countries of the European Community, including the Community itself, are Parties to the CCD. The other part of Europe is represented in the Convention only by eight states out of a total of 22 countries, which are considered, as countries of Central and Eastern Europe. And they are Albania, Armenia, Azerbaijan, Czech Republic, Georgia, Hungary, Moldova and Romania. Their representatives are going to participate in this Workshop.

As we, in the Secretariat, understand by acceding to the UNCCD a country becomes a Party to the main international instrument dealing with the urgent and growing global problem of land degradation which allows it to:

- gain from cooperation with other countries in designing and implementing its own programmes to combat land degradation and mitigate the effects of drought;
- improve access to relevant technologies and data for appropriate measures;
- nominate its scientists for inclusion in the roster of experts from which ad hoc panels are being established to deal with specific scientific and technological issues;
- take part in encouraging funding and promoting financial mechanisms that can help to ensure that adequate financial resources are available for programmes to combat land degradation.

In general participation in the CCD may greatly enhance the national programming framework for the sustainable development of land based natural resources. Parties to the Convention are entitled to participate in the networking of relevant institutions to be established to support the implementation of the Convention. These networks may be expanded to include the various aspects of land degradation relevant to countries of Central and Eastern Europe.

By acceding to the UNCCD a country will receive a good opportunity to cooperate closely with all Rio conventions. It will also show solidarity with other countries facing the effects of land degradation and drought- especially in its most serious form as desertification - as an urgent and growing task of global dimension and helping to conceive the implementation of the UNCCD and of other UN related conventions as an interlocking approach to sustainable development.

On my part, I would like to inform you that from my contacts with relevant authorities in many countries of your region, I came to the conclusion that there is a general desire to accede to the Convention. But I have to note that until now the process of accession was very slow. We, in the Secretariat, closely follow the situation with accession of countries of Central and Eastern Europe, which are also affected by either desertification or land degradation. We sincerely believe that without their participation, measures aimed at combating land degradation will be less effective. I would like to assure you that our Secretariat is ready to assist you to complete the process of accession as soon as possible. We hope that this Workshop will also contribute to this process.

We understand that there are different reasons for a slow process of accession. We do hope that the on-going discussion on the new regional implementation annex to the Convention for Central and Eastern Europe will help to accelerate the accession process in some countries of your region. At its second session the Conference of the Parties invited countries of Central and Eastern Europe to pursue consultations with a view to elaborating such

an annex and to submit a draft for consideration by the COP 3. I would like to remind you that the Conference also urged observer countries from Eastern and Central Europe to take appropriate actions to become Parties to the Convention, thereby facilitating adoption of an additional regional implementation annex at the COP-4.

Further to this decision, informal consultations for countries of Central and Eastern Europe were organized by Ambassador Bo Kjellen of Sweden, former Chairman of the Intergovernmental Negotiating Committee. A preliminary outline of an annex for Central and Eastern Europe, as prepared by Ambassador Bo Kjellen, was considered at the consultations and a broad agreement was reached on this outline. There was a general agreement that a revised text taking into account proposed amendments should be submitted to COP 3. It was also understood that this text represented a general consensus on the contents and structure of an annex, aimed at facilitating the further process. Armenia, as a Party to the Convention, transmitted the text of a draft to the UNCCD secretariat for consideration by the COP-3, which was reproduced in document ICCD/COP(3)/16. The document is available in this room.

It is expected that this annex would encourage Parties in Eastern and Central Europe to cooperate in implementing the UNCCD. Its provisions may stimulate, for example, preparation of subregional, regional and joint action programmes aimed at promoting technical, scientific and technological cooperation in this region. Such programmes might be prepared and implemented in collaboration with other Parties or regions. These provisions would encourage Parties in Eastern and Central Europe to cooperate with other countries, including, for example, countries from Western Europe.

A new annex may also provide a basis for the development, adaptation and transfer of relevant environmentally sound technologies within and outside the region. Under a new annex international cooperation requirements in support of national efforts might be identified, thereby creating, for example, an enabling environment for investments and encouraging active investment policies. It is expected that cooperation between countries of the region and bilateral and multilateral partners, as well as financial cooperation institutions would be stimulated

It is worth noting that the type of national programmes encouraged by the UNCCD can greatly facilitate a platform for synergistic initiatives involving local populations and decision makers in the restoration of land, the regeneration or preservation of carbon sinks and the protection of biodiversity. We are in the process of developing a Joint Work Programme with the CBD to this effect.

At its third session the Conference of the Parties in its Decision 7/COP.3 invited the countries of Central and Eastern Europe and all Parties to the Convention to continue, under the auspices of the Bureau of the Conference, the process of consultations on the draft additional implementation annex with a view to adopting it at its fourth session. The Conference also invited the

countries of the region to continue their efforts towards their accession to the Convention.

Further to this Decision 7/COP.3 consultations continued on the draft additional regional implementation annex. The Bureau of the Conference at its meeting held on 23 March took note of the ongoing process of accession to the Convention by Central and Eastern European countries, and decided that the draft regional implementation annex for countries of Central and Eastern Europe - as submitted at COP-3 by Armenia- constitutes a proposed amendment to the Convention and that no further notification to Parties is required for its consideration and possible adoption at COP-4. It means that at the fourth session of the Conference of the Parties, decision could be taken on a draft annex. In this regard I would like to remind you that a country becomes a full-fledged Party to the Convention, with the right to vote, after three months after the deposition of its instrument of accession with the Secretary General of the United Nations.

In this connection I would also like to draw your attention to the Article 31 of the Convention: an additional implementation annex in case of voting shall be adopted by a two-thirds majority vote of the Parties present and voting at the meeting and if this majority will include a two-thirds majority vote of the Parties of the region concerned present and voting.

Mr. Chairman,

I shall now end where I have started. The momentous movement of international solidarity to preserve our land based ecosystems and the drylands of the world for our children rest on a preliminary, very simple pre-condition: membership of the Convention. I therefore appeal to all countries to do their best to accelerate the accession process: this will ensure that the universal character of the Convention will be achieved. This in turn will ensure a timely implementation of this instrument, which promises so much for the sustainable development of the world.

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Statement by Mr. Christoph Bail, Head of Unit Development and Environment, Directorate General Environment, European Commission, Brussels Belgium.

Mr. Executive Secretary,
Ladies and Gentlemen,

It is my pleasure to welcome you on this exceptionally beautiful day in Brussels, here at the premises of the Hanns Seidel Stiftung, to the workshop on Land degradation and desertification in Central and Eastern Europe. To her regret, the Commissioner Margot Wallström is prevented from addressing herself this meeting. She is extremely interested in and concerned about land degradation and desertification in different parts of the world. She very much supports all efforts to involve people, civil society and governments at all levels in joined efforts to improve the quality of the environment and to adopt the *acquis communautaire*. Mrs Wallström wishes this meeting every success.

Within the Commission, it is the Directorate General for Development, rather than the Environment Directorate general, which takes the lead on the Desertification Convention. However, we are following the evolution and implementation of the Convention very closely, in particular within my unit which has responsibility for the integration of environment into development co-operation policies as well as for a number of important international conventions and processes, such as Biodiversity Convention, CITES, the international dialogue on forests and the EuroMED partnership. My deputy, Ms. J. Hanna, would have been a more competent speaker, as she is personally quite engaged in the working of the convention, but cannot be here as she is on her way back from the CSD in New York.

For us, the Desertification Convention, together with the two other big Rio Conventions on Climate Change and Biodiversity, constitutes the constitutional triad governing global environment policy. While the Framework Convention on Climate Change and the Kyoto Protocol currently tops the political agenda and while the Biodiversity Convention constitutes the most comprehensive environmental treaty on earth, the Desertification Convention addresses what can be considered as one of the most burning environmental issues, affecting the lives of millions of people day to day. This Convention therefore deserves our attention as much as the other two.

The European Commission is pleased to be associated with the organization and funding of this very important workshop. This meeting is being held as we prepare for the Fourth Conference of the Parties to the UN Convention to Combat Desertification to be held in September in Adelaide, Australia, where a fifth regional annex on Central and Eastern Europe will be considered and most probably approved by Parties.

The Commission is fully aware of the need to raise awareness of the seriousness of the problem of land degradation in this region and to

encourage accession to the Convention. We understand that of the 22 countries in the region only a handful have actually ratified the Convention. We have assisted in the organization of this Workshop not only because of our concern for global environmental protection and our recognition of the need for concerted international efforts to resolve the problems of land degradation and desertification in the different regions, but also our of self interest.

Among the countries concerned by the proposed fifth annex to the UNCCD are 10 candidate countries for membership of the European Union (Estonia, Lithuania, Poland, Czech Republic, Slovak Republic, Slovenia, Hungary, Romania and Bulgaria). These countries are already receiving substantial financial assistance from the European Community to build up their institutions and infrastructures and to adopt the *acquis communautaire* in anticipation of the enlargement of the Union. Furthermore, the Convention constitutes an important instrument in the fight against rural poverty and in the stabilisation of populations across Central and Eastern Europe. The last thing the European Community wants to see is large numbers of persons displaced as a result of environmental disasters such as land degradation, which head for Western Europe. Refugees are not a solution to problems. We need to tackle the causes.

As you know, harmonisation of environmental standards throughout Europe is a key policy of the Union. The Commission would like to see the accession countries take measures against pollution and land contamination and adopt sustainable soil and water management and good agricultural practices.

In the course of the Workshop, we will learn more about the state and characteristics of land degradation in Central and Eastern Europe, what is being done to address the problem and how the UNCCD can help. The Convention to Combat Desertification provides the framework for international action against a scourge that has brought poverty and misery to millions across the globe. Even as we discuss the severe drought in East Africa and in the Indian subcontinent is headline news. The images of displaced and starving people which we see on our television screen show all too well when land destroys the basis for food production for poor regions, whether cause of human activities or natural causes, such as changes in climatic conditions.

Regional implementation annexes are aimed at taking into consideration regional specificities. Central and Eastern Europe may not be as drought prone as Africa and Asia, it nevertheless has serious land degradation problems. It may well follow the example of the Annex IV countries to which the UNCCD has become a spur to combating land degradation and desertification. These countries, which include four EU member states (Italy, Spain, Greece and Portugal), have held a series of meetings on strategies and have either drawn up or are in the process of drawing up their national action programmes. They recognise the need also for a comprehensive regional approach involving the wider Mediterranean and have initiated measures to extend co-operation with North African Countries.

Although Italy, Spain, Greece and Portugal have access to European Community instruments such as the Structural Funds and the Cohesion fund, they have respected the spirit and letter of the Convention, in particular as regards to ownership of the process.

It would be in the interest not only of the applicant countries, some of which have similar climatic conditions to those of the Annex IV, but also of other Central and Eastern European countries to adopt a similar approach. National and regional action programmes are the bases upon which the Convention can realistically be implemented. Their formulation and implementation process must be participatory and must involve as much as possible large segments of civil society.

The developed country parties, including the European Community, have indicated their readiness to assist affected country parties in implementation by providing financial and technical assistance. The Community has co-operation agreements with countries and regions in the developing countries, which allow it, through the associated funding instruments, which allows the Community to contribute to combating land degradation and desertification in the partner countries and regions. Details of these are contained in the Report the Commission distributed at the First Conference of the Parties in Rome, 1997 titled "Addressing Desertification: EC policies, programmes, projects and financial instruments relating to combating desertification in the developing countries and EU member States", the report has been revised and brought up to date by our Services and is awaiting approval by the Commission. It will be published as soon as approved.

Although Central and Eastern Europe is not covered in the report because no implementation annex exists yet for this region, the Community's PHARE programme is assisting the candidate countries in the region, as already indicated, in building up their institutions and infrastructures and in their transition to a market economy. The TACIS programme is providing similar assistance to countries in Central Asian republics and in the ex-Soviet Union. Strong democratic institutions and well functioning economies are preconditions for an effective management of the environment and natural resources.

I wish you a successful Workshop and hope the results will be widely circulated in Central and Eastern Europe. I am also confident that this Workshop will contribute to the adoption and implementation of the proposed fifth annex to the Desertification Convention.

**Statement by Dr. Fritz Holzwarth, Federal Ministry of Environment,
Nature Protection and Nuclear Safety, Federal Republic of Germany.**

Mr. Chairman,
Distinguished organisers of this workshop,
Dear colleagues,

It is a great pleasure to me to address this Workshop on Land Degradation in Central and Eastern European Countries' on behalf of the Federal Ministry of Environment, Nature Protection and Nuclear Safety and to convey the best wishes of Minister Jürgen Trittin to you. We are pleased to support this event, as soil conservation and combating land degradation is a topic of particular importance to the German Government, not at least in the field of its international environmental policy. I am happy to see many colleagues of whom I know that they make all efforts on different places to halt soil and land deterioration. And I am acknowledging very much the decision of the governments they represent to strengthen international co-operation for sustaining the environment and promoting economic development also in the framework of the UNCCD.

Land conservation and soil protection are terms for closely related issues of land use policy. Land conservation expresses the task more comprehensively. It aims to maintain or to develop a way of land use which preserves the fertility of soils, the earning potential for agriculture and forestry and the diversity of flora and fauna under particular climatic, hydrological, geological and relief conditions. So, land conservation and combating land degradation strives for land management that ensures the maintenance of natural balances and encourages the sustainable use of our land resources.

Soil protection addresses these tasks from a more specific angle of view when it aims to preserve the various functions of soils in an ecological and economic context. The observation of increasing pollution and destruction of soils on one side and the experience that soil deterioration undermines the ecological and economic foundations of development in many regions have lead to environmental legislation designed to counteract chemical and physical and biological soil degradation.

It is true, soil protection has been given little attention in the past in comparison to other environmental protection issues such as protection of waters, air quality control, protection of flora and fauna species, policies for handling and transporting chemicals and waste management. There are various reasons for this: soil damage occurs over long periods of time and becomes apparent more slowly than damages in other fields of the environment. Because soils are very different from area to area and inhomogeneous in its composition generally applicable requirements for soil protection are difficult to develop and to enforce. And what is also important soil is usually considered as private property. In general, there has been little public awareness of the fact that soil is a limited resource that needs to be protected.

As yet there is no comprehensive soil protection policy at Community level. However, in compliance with the subsidiary principle in the EC Treaty numerous regulations have already been adopted also at Community level to promote soil protection both directly and indirectly. Furthermore there are joint activities that are geared in particular towards developing a common approach to solving the problems of contaminated sites and co-ordinating European rehabilitation measures for this purpose. Remedial care, which as a rule serves as a hazard aversion, is an indispensable part of soil protection.

In the future it will be increasingly important to develop legal and administrative instruments that make it possible to prevent soils from degradation, which means to strengthen precautionary action in order to secure sustainable development. In the discussion about the future environmental policy of the EU the following must be carefully reviewed:

- How much common ground is already present?
- How much common ground we should strive to achieve and how much of independence for national action we wish to maintain?

These questions also apply to soil protection policy. We wish to discuss them with our partners in Central and Eastern Europe. For this reason we initiated a 'Memorandum on Soil Protection Policies in Europe' that was adopted as a conclusion to a workshop held on this topic in Bonn in December 1998 and we established in co-operation with the EC Commission and other countries the European Soil Forum'. The intention with this forum is to encourage decision-makers from all European countries to develop the above mentioned 'common ground' for an efficient soil protection policy and adequate measures. The first meeting took place in Berlin in November 1999 the next will be held in Italy in the fall of 2001.

In the context of our efforts to strengthen co-operation with governments and scientific institutions in Central and Eastern Europe on the field of soil and land conservation I appreciate this workshop very much. We know, the UNCCD has its origin in the political will of the international community to combat desertification and the effects of drought particularly in Africa and other countries with arid conditions. The Convention provides the instruments for this fight but it offers beyond that a conclusive concept and legal and organisational means for conserving natural resources and promoting sustainable land management applicable by all countries in which land degradation occurs. This workshop is a further initiative to start a fruitful collaboration with governments and scientific institutions in Central and Eastern Europe aimed to get a grip on a serious threat to the environment and to make visible steps on the way to sustainable forms of land use. I am sure this meeting of representatives from governments and experts will facilitate the process of accession of those countries to the UNCCD that are not yet parties in this region.

Mr. Chairman,

I wish to conclude with a comment to the proposal recently made by some scientists and politicians to launch a separate international 'Soil Convention'. Allow me to remind that the Council of Europe agreed upon a 'Charter for the Protection of Soils' already in 1972 and has updated its rules in 1992. The FAO adopted a World Charter on Soils' in 1981, presenting guidelines for sound land management in agriculture and forestry. But as you know, only the Rio Conference on Environment and Development in 1992 with its decision to start negotiations on a Convention to Combat Desertification achieved to create the foundation for legally binding provisions in order to promote sustainable land management in all regions endangered by drought and land degradation and in particular by desertification in Africa. The CCD is together with the FCCC and CBI a pillar of an outstanding system of international environmental legislation in which the three conventions support each other.

A new 'Soil Convention' wouldn't have a chance to find space in this system because its objectives would be overlapping with many of those of the existing Conventions. It was the main reason that the German Government kept away to enter in this discussion and I can not imagine that other governments will support such an initiative. If there are issues the CCD doesn't yet cover sufficiently, and I believe specific needs of soil rehabilitation and protection are of such kind, Parties to the Convention and the Secretariat should improve the annexes to the Convention in order to meet these requirements. If necessary, a protocol to the Convention could extend its application to regions not covered by the present definition of affected countries.

Mr. Chairman,

I am convinced progressing co-operation of governments and experts in Europe will contribute considerably in the coming years to solve the task of restoring and protecting the various functions of soils and land and herewith help to secure the basis of sustainable development. We all have to do our best to meeting the commitment of handing over sufficient fertile land to future generations.

Thank you for your attention.

Statement by Mr. A.F. Marques de Carvalho, Portuguese Presidency of the European Community, Brussels Belgium.

Ladies and Gentlemen,

On behalf of the Portuguese Presidency of the European Community let me welcome you in Brussels and congratulate the UNCCD, the Hanns Seidel Foundation, the Governments of Germany and Finland and the Commission, for the organisation of this Workshop.

The Convention to Combat Desertification is one of the best achievements to put into practice the recommendations of the Rio 1992 Conference.

The Convention adopted a definition of desertification approved by the Rio Conference, which assigns responsibility for this phenomenon to climatic variations as well as to human activities. Among these, soil excessive exploration, due to excessive poverty, is of particular importance,

The Convention recognises this reality and proposes a sustainable development based on a "bottom up" approach, insisting on the participation of local populations in decision making.

It's common knowledge that the World areas mostly affected by desertification phenomena are in Africa, but the pressure of economic activities, demography and climatic change, under way, do not spare Europe from an increasing concern with this problem,

Europe is a rather diversified World Region. There are differences that are the fate of History and we may wish to overcome some of them. Others are a rich cultural variety that will improve the resilience to unforeseen events.

The subject of our workshop is strongly connected with traditional practices and the pace at which we are sometimes changing them. Both the traditional ways of using the soil or the more intensive ones, resulting from economies of scale, are difficult to modify because of their strong links with beliefs or short term economic pressures increased by globalisation.

The implementation of the Convention objectives will require the application of long term, integrated strategies, which include rehabilitation, conservation and management of terrestrial and hydrological resources.

For that integration to be efficient it is necessary to have a good administration and social stability, and often to implement an institutional reform, apart from economic incentives and infrastructure upgrading. The eve of a new millennium is a good opportunity to think about our future.

We have to recognise that the world is becoming so small and we are so crowded together that we have to improve our relations, understand each other better and co-operate intensively, which requires, of course, that we have to sit long hours listening to each other. That's an important learning process we appreciate better and better as we go along with the building of more extensive compromise commitments and binding rules for the strengthening of the European Community,

National action plans for the implementation of co-operation aid under this framework shall be elaborated through a democratic process which will require from all participants - bilateral and multilateral donors, regional organisations, local authorities and national governments, non governmental organisations and local population - a co-ordinated work.

That's why it is so important to promote the setting up and the strengthening of appropriate and enough powerful institutions to support and carry on the necessary reforms, and develop the participation of the populations so they understand and support what will be done.

It is a duty of developed countries to promote and facilitate access to the technology, general knowledge and technical knowledge relevant to achieve those objectives efficiently and timely.

No doubt it is very important to exchange technical knowledge to combat degradation of the soil.

Coming from a country where internal migrations of populations desertified the interland, enhancing the endemic forest fires and soil erosion, and where droughts are a periodic plague, I am aware of the great value of sharing our experiences.

However the technical knowledge has to be integrated into human practices, structures of power and social organisations which have high inertia and need a devoted, patient endeavour to adapt,

This is even more so in depressed, underdeveloped or low-income regions. There, we cannot wait for the slow process of self-learning to reach all people to make them aware of the quality of our best advice. We have to gain their confidence by working with them, not against their beliefs, even if they sound crazy to the educated technician.

Democracy is sometimes a slow process that desperates the engineer but will work better in the long term. One of the hardest things to learn is an efficient human interaction.

We welcome this UNCCD initiative which enhances exchange of information and mutual support among nations of the Old Continent and we are sure it will make a significant step towards an improved understanding of our specificities and make it a very fruitful meeting.

Background Paper on “Soil degradation in Europe” by Dr. Anna Rita Gentile, Project Manager for Soil and Contaminated Sites, European Environment Agency

Content

Scope	68
1. Introduction/Soil diversity supports Europe’s diversity	68
<i>Why is soil an important issue?</i>	<i>69</i>
<i>An integrated approach to soil and the environment.....</i>	<i>69</i>
2. Soil and sustainable development.	70
<i>Conflicts between competing soil uses at the global level</i>	<i>70</i>
<i>Soil and global change</i>	<i>70</i>
<i>Desertification</i>	<i>71</i>
<i>Soil and global conventions</i>	<i>71</i>
3. Current soil-related issues in Europe	73
<i>Consumption of the soil resource</i>	<i>74</i>
Soil sealing	74
Soil erosion	75
<i>Soil contamination in industrial and urban areas</i>	<i>77</i>
Pressures.....	78
Local contamination.....	79
Soil acidification	80
Heavy metals	81
Nutrient load	81
<i>Soil and slope stability</i>	<i>82</i>
<i>Soil and climate change.....</i>	<i>83</i>
The effects of climate change in agricultural areas - changes in water erosion risk	83
Soil as a carbon sink.....	84
Carbon sequestration and soil degradation	85
Conclusions and recommendations	87
References	88

Scope

This paper has been prepared for the workshop on “Land degradation/desertification in Central and Eastern Europe in the context of the UNCCD”. The text has been elaborated from background material compiled for the EEA-UNEP annual message on soil and from a report on soil degradation in Europe, currently under preparation by the EEA.

The geographical coverage is the whole of Europe, with particular reference to Central and Eastern European countries, touching Central Asia for some of the issues treated.

1. Introduction/Soil diversity supports Europe’s diversity

Why is soil an important issue?

The richness of Europe is in its diverse cultural heritage and natural environment. Pressures on Europe's soil come from the concentration of population and activities in a small space.

An increasing demand of land and soil resources comes from all human activities, including agriculture, households, industry, transport and tourism. Problems are particularly apparent in coastal zones especially in the Mediterranean, where urban and recreation areas, agriculture, industry, commercial activities and tourism are all concentrated and in many cases in competition in the same "strip" of land. The situation is different in other parts of the world, such as USA and the countries of the Cairn Group, where the spatial distribution of agricultural land in relation to other uses does not lead to such a strong competition.

Soil is land in its tangible form. In classical and southern European languages, the concepts of land and soil are united in one word-*suolo* in Italian or *suelo* in Spanish. Soil forms the spatial dimension for the development of human settlements: the building of houses and infrastructures, recreation facilities and waste disposal. It is the vital resource for agriculture. It provides raw materials, including water, minerals and construction materials. It forms an essential part of the landscape, it conserves the remains of our past and it is itself a relevant part of our cultural heritage. Soil is a limited resource and in contrast to air and water is not readily movable.

Moreover, European soils have a very high spatial variability: more than 320 major soil types have been identified in Europe. Each of these types supports a different range of functions and has a different vulnerability to the various pressures.

The diversity and multi-functionality of Europe's soil is the basis of Europe's cultural and natural diversity. Protecting soil will help to preserve Europe's identity and its ability to cope with change.

On this multi-functionality is based the soil paradox: its relevance to a wide range of human activities makes it more vulnerable to damage and depletion from many sides. Its buffering capacity, its resilience and its capability to filter and absorb contaminants mean that damage is not often perceived until it is far advanced. This is perhaps a major reason why soil protection has not been promoted to the same extent as protection of air and water.

Now, after many years of misuse, warning signs are appearing more clearly and responses are required, both corrective (costly and sometimes not fully feasible) and preventive, so that we do not continue to transfer problems to future generations.

An integrated approach to soil and the environment

Soil as a basis for life is recognised in the European Spatial Development Perspective (ESDP), adopted in the European Union (EU) in May 1999. In fact, ESDP seeks "protection of soil as the basis of life for human beings, fauna and flora, through the reduction of erosion, soil destruction and overuse of open spaces" and recognises that an efficient protection of soil is necessary to preserve natural resources and soil functions.

Due to the complexity of soil issues and the competing forces upon it, these general recommendations will have no effect unless a comprehensive

approach to soil and the environment is developed, including the concepts of land, space and territory, and the sustainable use of soil and land resources.

2. Soil and sustainable development.

Soil is a common resource and soil protection is a matter of global concern. However, the contribution of soil protection to sustainable development still needs to be fully discovered in all of its aspects. In fact, although the role of soil in achieving agricultural sustainability has been widely recognised, it is not so in relation to other soil uses. (Blum, 1998; Lal and Kimble, 1998)

Soil is not only the basis for 90% of all human food, livestock feed, fibre and fuel, but provides more than productive functions. The multi-functionality of soil is gradually being recognised and forms the basis of modern soil protection strategies.

According to the Brundtland commission: “sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

In this sense sustainable soil use means “to meet the diverse and potentially conflicting demands while ensuring that future generations have the same potential to use soils and land of comparable quality”. (Hurni, 1998)

In the decades to come, sustainable use of soil and land will be a great challenge, comparable and closely interrelated with the global concerns about changes in climate and biodiversity.

Conflicts between competing soil uses at the global level

The competition between concurrent uses of soil and land (feed people, increase space for living and industrial production, enhance sources of energies, improve mobility) needs to be recognised and addressed. How can these uses be developed in a sustainable way without damage and depletion of the soil resource?

In fact, the current increase in the pressures on soil resources at a global level is linked to the increasing demand of soil and land resources to satisfy diverse needs.

The need to guarantee food security to a growing population will require more agricultural land or, more probably, an intensification of agriculture in currently cultivated land. On the other hand, increase of overall population, industrial activities, changes in urban patterns and behaviour (sub-urbanisation and urban sprawling), together with the need for an increased mobility, will also require more land for irreversible uses. These competing demands, if not properly managed in a sustainable manner, will cause more degradation (unsustainable agricultural practices, soil contamination, sealing, etc), which ultimately will lead to even fewer resources being available, in a vicious circle of decline.

Soil and global change

Soils are a neglected resource at a global level, although current threats to the soil are much more serious and complex than in the past. (Hurni, 1998)

Soil degradation is what is called a “silent disaster” and its effects have been hidden by application of new and more efficient technologies, which initially led to an increase in agricultural production, by the high buffer capacity and resilience of soil ecosystems and by its ability to “absorb changes” to some

extent. This capacity has reached its limits in many parts of the world, including parts of Europe.

To make matters even worse, there is the influence of global climate change, whose links with soil are complex and not fully understood at present. According to some scenarios (EC, 1999), change in climate could lead to more soil degradation ([see section on the effects of climate change](#)). At the same time, soil has an important role in the sequestration of atmospheric carbon, through the dynamic process affecting the content of soil organic matter (SOM). SOM and with it the capacity of soil to act as a carbon sink is lost through soil degradation ([see section on soil and climate change](#)).

From what shown above a clear link between global change, sustainable development, environmental quality and soil degradation can be clearly seen.

Desertification

The effects of global change on soil functions and the links between soil quality and socio-economic issues are at the basis of the problem of desertification. In fact, desertification - as a gradual and progressive reduction in the capacity of the soil to support vegetation and animal communities, agriculture and forestry - is a result the interaction of various factors such as climate, unsustainable use of water and land resources, and has social and political impacts. A correct response to the problem would involve different levels of actions, at the local, national and the global level, as well as integrate environmental policies in sectoral policies.

Desertification is threatening parts of southern and central Europe. Typically, the affected areas have limited freshwater supplies and precipitation that varies greatly both spatially and temporally, with frequent and recurrent periods of drought. Extensive areas in the Mediterranean region that have been cultivated for long periods have become so severely degraded that they are no longer capable of supporting any profitable cultivation, resulting in land abandonment and depopulation. (EEA, 1998)

Very serious problems of desertification also occur in Central Asia, mainly due to changes in land use. In Kazakhstan, for example, vast areas of pasture land were converted to arable land for cultivation of wheat in the 1950s. After a few years, these new arable lands started to be affected by severe wind erosion, which destroyed their productivity, had severe effects on soils and fragile ecosystems and caused dramatic social impacts, disrupting the very delicate nomadic culture, which existed in these lands for centuries.

The UN Convention to Combat Desertification addresses these problems. Annex IV to the convention makes provisions for the affected countries of the Northern Mediterranean, requiring the countries to prepare national action plans (NAPs) as well as a regional action plan to combat desertification in the area. Greece, Italy, Portugal, Spain and Turkey have signed the Annex. Only Portugal and Italy have presented their NAPs to date.

A new Annex to the convention (Annex V) is being negotiated and would include Central and Eastern European countries.

Soil and global conventions

Although protection of natural resources is central to Agenda 21 of the United Nation Convention on Environment and Development (UNCED), soil as a major natural resource was not specifically mentioned in its various chapters.

However, Agenda 21 indirectly addresses soil issues in several chapters on land resources, such as those related to agriculture, sustainable land use, desertification and biodiversity.

Moreover, a number of international conventions addressing soil issues have been ratified since UNCED 1992. These include climate change (UNFCCC), biodiversity (UNCBD), desertification (UNCCD), as well as the International Forum on Forests with its International Forest Principles (IFF) and the Global Plan of Action on Land Based Pollution (GPA) .

Action should be taken at all levels, from land planning at the local and sub-national levels, to the set up of environmental and sectoral policies at the national and European levels, and the launch of initiatives on a global scale.

Although land planning and soil management have not been included in the list of policy issues where the European Union has a competence in accordance to the principle of subsidiarity, there is a need to go beyond this competence to address global problems.

In particular, a land planning which includes as objectives the preservation of soil multi-functionality and therefore soil quality for a number of uses, including biomass production, enhancement of carbon sequestration, maintenance of soil filtering and buffering capacity, minimisation of sealed land and deposition of toxic substances in soils is the key/tool to achieve sustainable soil and land use and ultimately sustainable development (Fleischhauer and Eger, 1998).

Box: Europe within the global context

Conditions of soils in other parts of the world, and in particular in developing countries, may have an effect in Europe. Soil degradation in drylands, for example, may have an important effect on climate change at the global level and cause flows of so-called environmental refugees, fleeing their countries in search of better living conditions.

One of the most important problems especially for the developing countries, e.g. in Sub-Saharan Africa, parts of Asia and Latin America is the unprecedented and still exponential growth of urban agglomerations, which leads to severe problems through soil sealing and contamination. Moreover, severe soil erosion around these centres can be observed. Urbanisation is probably one of the most important driving forces for further soil degradation in tropical and sub-tropical countries, in the near future, where climatic conditions accelerate adverse soil processes.

Another problem in tropical and sub-tropical countries is severe soil erosion by water and wind, due to the destruction of natural vegetation covers and forests to open up new agricultural areas, which are needed due to soil losses through inadequate agricultural practices on existing farmland. This leads to the problem that food security can only be reached through intensification of the remaining and still decreasing agricultural surfaces on a worldwide level.

At the global level, according to the Global Assessment of Soil Degradation project (GLASOD), nearly 2000 million ha or 14% of total are affected by soil degradation, while in Europe degraded soils accounts for 23% of the total land area. Water erosion is the dominant type of degradation in all continents, accounting for ca 1100 million ha or about 50% of world's degraded land area.

Wind erosion affects nearly 600 million hectares, while over 300 million hectare are affected by chemical and physical degradation.

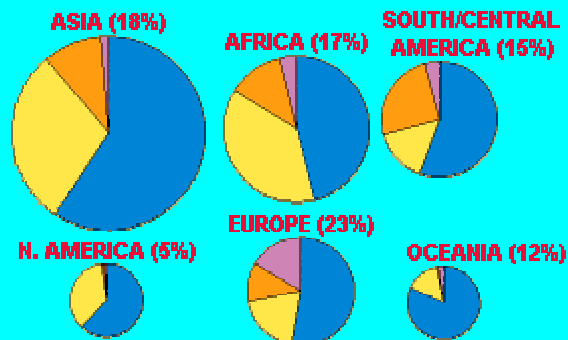
In Europe, approximately 14 million hectares or 6% of the total area are under strong or extreme soil degradation, while nearly 115 million hectares or 66% are effected by moderate degradation. Major type of degradation is erosion by water (>52% of total area) and wind (>19%). Physical degradation, including compaction, waterlogging and shrinking of organic soils, is the second most important type of degradation (17%), followed by chemical degradation (12%). (UNEP and ISRIC, 1991); (Van Lynden, 1995).

TYPE OF DEGRADATION: AFFECTED AREA

Water erosion is the dominant type of soil degradation on all continents. It occupies about 50% of the world's land area.



Win erosion is the second most important type of soil degradation on all continents, except for South America and Europe.
Chemical degradadtion is the second type of soil degradation in South America.
Physical degradation is the second type of soil degradation in Europe.

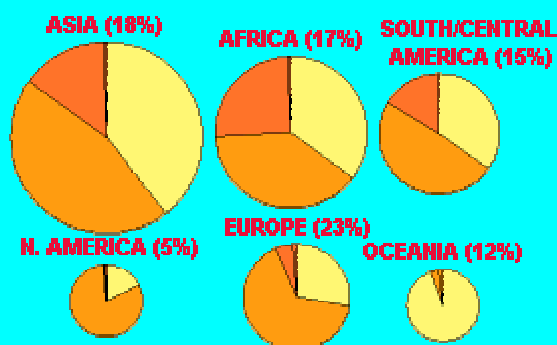


DEGREE OF DEGRADATION: AFFECTED AREA

The degree of soil degradation is assessed in relation to agricultural suitability. Almost 50% of the soils affected by soil degradation is moderately degraded.



About 75% of the strongly degraded soils is affected by water erosion.



3. Current soil-related issues in Europe

The main issues requiring action at a high level in today's political agenda to address and protect the soil resource are here analysed. The situation in Europe with respect to the global context is also reported.

Major issues are

- consumption of the soil resource, including the impacts of natural or man-induced disasters, such as landslides and flooding;
- contamination in urban and industrial areas due to the flux of materials;
- links with global issues such as climate change and international trade;
- questions posed by European Union enlargement.

In Southern Europe, especially in the Mediterranean Basin, soil erosion by water and wind, salinisation and the degradation of soil fauna and flora through forest wildfires play an important role, while in Western, Central and Eastern Europe, soil contamination and pollution due to urbanisation and industrialisation occur in large areas. Competition between different uses of soil, leading to soil contamination and consumption of the soil resource, is becoming relevant in the Mediterranean region, mainly the results of an increasing tourism. In fact, the Mediterranean is the biggest tourist region in the world, accounting for 30% of international tourist arrivals, while one third of its population is concentrated in coastal areas.

In Scandinavia, soil health and functions are highly endangered by acidifying air pollution deriving from industrial and other processes in Western, Central and Eastern Europe, which is transported by the prevailing winds to the north and deposited there. In addition, the forest cover of Scandinavia filters inorganic and organic pollutants out of the atmosphere, thus accelerating the degradation of soils, which have a very low natural buffer capacity against acidification and low storage capacities for most pollutants.

Consumption of the soil resource

Soil is effectively a finite, non-renewable resource since its regeneration through chemical and biological weathering of underlying rock requires a long time, typically hundreds of years. Consumption of high-value agricultural soil due to sealing through increasing urbanisation and changes in urban patterns (urban sprawl), and due to erosion in the Mediterranean area and Central/Eastern Europe are threatening the soil resource in Europe.

Soil sealing

The rates of soil loss due to surface sealing through growth in urbanisation and transport infrastructure (roads, airports, railways, ports, etc.) are similar in several EU countries. Since 1970, the increase in length of motorways has been significant in most of the EU countries. Occupation of land by transport infrastructures is high in the Netherlands, Belgium, Switzerland and Germany, and is increasing in Greece, Portugal and Spain. Soil loss rates through land development and transport infrastructures may exceed those due to soil erosion in many EU countries, with the possible exception of some countries in Southern Europe (EEA, 1999).

There is a lack of consistent data on the amount of soil loss through surface sealing at the European level. Data on the total amount of built-up areas are only available for a limited number of countries, and are not comparable since countries use different methodologies. Within these limitations, existing data show that since 1990 the growth of built-up areas has been similar in Belgium, France and Germany, where it reached about 50 and 70 ha/day over the period 1990-1995 in Belgium and France respectively, and exceeded 120 ha/day over the period 1993-1997 in Germany (EEA, 1999).

Built-up areas have grown at the expense of agricultural land in France, Germany, the Netherlands, Poland and Iceland, where forest areas have also decreased in the period 1990-1995 (EEA, 1999).

In the Mediterranean soil sealing mainly affects coastal areas. In 1985, almost 90% of urbanised land was located along the coasts of Spain, France, Greece, Italy and former Yugoslavia. This percentage is likely to increase by

2050. (Blue Plan) A study carried out by WWF Italy showed that in 1996, nearly 43 % of the Italian coastal zones were completely occupied by built-up areas, while 13% were occupied by extensive buildings and infrastructures, and only 29% were completely free from constructions (EEA, 1999 b).

Changes in land use leading to soil sealing are particularly relevant around urban areas.

In the past decades, loss of soils due to urbanisation and industrial development in most of the Central and Eastern European countries was not very high, due to the intensive type of construction used. In fact, although the population growth in most of the cities of Central and Eastern European Countries (CEEC) was high, actual growth of urban areas was relatively modest. For example, Hungary, due to urbanisation and mining, lost about 600 000 ha during the period 1945-1990 (about 6% of total land area) (Hungarian Commission for sustainable development, 1997).

However, in recent years, soil loss due to urbanisation has increased in CEEC, due to shifting to a more extensive urban pattern. In Romania, for example, the built-up area increased, between 1989 and 1994, by about 100 000 ha or nearly 19% (Ministry of Waters, Forests and Environmental Protection of Romania, 1996). Currently built-up areas occupy 630 thousand ha, over 2.6% of total land area in Romania.

Soil sealing is extremely severe in some areas of the Newly Independent States (NIS), which are so heavily transformed by mining and heavy industry, as to give rise to the term "industrial desertification". In Ukraine, for example, this phenomenon extends to 3% of total land area (National Report on the State of Environment in Ukraine in 1997).

Brownfield redevelopment, i.e. the re-use of abandoned industrial areas for new urban development, has been identified as a response to the increasing demand for land resources. Some EU countries- Germany, Italy, the Netherlands and UK among them - have initiated such redevelopment projects. In UK (England), for example, between 1990 and 1994, nearly 50% of total land changed to urban uses was previously developed urban land. The recycling rate was 44% between 1985 and 1988. (UK DETR, 1999)

However, soils of former industrial sites can be heavily polluted and their remediation could be economically or technically unfeasible ([see section on local contamination](#)).

Soil erosion

Soil erosion in Europe is mainly due to water and to a lesser extent to wind. The major causes are unsustainable agricultural practices and overgrazing.

In CEEC and NIS, past erosion was due to the use of heavy machinery, excessive irrigation of vulnerable soils, overgrazing and unsustainable land use changes. Currently, poor economy and war conflicts in some areas contribute to worsen the situation. After the collapse of the Soviet Union in some countries, such as Romania and Hungary, privatisation of once protected forests has led to uncontrolled deforestation in mountain areas and intensification of erosion (Ministry of Waters, Forests and Environmental Protection of Romania, 1996)

Soil erosion causes irreversible soil loss over time-scales of tens or hundreds of years and is an increasing phenomenon in Europe (Blum, 1990). In parts of the Mediterranean region, erosion has reached a stage of irreversibility, and in some places soil erosion has practically stopped through lack of soil.

Two types of impacts need to be considered, namely on-site and off-site impacts.

On-site impacts: Soil erosion reduces the ecological functions of soil: mainly biomass production, crop yields due to removal of nutrients for plant growth, and soil filtering capacity due to disturbance of the hydrological cycle (from precipitation to runoff). In the past, loss of productivity was compensated for by increased input of water and artificial fertilisers, so that the impact of the erosion was concealed. These effects are particularly relevant in vast areas of Southern Europe.

Off-site impacts: pollution due to transport of hazardous substances and sedimentation, disruption of the carbon and nutrient cycles. Soil erosion is one of the causes of the death of small rivers and springs all over Russia and Ukraine. According to estimates from the soil erosion laboratory of the Department of Geography of the Moscow State University, more than 30% of the overall length of small water channels in European Russia was lost due to erosion, silt deposition and powering since the mid-19th century.

The world's soils play a crucial role in the global carbon cycle. A principal off-site environmental impact is due to disruption of the global carbon cycle, resulting in an erosion-induced efflux of about 1.14 Pg C/year from soil to the atmosphere, according to recent estimates. (Lal and Kimble, 1998)

The areas with the greatest severity for soil loss due to both wind and water erosion is the Mediterranean, the Balkan Peninsula and the countries surrounding the Black Sea. Some Central European Countries such as the Czech and the Slovak Republics, also suffer from extremely serious soil erosion problems (EEA, 1998). In addition, erosion due to water is also becoming increasingly relevant in Northern Europe. Soil erosion also occurs in vast areas in Russia: 57% of agricultural land, of which 65% of arable land, is subject to strong erosion (SCRFEP, 1998). In Ukraine, 41 % (17 million ha) of agricultural land was subjected to water and wind erosion in 1996, of which 4,7 million ha were affected by moderate or severe erosion and 68 000 ha had lost the humus horizons almost completely. In Ukraine erosion is spreading quickly, with an increase of eroded land area of about 80 000 ha/year (National report on State of Environment in Ukraine in 1997)

Very serious erosion problems linked with irrigation occur in Central Asia. For example, the so-called "irrigation erosion" due to unsustainable irrigation practices, affects 486 thousand ha or nearly 60% of the total area of irrigated lands in Tajikistan.

These considerations are mainly based on qualitative and a few spot quantitative assessments, since the amount of soil loss from erosion in Europe is currently not known accurately and is difficult to calculate, due its high temporal and spatial variability (EEA, 1999). Country data are not comparable, since different methodologies were used to make country assessments. As for soil sealing, there is a need to monitor this form of degradation at the European scale.

Soil contamination in industrial and urban areas

Throughout Europe, in general, and the CEE countries in particular, there is little diffuse soil contamination of a severe nature, except for a possible increase in soil acidification. Nevertheless, a high level of contamination from heavy metals and acidification, mainly due to industrial and agricultural activities, is localized in a considerable number of “hot-spots” around urban and industrial areas (Gzyl, 1999). In Hungary, for example, a survey conducted in the early 1990s has shown that average concentration of lead in agricultural soils was about 13 mg/kg, which is far below the limit (100mg/kg). At the same time, soils were contaminated in big cities: 26% of soil samples from Budapest, for example, had lead concentration above the limit, as did strips up to 25 m wide along the major roads (Horvath, 1996).

Soil in European cities is contaminated due to poor management of potentially polluting activities and by atmospheric depositions. Contaminated sites have impacts on human health (contamination of groundwater, direct contact/ingestion) and the degree of contamination needs to be considered in land development and planning (e.g. brownfield re-development).

Soils are often used for the disposal of industrial and urban waste products. Contaminants from flowing water over soil or eroded soil itself can pollute surface waters such as rivers, streams and reservoirs. Furthermore, leaching of contaminants through channels in the soil via preferential flow is a large source of chemicals in groundwater (EEA, 1999).

The seriousness of the problem is linked to impacts on human health and irreversibility. Contamination is particularly relevant in densely populated areas, where high competition of different soil and land uses exists and where access to resources such as clean drinking water is often seriously compromised. Except in perhaps a few cases, it is extremely difficult and practically or economically impossible to restore contaminated soil's multi-functionality in full. Current remediation strategies aim to restore soil to perform some of its functions. In Copenhagen, for example, the municipal authorities decided to remove soil from kindergartens due to its heavy contamination, on the basis of the results of a geo-chemical survey of city's soils. In Helsinki, the municipally decided to demolish some of the buildings and to restore the soil in the Myllypuro suburb, partly erected on a former dump site, due to the threat posed by the presence of hazardous substances. The soil functions most affected by local and diffuse contamination are its buffering, filtering and transforming capacities. When the buffering capacity of soil with respect to a certain substance is exceeded, the substance is released back to the environment for example in rivers or groundwater. This delayed release of pollutants can be very dangerous; soil effectively acts like a “chemical time-bomb”.

Pressures on soil are applied through deposition of atmospheric emissions and excessive use of chemicals in agriculture. Major pollutants include heavy metals, organic contaminants (PAHs, chlorinated hydrocarbons, PCBs and dioxins pesticides), fertilizers, and artificial radio-nuclides. Sources for these pollutants are mining and processing industries, combustion of fossil fuels, industrial plants and road transport.

The most important problems are local contamination, soil acidification, diffuse contamination by heavy metals and chemicals, and surplus of nutrients in agricultural soils.

Pressures

Although there has been a reduction in emissions and use of some hazardous substances, mainly due to application of policy measures, these are countered by a general increase in economic activity. It is estimated that total annual emissions of chemicals will rise by 2010, following a 30-50% increase in the output of the chemical industry. Although emissions of lead decreased more than 50% between 1990 and 1996, mainly due to the phasing out of lead in petrol, cadmium and mercury emissions are expected to increase 20 to 30% between 1990 and 2010 from transport and industrial activities. For Accession Countries over the next decade a significant decrease in emissions is anticipated for lead (58%), copper (31%) and mercury (12%) due to policy implementation. However, emissions of cadmium are expected to increase 4% due to increase of traffic over the same period (EEA, 1999).

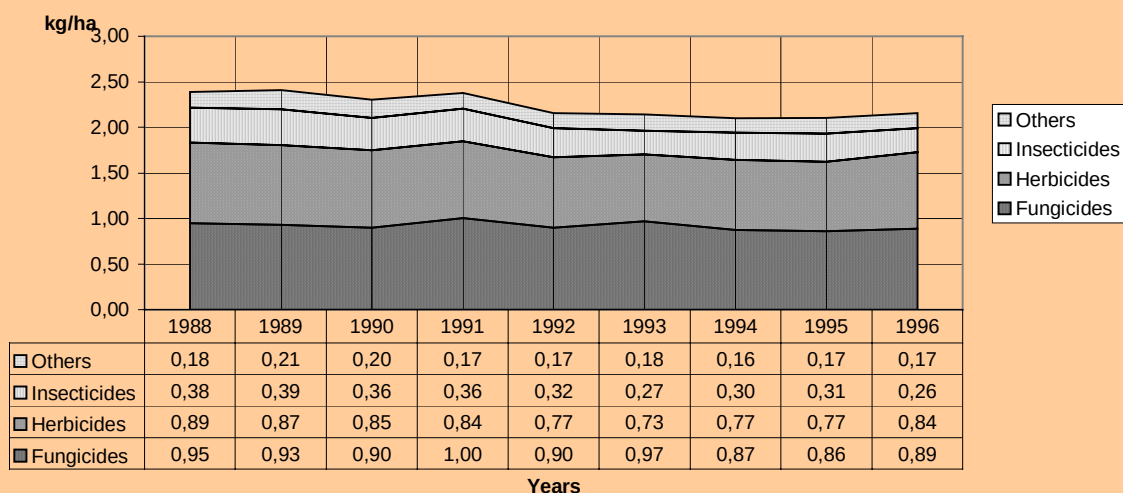
Use of pesticides has slightly decreased in most EU countries over the past decade, probably due to the Common Agricultural Policy (CAP) reforms in 1992. ([see Fig. 1](#)) Although there is a greater awareness of the negative effects of pesticides on the environment and human health, there does not appear to be much reduction (if any) in the dependence on pesticides. (EEA, 2000)

In CEE countries, the use of agrochemicals - which saw a dramatic increase during the 1970s and 1980s in the large collective farms - is currently decreasing, following the collapse of the centrally controlled economy. For example, in F.Y.R.O.M. pesticide consumption declined from 2706 tons in 1983 to 659 tons in 1993 (by 75%) (The Government of F.Y.R.O.M.,1997), in Slovakia use of pesticides in 1980 was about 19,000 tons, while in 1996 it was 3,890 tons, or about 20% of 1980 level (Ministry of the Environment of Slovak Republic,1998). In the Russian Federation also, use of mineral fertilisers in 1997 was about 20% of the 1990 level (OECD, 1999). However, a serious threat to the environment is posed by improper storage of old pesticides. In Russia, for example, 13 000 tonnes of pesticides stored in unsafe conditions are accumulated in southern agricultural regions (SCRFER, 1998).

Over the next decade, slight increases in pesticide emissions are expected in the EU. Use of pesticides is expected to have a large increase in Accession Countries, due to an increase in agricultural production. (EEA, 1999)

Fig. 1 Average consumption of pesticides (active ingredients) per area of agricultural land, EEA-18, 1988 - 1996

Consumption of pesticides (active ingredients) per area of agricultural land, EEA-18, 1988 - 1996



Source: Eurostat, FAO, ECPA, OECD

Local contamination

There is no European-wide monitoring of contaminated sites. Countries are at different levels of progress and apply different methodologies and definitions. Hence, the picture on the extent and severity of the problem remains unclear.

Several countries have initiated national inventories. However, data on the number of contaminated sites based on national inventories is not currently comparable, since it is based on different national approaches. Therefore, national totals do not represent the scale of the problem, but give only an indication of the efforts made by each country (EEA, 1999).

It is not possible at present to make a more comprehensive assessment of progress in the management of contaminated land in the EU, because the available information is far from complete. However, the EEA is currently working with the countries towards the harmonisation of data collection procedures and the assessment of the scale of the problem and its impacts. A pilot study covering test regions in eleven European countries is currently under way.

Many Accession Countries have enacted legislation for contaminated sites, started inventories and set up specific funding tools. Hungary and the Czech Republic can be regarded as the most advanced in this respect. The Slovak Republic and Slovenia are working on a new regime including financing schemes. Lithuania, Latvia, Hungary and the Czech Republic have started to set up inventories, while all Accession Countries have made assessments of the costs of remedial measures for former military bases. Co-operation with the EU is increasing.

Local soil contamination is mainly due to municipal and waste disposals, losses during industrial activities and accidents.

Many CEE countries experience specific problems with soil contamination on abandoned military bases of the Soviet Army. It was a usual practice on military bases to put waste oil or excessive petrol on the ground. Sometimes storage of emergency fuel was made in open pits. As a result, contamination

of soils and groundwater around military sites poses problems, especially in the Baltic States, Czech Republic and Hungary. For example, in Estonia abandoned military bases covered about 1.8% of the country's territory, and in many of the abandoned airfields and rocket bases high content of petroleum products and specific components of rocket fuel were reported in soils and ground waters even in 1996 (Estonian Ministry of the Environment, 1997).

Soil contamination usually affects areas with a high density of urban agglomeration and with a long tradition of heavy industry, or occurs in the vicinity of former military installations. However, a single site may pose a major threat to a large population group or to a large area, as for example the mine of Aznacóllar (Andalusia, Spain), where an accident occurred in April 1998 and caused the contamination of an area of about 4 500 ha, threatening the national park of Doñana (EEA, 1999). Less than two years later, in January 2000, a similar accident occurred at Baia Mare (Romania), highlighting again the risks connected to dangerous mining operations. Waste water, containing cyanide and heavy metals (lead, zinc and copper), spilled over a tailing dam at a gold mine, causing the pollution of the rivers Tisza, Szamos and Danube, and provoking the death of river life across four countries (Romania, Hungary, Ukraine and former Yugoslavia). Contamination could have reached some of the fields and pastures in the river valleys as well, since some of the spills occurred during the flood. The impacts and the environmental consequences of this accident are currently being assessed.

The occurrence of environmental disasters like those mentioned before points out the need for a European inventory of dangerous mining activities and their potential impacts on the environment, human health and economic activities. Several projects in this direction have been initiated and are due to provide results in the coming years.

Soil acidification

Soil acidification occurs as a result of emissions of acidifying pollutants from vehicles, power stations, other industrial processes and natural biogeochemical cycles, re-depositing onto the soil surface mainly via dry depositions and rainfall.

Exceedances of critical loads of acidification and eutrophication are at present mostly dominated by nitrogen deposition. The situation is not homogeneous over Europe, and some hot spots have been identified.

Soils under severe acidified conditions are difficult if not impossible to recover. For example, in the Russia Federation, it is estimated that 5 million ha of arable land are strongly acidified although treated with lime (National Report of Russia, 1992). Acidification of soils is also observed in Poland. Results of investigations over several years showed that ca. 25% of soils have a pH less than 4.5, despite an increase in liming (Korytkowski and Wojewódzki, 1993).

There have already been substantial reductions in emissions of sulphur dioxide and nitrogen oxides emissions will be reduced by 2010 by implementation of policies in the pipeline (EEA, 1999). Nevertheless, there is still concern over acid deposition in hot spots and areas with sensitive ecosystems, and if acid deposition does not decrease, the area of European

forest under threat may increase by 50% to 110 million ha (representing 45% of the total forest area) (EEA, 1995).

Heavy metals

Soils naturally contain trace elements, some of which function as micro-nutrients essential to plant and animal growth, while others can be a threat to the food chain. The elements of most concern are mercury (Hg), lead (Pb), cadmium (Cd) and arsenic (As), which are especially toxic to humans and animals, and copper (Cu), nickel (Ni) and cobalt (Co) which are of more concern because of phyto-toxicity. The toxicology of these contaminants depends on soil type, vegetation and climate, as well as their concentration.

Concentrations of heavy metals in soil cover a very wide range. In many cases, the higher values indicate contamination from man's activities, although large values can occur because of natural geological or soil-forming conditions.

As illustrated before, there is no severe diffuse contamination for heavy metals in Europe. Rather, heavy contamination is localised in specific areas, such as the so-called "black triangle" in Central Europe, and around cities and industrial areas.

For example, a major hot spot for heavy metal contamination is located in the Katowice District in Poland. In this district, which represents 2% of the country's area, are concentrated ca. 200 industrial plants considered as particularly burdensome to the environment. Some 55% of national steel production, 97% of black coal and 100% of zinc-lead ore-processing are located in the area (Polish Central statistical Office, 1997). High concentrations of lead (from 13 to 5000 ppm, mean 202 ppm) and cadmium (from 0.46 to 52 ppm, mean 6.7 ppm) were found in the arable layer (0-20 cm) of more than 400 allotments located in the central part of the district (Gzyl and Marchwinská, 1995). In extreme cases located in the district, lead values reached 8000 ppm and Cd 150 ppm (Gzyl et al., 1996).

Recently, heavy-metal exposure has been reduced throughout Europe, and a further decline is expected in the Accession Countries, although increases in cadmium and mercury in waste are projected in the EEA countries (EEA, 1999). ([see section on pressures](#))

Positive effects from these reductions on European soils are expected, although methodological differences between countries preclude accurate quantitative assessment. Moreover, there are still major gaps in quantifying heavy-metal emission factors from industrial processes and in knowledge about the toxic effects of heavy metal on ecosystems or the bearing capacity of different soils.

Nutrient load

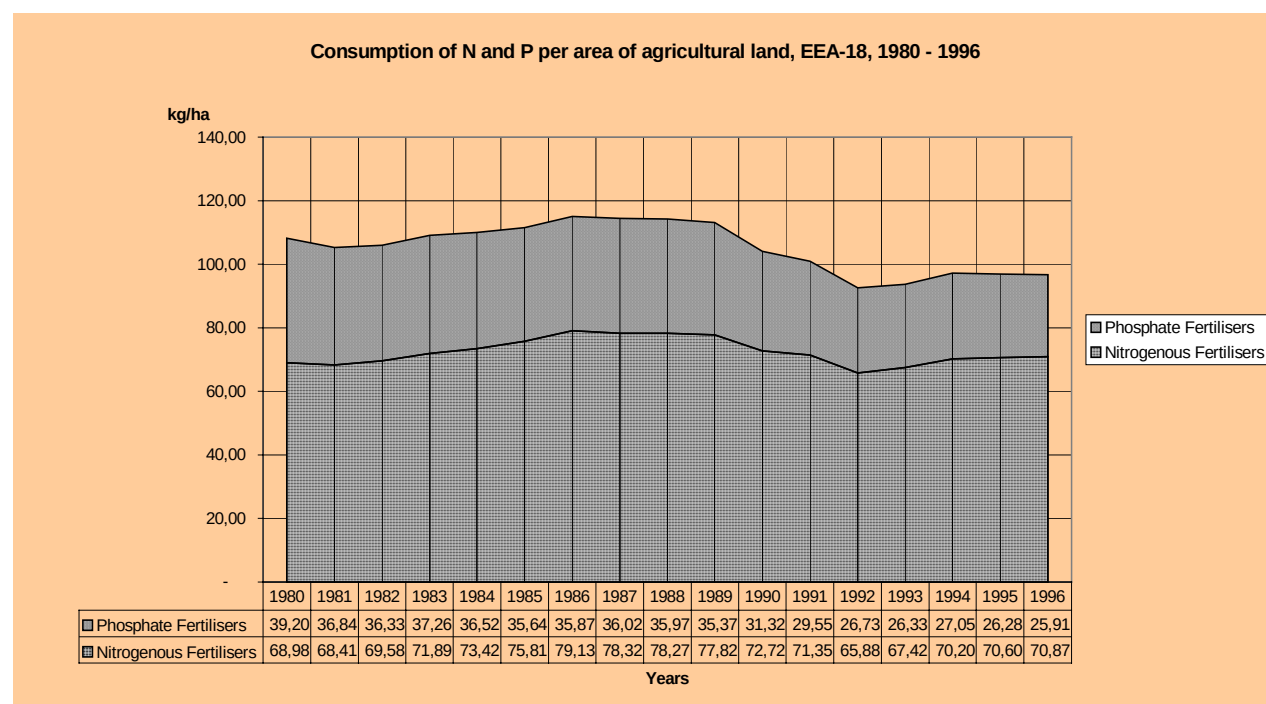
The over-application to soil of fertilisers with a high phosphorus and nitrogen content or of livestock manure, together with acid deposition from nitrogen oxide and ammonia emissions to air, can have important effects on the environment. It affects soil's capability to provide nutrients, as well as its buffering and filtering capacity. Both nitrogen and phosphorous are essential elements for plant growth, but can become damaging when present in quantities excessive to plant requirements. The nutrient accumulation may saturate the soil and the excess may be leached, eroded or simply washed off

into the groundwater, surface water bodies and coastal systems, causing eutrophication.

A high nitrogen content in soil may also be an important cause for the loss of vitality of European forests.

Fertiliser consumption has slightly decreased overall during the last decade, but in recent years this trend has reversed. (Fig. 2) Despite these reductions, crop yields have continued to increase. Increased yields and increasing levels of fertiliser highlight the intensive nature of the agricultural sector. (EEA, 2000) This means that nutrient loads (nitrogen and phosphate) from diffuse agricultural sources remain high, particularly in parts of North-Western Europe where there is intensive livestock production. Phosphorus surpluses are also relatively high in Southern Europe, due to low removal rates by harvested crops. In Accession Countries, fertiliser consumption has declined markedly, but in the future agriculture production, and hence fertiliser use, may be expected to increase again from its current reduced level (EEA, 1999).

Fig. 2 Average consumption of N and P fertilisers per area of agricultural land, EEA-18, 1980 – 1996



Source: FAO

Notes: Liechtenstein not included

Soil and slope stability

The occurrence and severity of natural events in Europe is directly linked to the unsustainable and uncontrolled use of soil and land resources. Natural disasters such as floods and mass movements are both a pressure and an impact on soil resources.

Soil plays an important role as support to slope stability and soil degradation, soil erosion and soil sealing in particular, can be the direct or indirect cause of catastrophic events. Floods and mass movements can cause erosion,

pollution and loss of soil resources, in a complex inter-linkage of causes and effects.

Among the major direct causes of mass movements and floods are intense precipitations, water filtration and soil saturation, soil erosion, as well as mining activities, poor agricultural practices and bad construction of transport infrastructures. Indirect causes are uncontrolled land development, soil sealing, poor agricultural practices, deforestation, steep slopes (relief), and soil and rock characteristics.

Major impacts are on population, human activities and soil resources through loss of human lives, displacement of population, damage to buildings and infrastructures, loss of agricultural land, water logging, sedimentation and pollution of water courses, soil erosion.

Soil and climate change

The interrelations between climate change and changes in soil quality are complex and not fully understood. Assessments of the impacts of climate change on soil properties and performance, as well as the influence of soil on global change, are mostly based on hypothetical scenarios and data obtained under controlled conditions. Thus, predictions are rather more qualitative than quantitative and could contain significant bias.

Climate-induced changes in soil structure may have a profound effects on susceptibility to soil erosion, crusting and compaction, infiltration rate and run-off, salinity and cycling of several plant nutrients. The nature and magnitude of the effect will depend on specific eco-regional characteristics. (Kimble, Lal & Grossman, 1998)

Many soil alterations occur slowly over a long term, while others will occur very quickly, such as loss of soil organic carbon (SOC). Loss of SOC causes rapid decreases in the quality of many soil properties (cation exchange capacity, soil aggregation, soil structure, biodiversity). The worldwide amount of SOC bears directly on changes in atmospheric carbon. Modest changes in SOC, whether positive or negative, may have an appreciable effect on the rate of change of atmospheric carbon, since the yearly change in atmospheric carbon is a small percentage of the total SOC. Therefore small changes in SOC due to climate change can have large effects on atmospheric carbon. In fact, as estimated on the base of cultivated land, an increase of atmospheric C concentration of 0.5 % would be equivalent to a 1.7 % increase in SOC. (Kimble, Lal & Grossman, 1998)

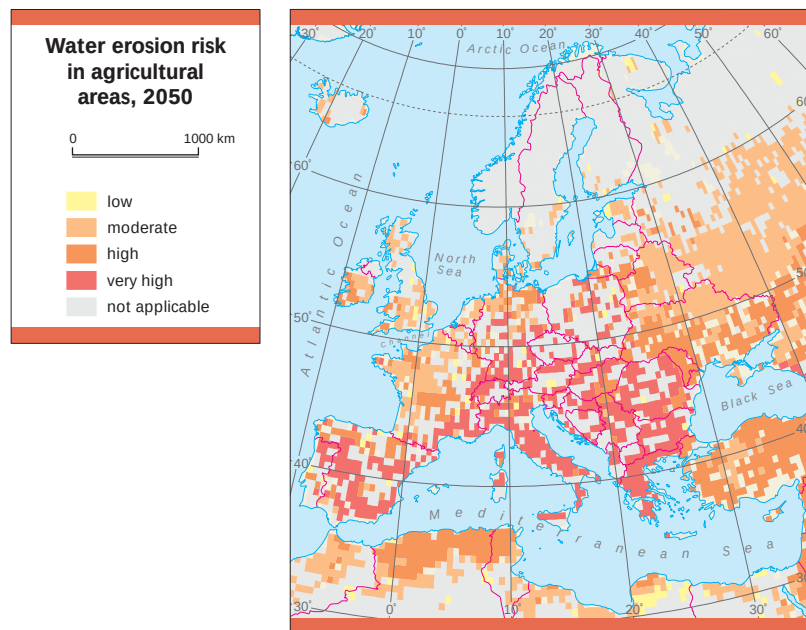
The effects of climate change in agricultural areas - changes in water erosion risk

According to a scenario developed by RIVM for the European Commission, water erosion risk is estimated to be (under current climate and land cover) high to very high in one-third of the European land area. Areas with such high risk are mainly located in southern and central Europe and the Caucasus area. In the remaining parts of Europe, the risk is low to moderate.

Under the EC baseline scenario, the water erosion risk is expected to increase by the year 2050 in about 80% of EU agricultural areas, as an effect of climate change. The risk remains the same in 10% of the areas and decreases in the remaining 10%. The areas with highest increase in erosion

risk are mainly located in the western part of central Europe, in the Mediterranean area, and north and south of the Black Sea. Areas with 10% or more decrease in risk can be found across the EU (parts of UK and Spain), but are mainly located in the areas south or south-east of the Baltic Sea ([Map 1](#)).

Map 1: Water erosion risk in agricultural areas due to climate change in 2050



Source: European Commission, 1999; EEA

Soil as a carbon sink

The capability of soil to sequester atmospheric carbon could be exploited to offset greenhouse emissions due to the burning of fossil fuels, and is currently under discussion in the framework of the United Nation Framework Convention on Climate Change (UN-FCCC).

The soil carbon argument is based upon the assumption that enlargement of the soil carbon stock reduces concentrations of CO₂ in the atmosphere. Soil carbon sequestration will redistribute carbon from the atmospheric pool to the soil pool.

Agricultural techniques have a significant influence on the amount of carbon stored in soil over time. Changes in agricultural practices and inputs- notably changes in crop varieties, application of fertilisers and manure, rotation and tillage practices - influence how much and at what rate carbon is stored in or released from soils. (Ringius, 1999)

The Kyoto Protocol of the UN-FCCC recognises the need to consider additional human-induced activities related to changes in greenhouse gas emissions by sources and removals by sinks in the categories of agricultural soils, land-use change and forestry.

It has been calculated that terrestrial carbon sinks represent a net sequestration of 2 Gt per year, or 5.5 Gt/year C emitted from fossil fuels and industrial activity (now 6.5 Gt) plus 1.6 Gt from deforestation. These are

sequestered by ocean and terrestrial ecosystems; however, 3.4 Gt of C still accumulates in the atmosphere each year.

Terrestrial sinks are part of an active biological cycle, so that a substantial fraction of the fossil fuel carbon sequestrates currently by terrestrial ecosystems could return to the atmosphere in one hundred years or so. Thus, terrestrial sinks are best viewed as important but temporary reservoirs that can buy valuable time to reduce industrial emissions, but they are not permanent offsets to these emissions.

The below-ground compartments (soils and roots) of terrestrial ecosystems are especially important for sequestering carbon. About two-thirds of terrestrial carbon is found below ground, and below-ground carbon generally has slower turnover than above-ground carbon. Thus, carbon storage can be maintained over a longer period of time. Below-ground carbon is normally more protected than above-ground carbon during fires and other disturbances (IGBP, Terrestrial Carbon Working Group, 1998).

Since 1990, progress has been made in regulating activities related to forestry (afforestation, reforestation and deforestation) in the so-called "Kyoto forests". The Protocol does not include provisions for national crediting for carbon sequestration in agricultural soils and does not state how carbon offsets should be determined, leaving this to the parties. While the question has not been solved thus far, it is expected to be solved at the sixth Conference of the Parties (COP6), which will take place in late 2000. At present, there is a growing pressure to include soil conservation in the project portfolio recognised and regulated under the protocol (Ringius, 1999). There is therefore a need to develop reliable and transparent methodologies, and guidelines on how to take into account additional sources/sinks.

Carbon sequestration and soil degradation

Conservation-effective land use and soil management systems offer a potential for carbon sequestration in soil and terrestrial ecosystems through decrease in losses of soil organic carbon and increase in biomass production, among other benefits. (Lal and Kimble, 1998)

Within this context, there is a clear economic linkage between fossil fuel burning, climate change, dryland degradation and carbon flux. Carbon sequestration may be viewed as the key to reversing soil degradation; as degradation is reversed, so carbon sequestration increases and vice-versa.

The projected opportunities for carbon sequestration in drylands over the next five to 50 years suggest that if conservation and rehabilitation measures were implemented in the world's drylands, this would lead to an annual carbon sequestration between 1.0 to 1.3 Gt per year (Combating global climate change by combating land degradation, UNEP, 1995), (Squires, 1998).

These considerations will become relevant once the Kyoto Protocol is ratified by allowing trading of carbon credits and cooperation between Annex I (developed and non-Annex1 countries in reducing net emissions through the Clean Development Mechanism (CDM).

Box: Soil degradation in Eastern and Central Europe, including Newly-Independent States

Soil problems in CEE countries are in principle not different from the problems of soils in the EU. Nevertheless, the economic crisis which followed the collapse of the former Soviet Union has resulted in lower pressures on the environment in general and on soil in particular. As economy recovers, an increase of impacts on soil can be expected, following similar trends to those that have been observed in the EU in past decades, if proper measures are not taken. However, the effects of mismanagement of soil in the past have not been eliminated and still limit the access to the resource today.

In summary, specific aspects of soil degradation in CEE countries include:

- uncontrolled management of polluting materials (oil, organic toxic compounds, military waste material, heavy metals);
- reduced agricultural pollution with respect to the EU (lower use of fertilizers, due to economic conditions);
- contamination, erosion, salinization, waterlogging and destruction caused by oil spills.

In the NIS, soil problems are linked to the overuse of small areas due to reduced fertility and functionality of larger areas, caused by problems such as water and wind erosion, soil compaction, overgrazing, salinisation and waterlogging. In specific areas, soil degradation can be severe, and includes contamination by heavy metals, persistent organic pollutants (POPs) and dioxins around industrial sites and urban areas, oil spills and contamination by radio-nuclides. Pressures on small plots are also caused by the abandonment of cultivation in larger agricultural estates due to lack of economical resources, technical facilities and manpower.

Quantification of the problem is difficult due to lack of comparable and reliable data, since methods that have been used to collect and assess data are not reported. This is the major limitation in producing a sound assessment on the base of available data.

Box: Soil contamination by radionuclides

In the case of artificial radionuclides, soil surveys are not being carried out on a regular basis. Contaminated soils can be found around the vast areas of former nuclear testing sites and where radioactive catastrophes have taken place. For example, in Kazakhstan 44 thousand km², or 25% of its territory is contaminated by radionuclides to a certain degree (mainly with Cs137 and U), while an area of 2400 km² is severely contaminated (Ministry of Ecology of Kazakhstan, 1998).

After Chernobyl, the radioactive contamination of the land surface was more than 40G Bq/km² in an area of 55000 km² around the nuclear plant (National Report of Russia, 1992) Ukraine, Belarus and Russia were the countries most affected by the Chernobyl nuclear disaster. After 14 years, radionuclides are still migrating through the soil profiles at a speed which depends on soil characteristics, and can reach 1.5 cm of depth per year as in the case of the leaching of Cs137 in sandy soils under wet conditions (Ministry of Natural Resources and Environmental Protection of Belarus, 1995).

Box: The impacts of the oil industry on Russian soils

The oil industry has impacts on terrestrial ecosystems in NIS countries. Accidents and mismanagement cause both mechanical destruction of soil and devastating effects on soil and permafrost. For example, some 40 000 accidents with considerable oil spills were reported in West Siberia in the period 1995-1997. The number of accidents could be higher, since oil companies tend to conceal accidents in order to prevent penalties (fines being levied, etc.). Destruction of soils on oil fields is also linked with construction of unauthorized roads, quarries and drilling sites (SCRFER, 1998).

The majority of oil and gas fields in Western Siberia are on permafrost soils, and very often the permafrost regime of these soils is seriously affected by mechanical pressure (construction sites, roads, etc). Once permafrost is destroyed, soils can behave in unpredictable ways, causing solifluction (or soil creep), waterlogging and general static instability of buildings.

According to some estimates, about 7% of all oil which was mined in Russia at the beginning of 1990s ended up in or on soils of Western Siberia. Russia produces hundreds of millions of tonnes of oil annually (more than 300 million tonnes in 1999); thus 7% is a very substantial figure (Committee of Ecological Security of Russian Federation, 1994).

Local contamination could be severe or at least present in abandoned drilling sites, which number about 3600 in western Siberia. Many of these sites are still under pressure and often oil and gas are still being extracted from them (SCRFER, 1998).

Another problem is linked with rusting pipelines. Annual maintenance is taking place on only about 2% of total pipelines, while for proper functioning it is necessary to maintain/repair 10-12% annually.

Conclusions

- **Desertification, as a gradual and progressive reduction of the capacity of soil to support vegetation and animal communities, agriculture and forestry, is threatening parts of Southern and Central-Eastern Europe.** Extensive areas in the Mediterranean region have become so severely degraded that they are no longer capable of supporting any profitable cultivation, resulting in land abandonment and depopulation. Very serious problems occur in Central Asia, mainly due to changes in land use.
- **Soil erosion.** Soil erosion by water and wind is a major problem in Europe, especially in the south. On-site impacts: loss of soil organic matter. Off-sites impacts: contamination and loss of soil's capacity to sequester atmospheric carbon.
- **Soil sealing:** The rates of real soil loss due to surface sealing through growth in urbanisation and transport infrastructure (roads, airports, railways, ports, etc.) are large and consistent in several EU countries.
- **Soil contamination.** There is no wide-spread (diffuse) pollution of Europe's soil (except soil acidification) but contamination is high in hot spots (urban areas and industrial compounds). Almost without exception, it is extremely difficult and practically or economically impossible to restore soil multi-functionality in full. Current remediation strategies aim to restore soil to perform only some of its functions.
- **Soil acidification** is a continuing problem, but it is not expected to increase further, except in central and eastern European Countries, due to the success of policy in place developed over the past 30 years.
- Data on soil has been gathered by different organisations for different purposes (soil has many users). **There are, however, important data gaps and access to relevant data and information is difficult.** Little data can be used directly for policy purposes and most only covers small geographical areas.

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Background paper on “State of land degradation in Central and Eastern Europe” By Dr. Ryszard Dębicki, Institute of Earth Sciences, University of Maria Curie Skłodowska and Institute of Agrophysics, Polish Academy of Sciences, Lublin, Poland

1. Introduction and historical background

2. Region and its environment in the transition period

- land and food
- forests
- freshwater
- atmosphere

3. State of land degradation/desertification in the region of Central and Eastern Europe

- main phenomena of land degradation
- agricultural degradation of the land ecological structure
- technical, mechanical, physical degradation of the land ecological structure
- erosion
- land degradation due to acidification, eutrophication and local and diffuse contamination
- biological degradation
- desertification and drought in countries of Central and Eastern Europe
- general impacts of land degradation on the economy and the environment

4. National action needed to bring land degradation to a halt and to alleviate drought effects

1. Introduction and historical background

Land degradation is as old as civilization itself. It can be said that environmental problems have always been part of the human condition. Our earliest ancestors were as dependent on nature for their survival as we are today. Early farmers had to learn seasonal patterns, the quality of soil and the effects of draught and rainfall, same as land users today. The impact of humans has grown tremendously over time, most particularly in the last two centuries. But even when mankind was a small community - whatever humans did, they could not do without effects on nature. For example, in biblical Mesopotamia irrigation caused salinity that made the land crusty and useless and ultimately turned the area into a desert. In Ancient Greece deforestation was widespread as an effect of fire, cutting and grazing, especially by goats. In the High Middle Ages, there was a period of considerable growth of agriculture and population in Europe with dire consequences for the central and eastern European forests that were felled as "reclamation" of land for agriculture. In the urban areas of antiquity, waste was already a known problem. Also the quality problems of water (ancient Rome) or air (London in 13th century) were recorded. Horse transportation left thousands of tons of manure in the streets, adding to human deposits that regularly contaminated rivers, causing diseases and epidemics. In the 20th century, most of the countries in Central and Eastern Europe experienced rapid industrialization which resulted in excavation of many raw materials, huge mining activities, loss of forests and agricultural lands, devastation of landscapes and pollution of water, air and soil. In the 1970s and 1980s the quantity and severity of environmental problems have continued to grow in many regions of the world and they have constantly become more and more global (e.g. the greenhouse effect, threats to biodiversity and human health, land degradation, desertification, etc.).

The international community has recognized the land degradation (caused by complex interactions among physical, chemical, biological, political, social, cultural and economic factors) as a major economic, social and environmental problem of concern in many countries in all regions of the world. Many efforts had been undertaken to halt and solve the problem, especially after the United Nations Earth Summit, held in Rio de Janeiro in 1992. Unfortunately, despite entering into force new conventions and documents (i.e. UNCCC, UNCBD, UNCCD and Agenda 21) and undertaking other efforts, the problem of land degradation in many areas had intensified, although there are "local examples of success". However, one very important aim has been achieved: as the environmental problems became global, more and more environmental issues are now part of everyday life of virtually every citizen, institutions are built, policy is widening and legislation is being reinforced. This also happened in 22 countries of the region of Central and Eastern Europe.

The common picture of the region in the past decades was gloomy and grey and the news about the environment was pessimistic. For a long time the environmental performance of industries and societies was drastically weak. Until the late 1980s, the dramatic differences in living standards, environmental conditions and social and political systems that characterized Western and Eastern regions of Europe are certainly not explained by

differences in climate, availability of natural resources, or any other “given” factor. They were all a result of the past. Or they are rather present manifestations of the different paths that societies have taken at different stages in the past. Even industrialization in Eastern Europe generally began to play an important role in economic life much later than in the West. For example, in Poland the first small factories appeared in the 1740s, but the epoch which used to be called Poland’s “first industrialization” began in 1815 and did not accelerate until the middle of the 19th century. By tradition, textiles and the mining industry formed the basis. But, as in St. Petersburg area (Russia), Plovdiv (Bulgaria), Ploesti (Romania), Ostrava (Czech Republic), Katowice (Poland) and many others, metallurgical and mechanical fabrics were founded. Rich deposits of coal, lignite, oil and other resources made industry possible. However, it was not until the middle of the 20th century that heavy industries developed and began to play an important economic role in many countries of the region. Before the Second World War the economy was still mainly based on agriculture. After the war almost all industry was destroyed. But in the 1950s a socialist planned economy was installed and a massive development of industry started. Development under the centrally-planned economies in Central and Eastern Europe was understood mainly in terms of growth of physical production (especially in the industry and energy sectors) and this resulted in the severe exploitation of renewable and non-renewable resources. Heavy industry, resource extraction, energy production and the military sector were all associated with high levels of environmental pollution. This brought serious conflict between economic growth and environmental protection till late 1970s. It must be stressed, however, that the new pro-environmental approach in the Soviet bloc in the 1970s had more of a symbolic than real value. Increased industrial production had absolute priority in the economic policy. The belief was widely held that one should first become rich and then take care of the environment. The idea prevailed that the most developed nations in Europe did not start to deal with environmental protection seriously until they had become rich; no country had ever given sufficient attention to environmental protection in the early phase of industrialization. Therefore, Eastern Europe should first catch up with the West, then invest for the environment. Virtually nobody questioned this assumption. As a consequence, in the wake of breakdown of communism, a large number of ecological disasters and environmentally harmful activities were revealed to the public in Central and Eastern Europe. Growing environmental consciousness among the general public also played a significant role in the movement for independence. The heritage from the previous periods included:

- high energy- and resource-consuming industry
- obsolete industrial structure and technology
- heavy pollution compared to Western Europe
- belief in continued economic growth as a political ideology
- centralized planning
- control of science and censorship
- limited information to the general public about the state of the environment
- state-controlled environmental movements and
- symbolic environmental legislation.

The swift and profound political and economic changes that are now taking place in the eastern part of the European continent apply also to the forms and targets of land use and protection. In most of the former socialistic states that process – the overthrow of the old political systems along with sweeping economic reforms – proceeds quickly and with consequences that are very obvious, especially in economic, social and environmental issues. Thus, it is not very bold to assume that the differences mentioned earlier are diminishing and will further diminish in the forthcoming decades, thanks to new political freedom, growing cooperation and communication both within the region and with European Union. Although European integration is generally regarded as a positive development, it may threaten the environment in several ways. The desire of people in the transition countries, especially the young, to attain the living standards and consumption levels of Western countries, with pressures to develop the economy first and solve environmental problems later, may have serious repercussions again. And “blindly” adapting to Western resource management techniques may well result in the loss of traditional, more sustainable approaches that still exist in some parts of Central and Eastern Europe.

The aim of this report is to review the main causes and effects of land degradation in 22 states of Central and Eastern Europe in the context of the UNCCD, taking into account linkages and synergies with other environmental issues. Vast areas in this region, same as elsewhere, have been changed both due to natural or human-induced factors to such degree that they are called “degraded” or “devastated”. Some estimates of areas of land affected by specific types of human-induced degradation have been presented earlier in the frame of GLASOD, SOUVER or CTB projects. These studies showed that regional and continental estimates of the actual extent of degraded and polluted land, and of areas of risk, remain open to improvement as well as the need to harmonize procedures of measurement and threshold levels used. Many countries of Central and Eastern Europe have already started systematic recording, monitoring and clean-up programmes of degraded or contaminated sites based on established new regulations, very often accepted after EU, and reclamation methodologies the implementation of which is also very often constrained by financial, legal or technical factors. Better knowledge and improved data on the extent of land degradation and pollution, and establishment of monitoring networks to assess the effectiveness of measures that have been put in place, are seen as a prerequisite to any further coordinated approach to land management and protection in the whole Europe. A very good opportunity to launch this goal is to discuss these problems in the light of the potential cooperation offered by the CCD.

Environmental policies regarding air, water and life quality were well developed before land/soil became an important issue (*vide*: dates of United Nation conventions: first on climate change, than on biodiversity and the last on desertification). One of the reason of such a sequence was lack of well defined and widely used indicators of land quality as it was already done for air, water and human well being. Similarly, a land or soil quality indicator would be most useful as a tool to focus and rise public attention and

awareness of the importance of our land/soil resources (World Bank, 1995). Land quality was defined by the World Bank as: "The condition of land relative to the requirements of land use, including agricultural production, forestry, conservation and environmental management". Land Quality Indicators (LQI) were defined as: "Measures that describe land quality and human actions that relate to it". Karlen et al. (1997) also pointed out that the quality concept is clearly dependent on the type of land use being considered while thresholds for environmental quality indicators have to be considered as well. Soil or land quality, as such, is therefore difficult to define in general: the concept needs to be focused. Separate definitions for different types of land use in a given soil series would conceivably result in a wide range of values without little diagnostic value (Bouma & Droogers, 1998). The necessary focus for the quality analysis can be provided by the concept of sustainable land use and management, as defined by FAO (1993): "Sustainable land management combines technologies, policies and activities aimed at integrating socio-economic principles with environmental concerns, so as to: simultaneously:

- maintain and enhance production and services;
- reduce the level of production risk;
- protect the potential of natural resources and prevent degradation of soil and water quality;
- be economically viable and
- socially acceptable".

These five criteria are referred to as five "pillars" and focus on management is attractive because definitions of "sustainability" in broad terms leave little opportunity for defining specific activities which are necessary for the concept to become operational. Land quality should therefore be defined for a given region in a given eco-climatic zone with known socio-economic conditions. The first three "pillars" of sustainability allow us to assess and select the risk. Having done this, economic feasibility and social acceptability can be explored next. However, this concept is still far from being implemented and used in practice, although it has already been included into many national programmes on sustainable development. Descriptive or qualitative approach is still most often used while evaluating land degradation in various regions of Central and Eastern Europe.

2. Region and its environment in the transition period

To understand the causes and effects of land degradation in the countries of Central and Eastern Europe, the background information on the status of basic elements of its environment is necessary. This short presentation of the region and its environment is based on the data available from many sources (GRID, EIONET, SoE, Agenda 21 NRs for UNCSD, EEA-UNEP, FAO, SOTER and others).

Two predominant geographical zones occur in the region: Central and Eastern European Plain (so-called Russian Plain) and the mountainous belts ranging from the Slovenian Alps and the Carpathians to the Caucasus and between the Adriatic Sea and the Black Sea – enclosing the Pannonian, Romanian and Bulgarian Plains (Geographical Encyclopaedia, 1996) (Fig. 1). The Russian Plain occupies 463 million ha (1/2 of the European territory) and it stretches from Barents Sea to the Black Sea and Caspian Sea and from the

Baltic Sea to the Urals. Almost 76% of the Plain total area belong to the temperate zone, the rest being boreal and cold-belt zone. The Plain comprises a wide range of soil and vegetation zones: tundra, taiga, mixed-forests, steppe and desert (Figs. 2-3). Two major land uses predominate within the Russian Plain, i.e. agricultural (65%) and forest (30%). Non-agricultural uses of land take now about 5% of the northern Plain and more than 7% in industrially developed southern regions. Chernozems count for more than 80% of the tilled land. In the mountainous regions of Southern Europe the environment is changing very rapidly due to deforestation, agricultural activity (overgrazing) and water erosion processes. Deserts can be found only in the area of the arid subtropical climate, i.e., in South-eastern Europe, in the area of the Caspian Sea.

Land and food

In Central and Eastern Europe agriculture was dominated by large-scale collective farming for much of the century, except Poland and Croatia. There has also been a decline in the area of agricultural land in Central Europe since around 1990. Significant changes in land use may be taking place on marginal land where many areas, small and large, are being abandoned. In Eastern Europe, almost half the land area is still covered by forests – and, with about further 20% covered by natural grasslands, about 70% of the total can be regarded as non-domesticated. However, over the century almost 10 % of this area has been converted into cropland or pasture land. Throughout most of the region, the dominant pressures on land use are from agriculture and forestry, although urbanisation, transport and tourism, with their associated infrastructures, are becoming increasingly important.

Collective agriculture was heavily subsidised but was unable to provide adequate supplies of food. Climatic variations led to large fluctuations in yields. Poor facilities for food storage and distribution led to large losses. Many attempts to extend the area under cultivation caused extensive ecological destruction (e.g. dry steppes were ploughed up and later suffered from severe wind erosion). In Central Europe, per capita food production was higher than in the former Soviet Union but the impact of heavy machinery and the widespread use of chemicals and fertilizers contributed to the degradation of soil structure, soil erosion and acidification. By the mid-1980s in Hungary, for example, about 50% of farmland was affected by acidification and 17% by severe soil erosion.

The pressure on land resources in Central and Eastern Europe has started to decrease during the past few years but for different reasons as compared to Western Europe. The collapse of centrally-planned economies and the ending of state subsidies to large collective farms were among the major reasons for a sharp decrease in the use of agricultural chemicals, the abandonment of large irrigation projects, falling livestock numbers and a general reduction in agricultural land, all of which resulted in a sharp decline in agricultural production. While some of these developments are encouraging from the point of view of a shift to more sustainable patterns of land use, there are number of other reasons of concern.

Soil erosion has always been a serious problem, particularly in the Mediterranean region. Of Europe's total land area (from the Atlantic to the Urals), 12 % is affected by water erosion and 4% by wind erosion, generally as a result of unsustainable agricultural practices. Salinization and water-logging are serious problems, especially in areas where large but poorly-managed irrigation systems were constructed. Large-scale irrigation projects have resulted in soil pollution from excessive fertilizer and pesticide use, salinization, and especially water-logging due to high percolation of water from unprotected channel beds. Pollution of land by excessive use of fertilizers and pesticides and by contaminants such as heavy metals, persistent organic pollutants and artificial radionuclides is not nowadays so widespread as before, although many of these pollutants end up in surface and groundwater. They can also be taken up directly by crops and affect soil structure. Soil acidification has been a problem mainly in Central Europe. Emissions of acidifying compounds have been reduced significantly in recent years but critical loads for acidification are still being exceeded in more than 10% of the land. In Eastern Europe, acidification is concentrated in specific areas (power plants). There are many contaminated sites, including many hundreds of abandoned military bases with high levels of soil contamination, mainly with oil products, heavy metals and sometimes radioactive compounds, but a comprehensive survey is still lacking. Large areas of Russian Federation, Ukraine and especially Belarus were affected by radioactive fallout from Chernobyl nuclear disaster in 1986, with serious consequences for food production as well as health, and there are continuing restrictions on access in some areas around the plant. Oil pollution has affected large areas in West Siberia, mainly because of oil and gas extraction, and along the Caspian shores in Azerbaijan. Ageing of the oil pipeline infrastructure linking Siberia with Europe poses a threat of further soil pollution and the frequency of accidents can be expected to increase.

Agriculture in the Central European countries seeking to join the European Union will face intense competition which may result in a decrease in the number of farms and thus reduce pressure on land resources. At the same time, as the economic situation improves, with more use of private cars and demand for one-family houses on individual plots, growing suburbanization may result in an increase in demand for land and a decrease in prime agricultural land. In Eastern Europe, long-lasting environmental disasters will continue to affect the land use, with the consequences for agricultural production.

Forests

Most of the indigenous forests in Central Europe disappeared long ago as a result of human activities. However, some areas of natural temperate forests can still be found in some of the Baltic countries and in part of Russian Federation. Over the past century, the total forested area within the region declined, mainly as a result of deforestation in Eastern Europe. In contrast the area in Central (and Western) Europe grew as a result of major reforestation programmes. In some countries, these programmes achieved impressive results (Hungary, Poland, Ukraine). Forestry practice in Central and Eastern

Europe has remained relatively small-scale and less technologically advanced than in the West. This was especially beneficial for preservation of species diversity. In many of the transition countries, forestry agencies and policies rapidly being re-structures as land privatization creates large numbers of private forest owners. However, there is little certainty about the long-term environmental implications of the privatization of forest land and its effects on biodiversity and land use (Belarus, Ukraine, Russian Federation). In some countries military conflicts, rural poverty and economic blockades has caused local deforestation (Armenia, Georgia). Forests throughout the region are affected by air pollution, pest outbreaks, drought and fires. In future forests in Central Europe will increase, while in Russia, Armenia and Georgia pressure on forest resources is likely to continue. It should also be mentioned here that following the Chernobyl disaster in 1986, more than 7 million hectares of forest and other wooded land were contaminated by radioactivity, preventing forest work and increasing the danger of secondary radioactivity in case of fires (FAO 1997).

Freshwater

Water resources have been profoundly influenced over the past decades by human activities, including changes in land cover, high inputs of chemicals from air emissions and agriculture, development of urban areas, depletion of aquifers, etc. As a result, problems of overuse, depletion and pollution have become evident in many countries of the region. In Central and Eastern Europe water consumption has declined during the past decade, mainly as a result of economic restructuring (specifically due to reduction of water abstraction for industrial purposes). Urban demand is steadily growing. The most important freshwater pollutants are nitrate, heavy metals and hydrocarbons, and the most important consequences of this pollution are eutrophication of surface waters and possible effects on human health. Over-use, resulting in lowering of the water table, is causing salt water to intrude into groundwater in coastal regions. Proper access to safe drinking water is often limited by poor surface water quality or poor state of distribution mains (losses sometimes reach 50%). Many areas with polluted surface waters are due to industry, agriculture, municipal landfills or other mix sources.

Atmosphere

Most of the recent air quality improvement have been due to economic decline (reduced agricultural activity, lower electricity consumption). But also installation of low-sulphur coal and flue-gas desulphurization equipment, as well as renewal of power plants. SO₂ emission was reduced by almost 50%, NO_x by 20%. It may, however, increase due to increasing number of private cars in the region. As a result of the above reductions in emissions, also the deposition of acidifying compounds has been significantly decreased (Table 3).

3. State of land degradation/desertification in the region of Central and Eastern Europe

Before presentation of the causes and effects of land degradation in Central and Eastern Europe, it should be explained what we understand by “land” and “land degradation”. According to definitions adopted for the purpose of the UNCCD – “**land**” means the terrestrial bio-productive system that comprises soil, vegetation, other biota, and the ecological and hydrological processes that operate within the system. It should be stressed here that the term “land” has wider meaning than “soil”, although in many reports they are used as synonyms, which creates some problems with the interpretation of the data available.

“Land degradation” means reduction or loss, in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as: soil erosion caused by wind and/or water; deterioration of the physical, chemical and biological or economic properties of soil; and long-term loss of natural vegetation. In a broad sense, however, it is obvious that land degradation results from climate variability and human unsustainable activities irrespective of the continent or climatic zone and embraces many more causes and effects than is covered by the CCD. Almost all of them involves loss of biological or economic productivity and complexity in any type of land use (e.g. mentioned above croplands, pastures, etc), also including loss of esthetic/cultural value.

Main phenomena of land degradation

In the past land degradation was primarily caused by natural factors such as water and wind erosion and global climate changes. Under modern conditions, land tends to lose its biological and economic productivity quickly due to a long list of human actions beginning with prefix “over”, such as: overpopulation, overexploitation, overgrazing, overcultivation, deforestation, etc. The prefix “over” clearly indicates that natural capacity of a given land has been exceeded or broken and the land is not anymore able to recover itself and fulfils its functions in new conditions. This “overpressure” on land is not generally caused only by economic and social pressures, but also by ignorance, war, political and cultural activities and, of course, natural phenomena such as e.g. draughts.

Many attempts have been undertaken to systematize, characterize and explain various causes and consequences of land degradation (e.g., Dębicki, 1998; Lal et al., 1998; Oldemann, 1997; Pimental, 1997, Varallyay, 1997). Natural factors of land degradation, as mentioned above, may occur in nature without human impacts. However, human activities accelerate natural processes of land degradation and provokes new ones. Among many human-induced causes of land degradation we can enumerate: agriculture, industry, urbanization, transportation, development of technical infrastructure, tourism and other forms connected with the development of modern societies. Land degradation can also be considered from the point of view of various phenomena and processes occurring as a consequence of above activities,

interfering with natural conditions. In this respect the following can be distinguished:

- mechanical degradation (mainly caused by mining industry, development of infrastructure),
- physical degradation (water and wind erosion, compaction, sealing and crusting, deterioration of water regime, resulting in drought, desertification, water-logging, etc),
- chemical degradation (acidification, deterioration of geochemical cycles, contamination and pollution with gases, dusts, heavy metals, PCB, PAHs, etc),
- biological degradation (disturbances in biodiversity, depletion and exhaustion, etc).

As a result of multi-factorial land degradation, the following negative consequences may occur: direct physical loss of land, decrease in land quality, decrease in quantity and quality of biomass production (loss of ecological functions), decrease in air and water quality, and human health; as well as increase in acidification rate, production costs, flood risk, and health risk. Of course, the above lists of causes and consequences of land degradation are not complete and everybody can add other facts that may be more important than those mentioned above.

Agricultural degradation of the land ecological structure

All forms of agriculture affect the land used and the environment. No doubt many agricultural practices have beneficial impact on land and soil. All of them have been included into the codes of GAP. But there are many others that are considered deleterious, such as: removal of nutrients by plants without replacing them, the addition of toxic materials, salinization, accelerating erosion, burning organic layers, reducing organic matter content, destruction of soil structure, compaction by farm machinery and grazing, acidification and urbanization. Many of these activities played or still play a significant role in land degradation in Central and Eastern Europe, causing in many states land abandonment which, in turn, may accelerate degradation processes due to desertification.

First of all, in many countries of the region the save ecological border between agricultural land and forests have been broken. It is assumed that for proper functioning of terrestrial ecosystems woodlands should constitute more than 35% of the area. Data given in Table 1 show that in 13 countries the share of forests is below this value and in 8 of them agricultural land constitutes more than 40 % of the country's land. In its extremity, exploitation of agricultural land may lead to its destruction. This is particularly clear in those countries where exploitation ends with soil/land erosion, water deficit and desertification through salt enrichment. Such consequences are recorded almost in every country of the region, to various extent (Table 2). For example, wind or water erosion is a severe problem in agricultural land almost in every country, even in flat countries such as Lithuania or other Baltic states; water deficit – Poland, desertification - Albania, Romania, Moldova, Georgia and elsewhere), acidification – Poland, Baltic states, Russia, Ukraina, Romania, Bulgaria, etc. In the Baltic countries, environmental effects of agriculture are obvious on

water bodies, where eutrophication, including nitrate enrichment in ground water, is due mainly to poor management in plant and animal production, even in case of a reduced application of mineral fertilization in all those countries in the last decade. There is also impact on the land quality by current cropping techniques, such as soil compaction (Hungary, Moldova, Romania, Ukraine), and reduced humus content (especially critical in Ukraine), and on the atmosphere, with emissions of ammonia, methane and some nitrogen oxides (e.g. Belarus, part of Russian Federation, etc).

The main factor of land degradation in agriculture in Central and Eastern Europe is ecologically incorrect land use and mismanagement due to changing economic and political circumstances, poverty, shortage of production means and population growth. Examples from the past could be liquidation of windbreaks to enlarge field size (Western Poland, former USSR and many other states of the region), deforestation on sandy soils (Poland, Belarus, Baltic states, Ukraine), compaction by heavy machinery (former USSR, Romania, Bulgaria, Czech Rep., Hungary), improper use of chemicals and irrigation or drainage systems, overgrazing, cultivation of loose sandy soils (Poland, Belarus, Lithuania or part of Western Russia). Loose sandy soils have low productivity and are not suitable for agricultural use, mainly due to inherent poor physical, chemical and physicochemical properties, such as: low fertility (lack of nutrients and acidity), high permeability, low water retention capacity, etc. Agricultural use of those soils exposes them to the destructive influence of wind, intensifies the leakage of rainfall waters and nutrients, and causes losses in organic carbon and humus. Only in Poland, abandoned poor agricultural land, which constitutes at least 1/3 of all waste land (almost 0.5 million ha), are land degraded to a very high degree. Total area of incorrectly managed - and therefore clearly degraded - sandy land is approx. 5 mill. ha. Only the change of land use of that land from agricultural to forest, would be a very important factor of their remediation.

Little information is available today in Central and Eastern Europe on the concentrations of pesticide residuals in soils, surface and groundwater. Taking into account the financial situation and the decreased purchase of chemicals for agriculture, it seems reasonable to believe that this is not an acute problem nowadays. On the other hand, continuous decrease in application of mineral fertilization in agriculture leads to exhaustion of nutrients from soils which, in a long-term, may result in permanent impoverishment of land and further deterioration of its ecological functions. Natural depletion of all soluble elements occurs from soils through the process of leaching by rainwater, but this form of degradation also occurs whenever soils bear crops or are grazed. Depletion of plant nutrients from soils (especially poor sandy soils) has been an obstacle to increasing food production in many countries of the region. Insufficient returns for their produce is forcing many farmers throughout region to literally "mine" the fertility of their soils. Loss of fertility has caused farmers to extend the area cultivated to make up for reduced yields. In the process they are moving on to less suitable lands and rapidly destroying the natural environment with its biological diversity. This brought us to another serious problem constituted by marginal lands which are still used for agricultural production.

In Central and Eastern Europe, due to increase in field traffic, compaction of arable soils has also become one of the major factors affecting crop production. It is also important from the view point of land degradation. In many countries of the region compaction is reported as very serious problem in recent years as the size and weight of farm machinery has increased. For example, in the former USSR, since 1922 the mass and power of tractors used have increased 15 and 20 times, while in Czech and Slovak Republics since 1955 the mass of tractors and tillage implements have increased by 68 and 200%, respectively. Subsoil compaction may occur below the plough-layer through frequent use of machinery. The cumulative percentage of land covered by wheelings varies in a wide range, depending on season and crop type (from 30 to 80% of the field area during seedbed preparation in Russia, with 3-9 wheelings in some parts of the field, up to 250% of land area in cereal production or 500% in root crops in Poland). Soil deformation caused by severe compaction influences other processes, such as air exchange and composition, water retention capacity, heat balance, biological activity, redox potential, etc. The range of negative consequences depends of inherent properties of soils, land bearing capacity, moisture conditions, applied technology as irrigation, fertilizer application, land relief, field pattern, and many others. There are also evident negative responses of plants to surface and subsurface compaction, proved by decreased yields in quantity and quality (Fig. 4). Nearer the surface a combination of compaction and tractor wheel-spin may limit the extent to which plant roots exploit the soil for moisture and nutrients and the free movement of gases between soil and the atmosphere. Compaction decreases infiltration capacity, porosity and increases bulk density and resistance to plant root penetration. In soil with a reduced infiltration capacity, saturation is reached quickly and surface flow is generated which can cause erosion and carry pesticide residues from the soil before they have been degraded by the soil bacteria. Crusting or surface sealing can occur, especially in silty soils, where the organic matter has been lowered by oxidation through long-term cultivation; again this results in decreased infiltration and a greater likelihood of run-off and erosion.

Technical, mechanical and physical degradation of the land ecological structure

Destruction of the soil-plant cover resulting from technical building development on the surface of the Earth together with exploitation of fossils and storage of wastes, are a radical and long-lasting form of degradation of the land ecological structure. Despite of the technical elimination of the plant cover and soil, technically developed and devastated areas are sources of various noxiousness in adhering areas. They are also the reason for disturbance of their ecological structure, example of which are industrial objects, waste landfills, mass communication and transport routes, housing and recreation spots. Of course, competition in terms of space always exists between the ecological and socio-economic functions of land. For example, the use of land for infrastructure construction – irreversible in relation to several generations time scale – makes land unavailable to ecological functions. Meanwhile the over-intensive use of land by modern farming imposes too heavy a burden on the ecological functions, resulting in

contamination of soil, food, water, etc. The percentage contribution of technically developed areas (buildings and squares, roads and railways, excavations and resource extractions, dumping grounds and landfills, and other industrial consumption of the land) in a specific region is an overall index of technical degradation of the land ecological structure. And it is becoming more and more significant factor of land degradation in Central and Eastern Europe, where pressures on land use are particularly associated with urban sprawl, increasing mobility and tourism, irrespective of the already existing uses by heavy industry, mining, energetic sector, etc. Every year more and more land is being converted from “eco-zones” into “techno-zones”, i.e. more land surface is being sealed, destroyed or degraded. Data show that in every country of the region the area of arable land, pastures or woodlands is decreasing, sometimes dramatically, and area under urbanization, transport and industry development is being continuously increased. These sectors are affecting the land most both in terms of local contamination, mainly due to inadequate waste management and “old-fashion” production processes, and diffuse contamination, due to emission and transport of pollutants via air, water and earth often in regions far from the original source. For example in Poland every year an area of about 50,000 ha is being withdrawn from ecological use into various technical sectors. On the other hand, almost in each country of the region, due to restricted standards as to production technology (introducing environmentally friendly technology is an obligation), waste management, air and water protection and conservation programmes, there is a significant reduction of gas, dust and pollutants emissions (see Table 5). Of course, there are still many local “hot-spots” , both an old ones (historical sites) as well as new, due to on-going waste-disposal, gas works, oil refineries, metal-processing industries, chemical industries and other production facilities (e.g. extraction of minerals). *Nota bene*, there is an urgent need to inventor all these spots according to uniform methodology and to assess risk they impose to the environment. Such actions are being undertaken in many countries but still the data are sometimes based more on intuition than on real measurements and studies (e.g. heavy metal content, organic matter depletion, etc). There is also a lack of consistent data on the amount of land loss through surface sealing and build-up areas (urbanisation and infrastructure constructions), and estimates of their impact on water reserves (water deficit is more and more often evidenced in many urban areas in Poland, Ukraine, and elsewhere), flood risk, public health, biodiversity, and urban environment quality in general. It is estimated that in Poland almost 10 % of the country area shows water-shortage due to the above factors, and in years of drought occurrence, which happens every 3-5 years, almost half a country is endangered by drought and water deficit. Similar data or even more dramatic are reported from other states of the region.

We should also mentioned here such important factors as: military activities, accidents and mechanical destruction of the soil surface humus horizon. The last plays for example, an important role both in ecological and technical functioning of land. Deformation of the structure and thickness of the humus horizon is most frequently caused by leveling the terrain, operation of technical equipment, installment of underground cables, mixing with foreign soil mass, surface sealing, etc. The decreasing regulatory function of this

layer results very often in loss of water, nutrients, accelerated water contamination, etc. This has to be taken into account while estimating land vulnerability to various degradation processes.

Apart of wind and water erosion ($\Rightarrow$ Erosion), there are many other evidences of physical degradation of land due to complex factors, among them compaction, sealing and crusting, water-logging, oxygen deficit, and aridification or desertification ($\Rightarrow$ drought and desertification). Some of them are very new and many gaps in knowledge are still to be recognized.

Erosion

Erosion is one of the main factors of land degradation not only in Central and Eastern Europe. Most countries in the region consider erosion as the main factor of land degradation. There is a popular saying that erosion is “a farmer’s hidden whip”. But this process occurs not only in arable lands. Deforestation and farming in uplands and mountains, overgrazing, use of heavy machinery, excessive irrigation of vulnerable lands, poor economy and poverty, etc. result in severe damage not only to land but also to permanent plant cover. Replacing natural vegetation cover with plants that require mechanical soil cultivation is crucial for intensification of erosion. The type and rate of erosion processes mainly depend on physiographic conditions, soil properties (grain size distribution of the surface ground/soil, moisture and density, organic matter content, pH, etc), rainfall characteristics, hydraulic properties of the earth surface and subsoil, field pattern, land use, existing protection measures, etc. Due to the protective function of forest and permanent grass against erosion, these problems relate most of all to arable soils. In climatic conditions of Central and Eastern Europe the following types of erosion can be distinguished: wind and water erosion, snow erosion, cultivation erosion and landslides (or mass movements). Erosion destroys the land both on-site and off-site. Among on-site effects we can mention reduction of land ecological functions, loss of land, drop in biomass production (quality and quantity), nutrient depletion – including organic matter, disturbances of hydrological cycles (from precipitation to runoff), decrease productivity, increase in production costs, etc. There are also severe off-site effects: pollution with hazardous substances that were present in eroded lands, silting-up of water reservoirs, eutrophication of waters, etc. Erosion that dominates in our region is mainly caused by water and, to a lesser degree, by wind erosion. The significance of erosion is that it is frequently a symptom that something else is wrong, and so it is necessary to look at the management of the land, its physical and chemical conditions rather than spending too much time on measuring or estimating yet another example of erosion. If the underlying cause or causes are addressed, rather than effects, the problem of erosion falls into the correct perspective. This perspective in this part of Europe is, however, very pessimistic because of many reasons: traditional farming, field patterns, lack of funds and others.

All the evidence points to the continued increase of erosion in Central and Eastern Europe on cultivated lands, despite the availability of technology to limit its impact being known for the last 60 years and traditional methods for much longer. The erosion of 1 cm/ha of topsoil is a loss of between 100 and

150 tons of soil, and each 100 tons of soil per hectare represents a total loss of 2,000 to 2,500 kg/ha of humus, 200-300 kg/ha of nitrogen, 100-200 kg/ha phosphate and between 500 and 1,000 kg/ha of potassium. These nutrients have to be replaced if yields are to be maintained. On the other hand, these nutrients are deposited in surface waters, resulting in increasing eutrophication and other negative effects. Water erosion is increasingly relevant in the Balkan Peninsula, where it has always been very severe, in the countries surrounding Black Sea, Poland, Czech and Slovak Republics, great part of Western Russia and even in the Baltic states. In some of these countries it is estimated that water erosion reached ultimate stage and leads to desertification (Bulgaria, Romania, Albania, Slovenia, FYR of Macedonia, Georgia, etc). The processes of water and wind erosion also lead to ultimate physical degradation, beyond a point of no return within 50-75 years.

Erosion by wind is experienced throughout the arid regions and seasonally dry agroecological zones, as well as on sandy and silty soils of other regions and drought periods. It occurs on arable land, but also on pasture land due to overgrazing and on industrial lands, which is especially dangerous. This erosion is equivalent to a loss of 2.4 kg/ha/yr of N and 0.6 kg/ha/yr of P. In Central and Eastern Europe this form of land degradation was not a typical land degradation before land collectivisation at the beginning of the 1950s. Today it is becoming more and more serious because of many complex reasons: farming on poor sandy soils, cutting wooded shelter belts, introducing arable fields higher and higher in mountainous regions, overgrazing, desertification, etc.

Land degradation due to acidification, eutrophication and local and diffuse contamination

Two main problems occur in the chemical degradation of land: depletion and contamination. Depletion of plant nutrients from soils has been an obstacle to increasing food production since mankind began to practise settled forms of agriculture. At present time, as it was already mentioned, insufficient returns is forcing people to extend the area cultivated to less suitable lands and rapidly destroying the environment.

Contamination may be local (concentrated) or diffuse (dispersed). Both has increased dramatically in the second half of this century, especially in Central and Eastern Europe, due to rapid industrialisation and urbanisation. However, recent actions to halt these processes and to diminish the problem are promising. Diffuse pollution results from acid deposition and atmospheric fallout of toxic elements and compounds. Moreover, movement of chemicals that are initially absorbed to mineral or organic soil particles is also governed by wind and water erosion, while those solved in water are transported via water flow either through the soil or as surface runoff. Because many chemicals exhibit both partial adsorption and solubilization, making prediction of their fate, behaviour and environmental impacts difficult. Up to a critical point the land/soil can absorb these toxic metals without harm (due to buffer capacity). When this capacity is exceeded or other conditions are being changed, e.g. soil reaction, the substances can be even catastrophically released to the environment. This has become known as a "Chemical Time

Bomb". The most relevant problems posed by diffuse contamination are acidification, eutrophication, contamination with heavy metals and chemicals, and others.

Large-scale acidification and eutrophication caused by human activities increasing inputs of nitrogen (N) and sulphur (S) compounds into the earth's atmosphere and hydrosphere were identified as important environmental problems in many areas of the Central and Eastern Europe. The most important anthropogenic sources of S emissions are fossil fuel burning and industrial sources. The most important anthropogenic sources of N emissions are industry, fossil fuel burning, transport and agriculture. When deposited in excessive quantities, these substances are major contributors to acidification and thus usually referred to as "acid rain". The exchangeable base cations (Ca, Mg, K, Na) are mobilized under influence of acidic inputs and leached into the groundwater. Thus soil buffer capacity is depleted, pH will start to drop and with increasing acidity, aluminum ions are mobilized. They are toxic to most plants and have harmful effects of aquatic ecosystems. Acidification also mobilize heavy metals that were accumulated and bound in the soil under higher pH conditions. Acidification can also be caused by acidifying fertilizers, removal of base cations through over-exploitation, planting of acidifying vegetation (e.g. pine or fir) or drainage of wetlands which leads to pyrite formation. But the most important is air pollution. There is well known region in Europe, named "black triangle". But actions undertaken so-far resulted in significant reduction of dust and gases, even by 70 % (Table 3). However, still in small areas over the region occurs sever exceedance of critical loads, causing acidification. It is estimated that in Eastern Europe still 47 % of natural or semi-natural ecosystems are exposed to acidification and 61 to eutrophication risks. The most affected ecosystems are temperate forests as well as tajga and tundra ecosystems. We should also mentioned here that in the aquatic ecosystems of Eastern Europe, the most important sources of dissolved inorganic nitrogen originates from fertilizers, human sewage and deposition. In many regions eutrophication and acidification occur simultaneously and their combined effect may create even more significant stress in various ecosystems. Generally, acidification is concentrated in industrialized areas or areas of heavy traffic, whereas eutrophication occurs close to regions with intensive agricultural activity. In many countries there is low natural soil acidity which, together with atmospheric deposition, creates additional stress to the environment, especially forest ecosystems. This was clearly evidenced within an international program on "Assessment and Monitoring of Air Pollution effects on Forests".

As it was already mentioned, chemical land degradation in Central and Eastern Europe has geographical (richness of various ores, and mineral resources, wind directions, temperature and rainfall patterns), technological (inefficient "dirty" technologies) and political (the bigger the better, so-called "gigantomaniac" philosophy) causes and backgrounds. This resulted in increased content of heavy metals or other chemicals in air, water and soil. Today the most severe problem is the continuously increasing loading of the environment with industrial solid and liquid wastes due to a very low level of

their recycling. It is assumed that with the present utilization rate Poland itself would need 140 years to recycle already deposited wastes, and 200 years for the mentioned earlier. This clearly points to future actions to solve the problem, which is typical for many areas in Central and Eastern Europe. New inventory on heavy metal status in various countries proved that increased amounts of heavy metals (exceeding admissible limits) are only found in ecologically threatened areas.

Local or concentrated form of land contamination by chemicals is a characteristic of regions where intensive industrial activities, inadequate waste disposal, mining, military activities or accidents pose a special stress to the environment. Local contamination is usually smaller in extent. However, they are sometimes also due to ignorance or deliberate dumping of toxic substances to avoid paying for their safe disposal. If natural land/soil capacity is overexploited, a variety of negative impacts arise, as air and water pollution, direct contact by humans with polluted sites and uptake of contaminants by plants.

There is no uniform monitoring system of contaminated sites, neither in European Union nor in regional scale in Central and Eastern European countries. Hence, the picture on the extent and severity of chemical land degradation remains unclear. Many countries of the region have initiated national inventories. However, data on the number of contaminated sites based on national inventories is not yet comparable. The inventories are based on different approaches, methodology, definitions, threshold values, classifications, etc. Also many countries have already enacted legislation for contaminated sites, started inventories and set up specific funding tools, also via various international programs (PHARE, CARACAS, CLARINET, EIONET, SOVEUR, and others. Hungary and Czech Republic are the most advanced. But also significant progress has been achieved in Russian Federation, Poland, Slovak Republic, Bulgaria, Slovenia, the Baltic states. Partial inventories were also performed in Moldova, Romania, Georgia, etc. From these inventories it can be concluded that the largest and most affected areas are located in old traditional regions, where industry was known for centuries, as the corner between Poland-Czech Rep.-Germany, Silesia region in Poland, and many others in every country of the region. The information on the overall emission of metals, dust, SO_x, NO_x and some organic compounds is published annually for the major administrative units in every country by the Main Bureau of statistics and information is also published in the OECD reports. However, detailed information on emissions from a particular plant and its effect on the surrounding environment is not very widely disseminated, and the respective data bases are maintained by control and enforcement organisations. Maps of contaminant loading rates were developed for regions with a possible greater pollution impacts. Finally, e.g. in Poland there were delineated 26 zones of ecological risks, taking into account, among others: population, accumulation and "production" of wastes and waste waters, chemical loads due to emissions, etc. All in all, they occupy 10% of the country's area.

Let us present the actual situation in one such a region on the example of Silesia district. Mining and smelting in Upper Silesia have a long tradition going back to medieval ages. In the 13th century, silver and lead smelters were established here, and the mining and processing of zinc and lead ores has continued to date. Unfortunately, the non-ferrous industry has many adverse ecological effects associated with emissions of metallic dust. The extent of industrial contamination of all elements of biosphere is enhanced by inadequate care of the environment in general. The measure undertaken in recent years such as installing scrubbers, introducing closed-cycle industrial water systems and technological designs to minimize waste production have contributed to a general reduction of air, water and soil contamination. However, these measures have not completely eliminated the impact of toxic waste piles on the environment. Water and wind erosion, which are present in the region, lead to movement of toxic elements from dump sites to the biosphere. The most troubling risks which come from stock-piling smelter waste arise when dump sites are located in or near urban areas. These sites have a significant effect on nearby populations, and unfortunately this is frequently the case in Upper Silesia. The total area of smelter sites which require reclamation comes to approximately 300 ha. These sites are known to contain more than 87 million tons of waste. Each year this amount increases by new 400,000 tons.

It is obvious therefore, that this site, as well as many other similar sites present elsewhere, called “hot-spots” and disasters, like the last at Baia Mare (Romania), or disaster in Chernobyl, etc. point out the need for open universal (integrated) inventory of all dangerous activities and their possible impacts on the environment, human health and economic activities.

According to a report on Europe’s environment, nearly four million hectares of land, mainly in the Mediterranean and in Eastern Europe, are affected by soil salinization. Soil erosion and soil salinization increase the risk of desertification, which is to be combated within the framework of the United Nations Convention to Combat Desertification (UNCCD).

Biological degradation

It should be stressed that all the types of land degradation described above affect biodiversity of every terrestrial and aquatic ecosystem. Natural ecosystems contain a great diversity of biological activity which is the natural biological “capital” of the earth, and land/soil is no exception. It is estimated that in the global scale, the amount of carbon stored in soils is two to three times higher than the carbon stored in the natural vegetation and standing crops. Soils are important as they sequester carbon removed from the atmosphere, thereby buffering the “greenhouse effect”. Soil flora and fauna are therefore at risk from various degradation processes or application of pesticides. In particular, the soil microbial biomass deserves special attention in the discussion on biodiversity. Breakdown of organic debris in the soil is one of the critical soil functions. Microorganisms are responsible for recycling of plant nutrients, carbon, nitrogen, sulphur, phosphorus from the debris, detoxication of pollutant and complex wastes and suppression of pathogenic

organisms. In summary, any chemical, physical or biological deterioration of land is likely to seriously affect the species inhabiting soils and their functions.

Desertification and drought in countries of Central and Eastern Europe

In countries of Central and Eastern Europe both desertification and drought occur more and more often. "Desertification" means land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities. Desertification is recognised in the South (former Yugoslavia), Hungary and around the Black Sea (Bulgaria, Romania, Moldova, part of Ukraine, Russia), and the Caspian Sea (three Caucasian states – Armenia, Azerbaijan and Georgia). Drought is common phenomena in Poland, Czech and Slovak Republics, also in Western and Central part of former USSR. Many studies on rainfall patterns, ground water tables, soil moisture and biomass production in agriculture and forestry indicate that drought occur in the Balkan region more severely and frequently during the last decades than in former periods. The entire flat and hilly areas of the Carpathian Basin are affected. In Hungary, the last 10 years were the driest in this century. According to the ratios of annual precipitation to potential evapotranspiration in this period the central part of the Great Plain may be identified as a drought affected country. In terms of the climate classification, the dry climate occurs over 16% of Poland's territory, while drier than sub-humid climate dominates. Even in the conditions of the sub-humid climate, long-lasting drought often occurs in Poland. Periodical occurrence of the draughts is one of disadvantageous features of Polish climate. Due to poor water resources, one of the lowest in Europe, inadequate to economy request, negative consequences of draughts are more and more significant in Poland than in other countries with similar climatic conditions. In the years 1950-1990, atmospheric drought of various intensity, range and duration, were recorded 14 times. The drought in 1969 lasted for 19 months and affected 95% of the country's territory. Very often atmospheric drought leads to hydrological drought. The hydrological drought, the effect of many-years deficiency in precipitation, causes decrease in ground water table, concentration of pollutants, affects plant growth, limitations of water in rural population and urban agglomerations. Changing environment leads to very specific phenomena in Poland, called steppe-formation. Climate, plant cover and land use, especially deforestation lead to steppe development. This phenomenon was already reported and studied before the Second World War. Therefore, today in Poland and many other countries of the region, afforestation programme is of a particular significance to combat draught and desertification.

In Europe, deserts can be found only in the area of the arid subtropical climate, i.e., in South-eastern Europe, in the area of the Caspian Sea. It is only in this region of Europe that the ratio of annual precipitation to potential evapotranspiration is lower than 0.65, meeting the definition of arid, semi-arid and dry sub-humid areas as adopted for the purposes of the Convention to Combat Desertification. While presenting a definition of desertification climatically linked to arid zones, the Convention contains provisions relevant for combating land degradation across a wide spectrum of different ecosystems. It is believed that the UNCCD would strengthen the prevention of

land degradation and desertification in countries of Eastern and Central Europe. A more universal coverage of this multilateral instrument should be insured. Measures taken under this Convention by Central and Eastern European countries would greatly enhance the national programming framework for the sustainable development of land based natural resources and better link these countries to international cooperation and partnership initiatives. As at present, out of 22 countries of CEEC only seven are Parties to the Convention.

General impacts of land degradation on the economy and the environment

The natural and climatic conditions in the Central and Eastern Europe have been forcing people to fight for the conservation of land resources in a different way: to avoid acidification in Poland or salinisation in Hungary, to build drainage systems in Belarus or irrigation systems in Bulgaria, Romania or Georgia, to terrace steep slopes in order to prevent land removal (Caucasian countries, former Yugoslavia, Romania), to change field patterns or land use of agricultural system to avoid erosion, etc. Today in many of these countries people have to fight against contemporary causes of land degradation and desertification, resulting both from global changes and from local activities.

The main sectors suffering economically from land degradation, draught and desertification are agriculture (including husbandry and horticulture), forestry, food industry, and tourism. However, it should be stressed that almost every sector of economy can be seriously affected (land use, water management, health, rural and urban planning, transport, various branches of industry, etc). It is difficult to estimate how much money all these negative effects of land degradation cost every national economy. It was already mentioned that for example in Poland the problems occurring due to land degradation would take in some areas up to 150 years to be solved, taking into account actual state of the environment and level of funding. But it should be noted that in many countries of the region the environmental impacts have been seriously decreased and environment investments were significantly increased in the last decade (Table 5).

4. National action needed to bring land degradation to a halt and to alleviate drought effects

Awareness and involvement of people with regard to problems and actions related to land degradation is indispensable for successful solving problems in the framework of the UNCCD. There are many evidences of that. Countries in the region evolved from a command system to a more decentralised form of decision making for natural resources management. This trend is in full conformity with the CCD, which advocates more participatory development. Laws on the restoration of the rights of ownership and for the implementation of a land reform were set in force in all countries. An agricultural structure that is characterised by family farms has been reshaped. But new problems arise for farm management from the ownership of scattered and usually small fields. In several countries large areas of agricultural land are abandoned. The accession to the European Union will probably not ease these problems. The

adoption of environmentally friendly methods of agricultural production and land management is both a prerequisite and an opportunity for private farming in the future.

Today, there are also other reasons which underline the intention of many countries in the region to become Parties to the UNCCD. Among them there are following:

- strong political will to fully participate in the institutions and further agreements regarding the UNCSD follow-up on environmental protection and sustainable development. The linkages between the tree conventions (UNFCCC, UNCBD, UNCCD) are well perceived and it is envisaged that the economic, social and political impacts of these interactions will increase;
- obligation to adapt national environmental strategies and legislation to the EU recommendations signed by accession countries (*aquis*);
- the decision-makers and scientists anticipate that the philosophy and the instruments of the UNCCD are in principle suited to deal with the ecological and socio-economic reasons and consequences of land degradation, not only in geo-climatic zones as they are now defined by the convention but also in other regions. In all those countries there is a strong awareness of increasing threats and of the need for forceful and comprehensive action.

There are also many other benefits, and of course obligations, for countries willing to join the Convention. They might be as follows:

- gain from cooperation with other countries, in designing and implementing its own programmes to combat land degradation;
- improve access to relevant technologies and data for appropriate measures by participation in the work of the Committee on Science and Technologies;
- nominate scientists for inclusion on the roster of experts from which ad hoc panels will be established to deal with specific scientific and technical issues;
- take part in encouraging and promoting financial mechanisms that can help to ensure that adequate financial resources are available for programmes to mitigate the effects of draught and to combat land degradation;
- show solidarity with other countries in facing an urgent and growing task of global dimension and helping to conceive the implementation of the CCD and of the other UN Conventions as an interlocking approach to sustainable development.

The common obligations of all Parties are to:

- cooperate in implementing the UNCCD at all levels, particularly in the areas of information collection, analysis of exchange, research, technology, transfer, capacity building and awareness raising;
- promote an integrated national approach for elaborating appropriate measures and ensuring adequate financial resources for programmes to combat land degradation and to alleviate its economic and social impacts;

- have an option of preparing action programmes for combating desertification following Convention guidelines, or more generally of establishing strategies that focus on the prevention of land degradation or rehabilitation of degraded lands.

It should be stressed, however, that to do so there should be parallel actions on establishing uniform and integrated criteria for land quality assessment, risk assessment procedures for threatened areas, developing new annex for Central and Eastern European region, more open sharing of information and experiences on progress in relevant fields such as: watershed management, water resource management, integrated farming systems, reforestation and agro-forestry, range management, water logging and salinization or alternative sources of energy to enhance land degradation across different climatic, economic and cultural sub-regions (similar as was done after New Delhi or Tashkent conferences or the coordination of such activities as in the Balkan Group).

In many countries of the region there are already different legal acts laying down the principles for sustainable land use, protection of water, soil and natural resources, for sustainable development of agriculture, forestry and other sectors, and involvement of various social groups in setting rules for future sustainable development of the region. All these acts provide the legal grounds for actions aimed at preventing and/or reducing land degradation caused by various factors. In some countries, however, still environmental law must be transposed to the CCD. The state-of-art has been clearly presented in individual national reports. The same concerns national action programmes which should be worked out according to the principles laid down in the Convention; they should explain the principles of international cooperation, data acquisition and reporting systems, future research and education and, of course, it should embrace public awareness.

Table 1. Some figures about the region of Central and Eastern Europe (22 states)

No.	Country	Area thous. km ²	Popu- lation in mill.	Popul. density km ²	Land use (%)				
					Arable land	Orch- ards	Pasture	Forests	Other
1.	Albania	28.7	3.4	118	20	4	14	36	26
2.	Armenia	29.8	3.5	119	16	3	23	14	44
3.	Azerbaijan	86.6	7.8	90	18	5	25	11	41
4.	Belarus	207.6	10.4	50	29	1	15	34	21
5.	Bosnia & Herzeg.	51.3	4.4	87	14	5	20	39	22
6.	Bulgaria	110.9	8.8	79	36	3	16	35	10
7.	Croatia	56.6	4.7	83	20	2	19	36	23
8.	Czech Republic	78.9	10.4	131	40	3	12	34	11
9.	Estonia	45.2	1.6	35	22	-	11	45	22
10.	Georgia	69.7	5.7	82	10	4	29	39	18
11.	Hungary	93.0	10.3	111	54	3	13	19	11
12.	Latvia	64.6	2.8	44	27	-	13	39	21
13.	Lithuania	65.2	3.9	60	38	-	17	28	17
14.	FYR of Macedonia	25.7	2.2	86	21	2	26	30	21
15.	Moldova	33.7	4.5	134	50	13	9	6	22
16.	Poland	312.7	38.8	124	46	1	13	30	10
17.	Romania	237.5	23.2	100	39	3	20	28	10
18.	Russian Federat.*	17175	149.9	9	8	-	5	46	41
19.	Slovakia	49.0	5.4	110	33	-	17	39	11
20.	Slovenia	20.3	2.1	103	12	3	28	50	7
21.	Ukraine	603.7	51.9	87	56	2	12	17	13
22.	Yugoslavia	102.2	11.1	108	36	4	20	29	11

* European part consists 25% of the total area of Russian Federation and it is inhabited by 75% of the total population.

Source: various (Encyklopedia Geograficzna Świata, Kraków 1996; World Resources 1998-1999, web).

Table 2. Climate, relief and main causes of land degradation in the region

No.	Country	Temp. °C	Precip. mm	Altitude m asl	Dominating causes of degradation
1.	Albania	-3 -10 17-26	1480 600-3100	av. 708	deforestation, overgrazing, erosion, fires
2.	Armenia	-5 24	250-300 700-900	360- 4090	desertification, erosion, mudslides, salinization
3.	Azerbaijan	-6 26	150-2000	av. 384	erosion, salinization, mechanical, air pollution,
4.	Belarus	-4 17	600-750	plain max 345	peat excavation, drainage, air pollution, wind erosion, wastes, radiation
5.	Bosnia & Herzegovina	-1 20	730-1975	hilly & mount.	erosion, mechanical (excavation), pollution (heavy metals, SO ₂)
6.	Bulgaria	-1 20	400-1200	2/3 mount.	erosion, heavy metal pollution, coal mining, salinity
7.	Croatia	1-10 19-27	600-1200 3000	hilly	erosion, fires
8.	Czech Republic	0-6 16-20	500-700	75% 300-800	erosion, pollution, acidification, dehumification, compaction
9.	Estonia	-3 –7 16-17	500-700	lowland	wind erosion, compaction, waterlogging, acidification
10.	Georgia	-2 4 26	400-700 3000	mount.	water and wind erosion, pollution, land- and mud-slides, desertification
11.	Hungary	-1 –3 20-23	500-900	80% < 200m	water and wind erosion, droughts, salinization, compaction, acidification
12.	Latvia	-3 17	550-750	60% <100m	wind and water erosion, pollution, acidification, military bases, urbanization
13.	Lithuania	-2 18.5	500-650	av. 100 plains	water and wind erosion, pollution, acidification
14.	FYR of Macedonia	-1 31	500-1200	maunta nous	erosion, pollution, droughts
15.	Moldova	-3 -5 19-22	400-550	60% >150	erosion, pollution, drought
16.	Poland	-1 –4 17-19	600 530-1200	55% <150	erosion, pollution, mining, urbanization, acidification, floods and droughts
17.	Romania	-2 –4 20-30	400-600	hilly & mount.	erosion, pollution, drought and desertification, deforestation
18.	Russian Federat.*	various	500-700	various	erosion, acidification, pollution, mining, droughts, desertification, flood
19.	Slovakia	av. 10	500-900	50% 300-800	erosion, pollution,
20.	Slovenia	-2 –8 20-24	800-3000	mount. hilly	erosion
21.	Ukraine	-3 –7 18-23	400-600	plains	pollution, erosion, compaction, dehumification, desertification and droughts, excavations, radiation
22.	Yugoslavia	-1 23	600-	various	erosion, war conflicts

Table 3. Common anthropogenic pollutants in the states of Central and Eastern Europe

No.	Country	Sulphur dioxide (thousand tones)		Nitrogen oxides (thousand tones)		Volatile org. comp. (thousand tones)	
		1980	1995	1980	1995	1980	1995
1.	Albania	120	120	30	30	30	x
2.	Armenia	x	x	x	x	x	x
3.	Azerbaijan	x	93	x	82	x	37
4.	Belarus	740	380	244	207	549	508
5.	Bosnia & Herzegovina	480	480	45	x	x	x
6.	Bulgaria	2,050	1,484	416	327	2,594	x
7.	Croatia	150	88	100	59	x	x
8.	Czech Republic	2,257	1,091	937	412	435	286
9.	Estonia	240	140	66	43	x	x
10.	Georgia	162	162	188	x	x	x
11.	Hungary	1,633	705	273	182	215	150
12.	Latvia	116	116	54	93	x	x
13.	Lithuania	222	222	158	158	x	x
14.	FYR of Macedonia	10	10	2	2	x	x
15.	Moldova	92	92	35	35	x	x
16.	Poland	4,100	2,605	1,229	1,120	1,036	769
17.	Romania	1,800	560	520	443	440	x
18.	Russian Federation	7,160	2,984	1,734	1,995	x	x
19.	Slovakia	780	238	197	173	149	117
20.	Slovenia	436	176	48	66	x	x
21.	Ukraine	3,850	1,716	1,145	568	1,369	x
22.	Yugoslavia	700	424	47	52	x	x

Source: various - World Resources 1998-1999, web.

Table 4. Occurrence of various types of land degradation in the states of Central and Eastern Europe

No.	Country	Desertification	Drought	Erosion wa/wi	Compaction	Chem. degrad	Salinity alkalin.	Acidification	Other*
1.	Albania		+	+			+		+
2.	Armenia	+	+	+	+	+	+		
3.	Azerbaijan	+	+	+	+	+	+		
4.	Belarus		+	+	+	+		+	+
5.	Bosnia & Herzeg.		+	+		+			
6.	Bulgaria	+	+	+	+	+	+	+	
7.	Croatia			+					
8.	Czech Republic		+	+	+	+		+	
9.	Estonia			+	+	+		+	
10.	Georgia	+	+	+		+	+		
11.	Hungary	+	+	+	+	+	+	+	
12.	Latvia			+		+		+	
13.	Lithuania			+		+		+	
14.	FYR of Macedonia		+	+		+			
15.	Moldova	+	+	+	+	+			+
16.	Poland		+	+	+	+		+	+
17.	Romania	+	+	+	+	+	+	+	
18.	Russian Federat.	+	+	+		+	+	+	+
19.	Slovakia		+	+		+		+	
20.	Slovenia			+		+			
21.	Ukraine	+	+	+	+	+	+	+	+
22.	Yugoslavia		+	+					

Source: various (author, EEA; Agenda 21; UNCSD)

Table 5a. Changing environment in Eastern and Central Europe (examples of emission and waste disposal)

Country	SO emission Thousand tons (%)			NO _x emission Thousand tons (%)			Dust emission Thousand tons (%)			Wastes		
	Change			Change			Change			Thousand tons	Per 1 inh	Kg
	1980	1997	Change	1980	1997	Change	1980	1997	Change	Total	Municip	Per 1 inh
Czech R.	2,257	701	-69	937	-49	-49	1,267	128	-87	89,050	3,200	310
Hungary	1,600	657	-53	273	-25	-25	586	136	-72	68,890	5,000	500
Poland	4,100	2,368	-45	1,219	-23	-23	-	1,182	-	136,650	12,800	320
Slovak R	780	202	-67	197	-37	-37	-	63	-	19,900	1,800	340
Russian	12,130	6,000	-49	3,300	-16	-16	9,651	3,042	-68	-	50,000	460
F. Germany	5,321*	1,468	-72	2,709*	1,803	-33	1,860*	316	-83	276,560	36,970	450

* Germany - data for 1990.

Table 5b. Changing environment in Eastern and Central Europe (examples of facilities and investment)

Country	CO ₂ emission from energz sect. Million tons			Population connected to waste water treatment plants (%)			Forest defoliation (%)			Investments on environment			
	Change			Change			Change			Mil.USD	Per capita	Nat. Inc.	%
	1980	1996	Change	1980	1997	Change	1980	1997	Change	1990	1996	1999	%
Czech R.	166	120	-28	43	73	-20	45	49	-20	-	-	-	-
Hungary	81	59	-27	19	22	-4	12	19	-4	130	270	13	0.6
Poland	442	365	-17	-	47	-2	32	35	-2	437	2271	11	1.6
Slovak R	-	-	-	27	49	2	49	32	2	20	60	10	0.4
Russian	-	-	-	-	55	x	6	9	x	221	1578	1	0.4
F. Germany	1,083	905	-16	80	89	2	16	21	2	1090	1035	172	0.5
										4	0	157	

* in relation to 1997.

Background paper on “Major issues related to the implementation of the UNCCD in countries of Central and Eastern Europe” by Dr. Joachim Woiwode, Head of Division, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Federal Republic of Germany. With the support of the UNCCD Secretariat

TABLE OF CONTENTS

Introduction

Chapter One

Presentation of Major Issues

- 1.1 General observations on factors of environmental changes
- 1.2 Secular trends of land degradation in Central and Eastern Europe
- 1.3 Burdens of industrialisation
- 1.4 The aftermath of war
- 1.5 Agriculture in transition – the challenge to establish an enabling land reform
- 1.6 Drought occurrence in Central and Eastern Europe
- 1.7 The increased need for alleviating the effects of drought
- 1.8 Involvement of scientific and state institutions in drought mitigation
- 1.9 Responses of scientific and political-administrative institutions to the threat of land degradation

Chapter Two

Features and Potential of the UNCCD Implementation Process in Central and Eastern Europe

- 2.1 Background: The road from Rio
- 2.2 Specific features of the Convention
- 2.3 Membership of the UNCCD
- 2.4 Benefits resulting from participation in the UNCCD
- 2.5 Additional regional implementation annex for countries of Central and Eastern Europe
- 2.6 Obligations of country Parties to the UNCCD
- 2.7 National Action Programmes (NAPs) and National Reports (NRs)
- 2.8 Interregional cooperation

Chapter Three

Linkages and Synergies with other Environmental Conventions

- 3.1 Achieving the goals of the three Rio Conventions by joint action.

Conclusion

INTRODUCTION

Since the early 1950'ies the European Countries are growing closer together. At the beginning of this process only western European countries had been involved but, with the start of the 21st century, central and eastern European countries are fully joining in this dynamic. Therefore there is a need to review a set of priority issues with central and eastern European partners.

One of these key topics is the protection of soils. In 1998 a workshop on Soil Protection within the European Union was organized with the participation of the accession-countries. In November 1999 the first European Soil Forum continued this process. The rational for starting this process has been the recognition that the general public has little awareness of the fact that soil is a limited resource that needs to be protected.

Any important human activities take place on the earth's surface. As the uppermost layer of the earth's crust, the soil is the main basis for production in agriculture and forestry; as a result, it is a vital element in feeding a growing world population and in producing renewable and regenerative raw materials.

It is a protective layer and natural filter for groundwater and drinking water. It is a home and habitat for a great range of plants and animals, a genetic reserve. Land provides space for housing and transport infrastructure, for recreational activities, for water storage. It is the prime source for raw materials such as gravel, sand, clay and minerals for various uses; and it is a cultural and geological heritage.

Nonetheless, it seems that our society neither fully understands the great significance of the soil's role in our life nor shows sufficient awareness that soil degradation and even destruction are increasing around the world.

The World Map of the Status of Human-Induced soil Degradation (GLASOD), which has been prepared by UNEP and the International Soil Reference and Information Centre (ISRIC) in the Netherlands, shows that about 20 million km² of visible damage have been caused world-wide by human activities.

A total of 11 % of these areas, or over 2 million km² of degraded soils, has been identified in Europe. This area is equivalent to about one-fifth of Europe's total land area, and it is more than twice as large as the combined areas of France and Germany. One of the main threats to soil conservation in Europe and throughout the world is soil erosion. Indeed, according to the aforementioned report on Europe's environment, soil erosion is still increasing. Over 115 million hectares of soil are suffering from water erosion and 42 million hectares are suffering from wind erosion.

According to a report on Europe's environment, nearly four million hectares of land, mainly in the Mediterranean and in Eastern Europe, are affected by soil

salinization. Soil erosion and soil salinization increase the risk of desertification, which is to be combated within the framework of the United Nations Convention to Combat Desertification (UNCCD).

The Workshop on Land Degradation/Desertification in Central and Eastern Europe was organised to give the opportunity to discuss these problems in the light of the potential for cooperation offered by the Convention.

The main purposes of the Workshop are to:

- Review problems of land degradation, desertification and drought mitigation in Central and Eastern Europe in the context of the UNCCD, taking into account its linkage and synergy with other environmental conventions
- Assist countries of Central and Eastern Europe in the process of their accession to the UNCCD and raise awareness among the countries of the region of the benefits, which could be gained from participation in the Convention;
- Strengthen regional and interregional cooperation, including cooperation between the EU and countries of Central and Eastern Europe on the issues of land degradation, desertification and drought mitigation; and
- Promote suitable environmental legislation in Central and Eastern Europe.

CHAPTER ONE

PRESENTATION OF MAJOR ISSUES

1.1 General observations on factors of environmental changes

Climate variability and human activities cause land degradation. In the past, soil fertility and other significant ecological functions of land were recovering after events of fire, flooding or other forms of natural disturbances or, mostly after disturbances resulting also from human impacts. Under the conditions of our times - population increases, industrialisation and urbanisation – soils tend to lose their ecological and economic productivity in a way that may not be reversible. Today land on every continent is being degraded by over cultivation, deforestation and unsuitable agricultural practices. The ecological value of land resources deteriorates through a continuously increasing consumption of land for human purposes others than for the production of food and renewable goods. The expansion of this kind of land utilisation is - seen from the social and economical angle - unavoidable. But undoubtedly the potential of land for biomass production and its functions within the cycles of water, gasses and nutrients is substantially reduced. There are some prime conditions for the livelihood of people that are related to land: fertile topsoil, vegetation cover, crops for food security, animal and plant biodiversity, adapted to soils and climate, renewable materials and medical agents. They are the main losses as a consequence of the loss of soil fertility. Other forms of loss to human societies resulting from land degradation include also other indispensable properties and characteristics of landscapes such as securing psychological well being and recreational reservoirs.

Such overexploitation of natural resources and devastation of landscapes are generally caused by economic and social pressure, natural catastrophes as drought and floods, bad governance and war. Clearly, floods are largely perceived as natural phenomena, not linked to drylands conditions, and thus seem remote from the subject matter of the UNCCD. But it is also recognized that some land use practices, such as deforestation or elimination of marshlands contribute to the gravity of flooding and these issues can be addressed under the programming frameworks of the Convention. In many parts of the world, strong population growth is the driving force for economic and social pressure on the land. This is not the case in the countries of Central and Eastern Europe that are the subject of this paper.

1.2 Secular trends of land degradation in Central and Eastern Europe

We will consider here only a few characteristics of the long term environmental alteration in the two predominant geographical zones: the Central and Eastern European Plain (Russian Plain) and the Mountainous belts from the Slovenian Alps and the Carpathians to the Caucasus and between the Adriatic Sea and the Black Sea - enclosing the Pannonian, Romanian and Bulgarian Plains.

The Russian Plain is the world's largest plain outside the Tropics. It stretches from the Barents Sea to the Black and Caspian Sea over more than 25 degrees of latitude and from the Baltic Sea to the Urals over 35 degrees of longitude. The Plain occupies one-half of Europe. 356.5 million ha of the total area of 462.8 million ha belong to the temperate zone the remainder part to the boreal and cold-belt zones. It comprises a wide range of soil and vegetation zones as Tundra, Taiga, Mixed-Forests, Steppe and Desert. Annual precipitation varies from 675 - 852 mm in the Taiga-forest zone to 456 - 558 mm in the steppe and 249 - 389 mm in the desert.

Two major historical trends of land use have occurred on the Russian Plain: the expansion of lands used for agriculture and the continuously increasing alienation of land for industrial, social, transportation and other nonagricultural purposes. The extension of the territory occupied by arable lands was most rapid at the end of the nineteenth and the beginning of the twentieth century. It increased in the steppe and foreststeppe zones mainly through deforestation and through the conversion of other types of agricultural lands into plowed fields in the former forest zones. In the mid-twentieth century the expansion of the area occupied by agricultural land and by arable land in particular continued. The territory of arable lands has almost doubled as compared with the situation at the end of the nineteenth century. Alienation of lands for nonagricultural purposes is a result of the rapid growing industry and transportation sector and of the increase in settlements. Nonagricultural uses take now up 5% of the northern Plain and more than 7% of the southern Plain in industrially developed regions.

Forest coverage on the Plain has declined continuously during the last centuries from more than 50% to about 30% of the total area. Deforestation was greater in the southern Taiga-forest area and the steppe. In the zone of

mixed and broad-leaved forests, forest cover has now diminished by one-third and, in the steppe zone, by one-half. Today virgin land exists only in reserves. Intensive transformation of the vegetation of the floodplains of medium-sized and large rivers began as late as the second half of the nineteenth century and reached its peak in the middle of the twentieth century. This is due to the construction of a cascade of dams on the Dnieper, Volga, Don, Kama and other rivers.

As in the case of vegetation, the transformation of soils as a result of human activities stems mostly from agriculture. The level of land management and the degree of fertilization determine the transformation of the physical and chemical soil properties in agriculture. At a low level of land management and with scarcity of fertilizers the soil in the northern part of the Plain remains acid. The content and reserves of humus considerably diminish. The physical properties are considerably impaired too; the density of soil increases while its porosity goes down. All of those changes abruptly influence the erosion of such soils. In particular the proneness to wind erosion increases considerably. Tillage intensifies the biological decomposition and mineralization of organic substances, which brings about an intensive removal of humus and plant nutrients. The same regularity is found in the central regions of the Plain where the content of humus and its reserves in grey and dark-grey forest soils decreased considerably. The loss of humus and the rate of mineralization intensify from the north to the south of the grey forest soil zone in line with the history of the exploitation of these soils. The loss of humus results in a severe disintegration of the topsoil, rapidly intensifying erosion. Large-scale plowing of chernozems started in the nineteenth century. Today chernozems count for more than 80% of the tilled lands. The long-term use of these soils has brought considerably changes in the content and reserves of humus. The most significant losses of humus in the last century occurred in chernozems on the eastern Russian Plain. In the period of the last 100 years the humus content decreased from about 13 - 16 % and the humus reserves from 390 - 480 t/ha to 8 - 10 % and 240 - 300 t/ha. At present, humus equilibrium is not achieved on the whole of the chernozem zone. The doses of organic and mineral fertilizers applied in recent years on the Ukrainian forest-steppe and steppe chernozems still leave a mean annual humus deficit of 0.45 - 0.55 t/ha. Irrigation imposes a very strong effect on chernozems. It has been widely used since the 1960s; the area of irrigated chernozems grew three times since. Irrigation leads in many regions to a rise of groundwater and waterlogging of soils. Irrigation water comes in contact with rising groundwater causing deterioration in the chernozem's water regime and in the landscape hydrology in general. Salts gradually rise to the surface and increase the soil's salinity. Sagging of soils takes place and deforms the surface. Lamination of the soil layers brings about temporary or permanent lenses of surface water.

In the mountainous regions of Southeast Europe deforestation and water erosion are the main features and forces of secular changes. Both landscapes and ecosystems changed considerably. The sedimentation of the eroded material has detrimental side effects on the riverbeds, watersupply systems roads and so on. Amounts of rainfall of above 1000 mm annually in the upper zones caused over long periods substantial soil losses. On agricultural land

they account to 15 -70 t/ha annually. How dramatically soil fertility is impaired by these losses becomes obvious if they are compared with the long-term natural reshaping rate of soils of about 2 - 4 t/ha in these ecoregions. A radical reduction of this severe form of soil erosion will only be achieved if agricultural land use can be abandoned in the higher elevations. In the resorts for winter recreation the construction of roads, lifts and other facilities also contributes to erosion.

1.3 Burdens of industrialisation

Most of the countries in Central and Eastern Europe went through a fast and extended industrialisation in this century. The extraction of nearly all existing raw materials by vast mining activities and the extension of transport systems are part of the process. Beyond the loss of forests, agricultural and virgin land we must mention that vegetation, soils and waters with their habitats for wildlife, in the vicinity of these industries, were extremely devastated through dust and air pollution. Oil pollution of land is widespread going with the drilling sites, pipelines and petrol industries. Persistent substances accumulated in soils and in the food chains. Very often irrigation of polluted water from mining areas caused severe contamination of soils and agricultural products. In large intensively used agricultural areas the use of persistent pesticides lead to a still prevailing soil contamination on large areas.

Naturally acidic soils are characteristic for large regions in Central and Eastern Europe. Heavy applications of fertilizers particularly of ammonium and nitrate, which have acid forming properties, have contributed to the acidification of landscapes with severe effects for soils, waters and vegetation. Very often impediments arise for land use planning through contaminated sites and landfills. Usually these spots do not stretch over a large area but contain high risks for people and the environment due to very toxic substances in soils and wastes.

1.4 The aftermath of war

It is hard to appreciate the magnitude of damages caused to the environment by war, conflicts or civil strife that have a prolonged negative impact on public security. To start with, some Central and Eastern European sites linked to former military/industrial complexes are reported to be heavily polluted. Armaments industries and other military uses of land created in the period of the cold war left behind a large number of hazardous sites. Land heavily polluted with oil derivatives is found in abandoned airfields and garrisons. In many areas, people must still wait for the eradication of these sites due to very high costs of remedying measures. The recent wars in Southeast Europe had tremendous detrimental effects on the land in the affected countries. Hundreds of kilometers of trenches were dug; dug-outs and provisional roads were built for military operations causing tremendous damages to soil and vegetation also in their proximity. In the mountainous and hilly regions those interventions in landscapes aggravated soil erosion considerably. Remaining minefields forbid the use of large areas particularly along the battle lines but also off the road. In Bosnia and Herzegovina up to 5% of the territory is kept

off. The United Nations Mine Action Center estimates that it will take years until cultivation of this land can be permitted again. Similarly the consequences of various wars in the Caucasus caused widespread damages to the concerned mountain eco systems.

1.5 Agriculture in transition - the challenge to establish an enabling land reform

Countries in the region evolved from a command system to a more decentralised form of decision making for natural resources management. This trend, again, is in full conformity with the CCD, which advocates more participatory development. Laws on the restoration of the rights of ownership and for the implementation of a land reform were set in force in all countries. Conditions for this reform may differ. In some countries, the communist regime had imposed large-scale state owned and collective farms as e.g. in the former USSR. Some countries, especially the smaller ones, are on the way to complete their land reform soon. An agricultural structure that is characterized by family farms has been reshaped.

But new problems arise for farm management from the ownership of scattered and usually small fields. Farmers, in most countries, are under pressure with competition of products from foreign markets and low farm incomes. The accession to the European Union for which the governments of the majority of these countries are applying will probably not ease these problems. The adoption of environmentally friendly methods of agricultural production and land management is both a prerequisite and an opportunity for private farming in the future. In several countries large areas of agricultural land are abandoned. Assuming this situation will prevail due to the competition of commodities on more open agricultural markets, decision makers may strive for an approach that will integrate agricultural productivity and nature protection.

1.6 Drought occurrence in Central and Eastern Europe

A number of studies on rainfall patterns, ground water tables, soil moisture and biomass production in agriculture and forestry indicate that drought incidents occurred in the Balkan region more severely and frequently during the last decades than in former periods. The entire flat and hilly areas of the Carpathian Basin are affected. In Hungary, the last 10 years were the driest in this century. According to the ratios of annual precipitation to potential evapotranspiration in this period the central part of the Great Plain may be identified as a drought affected country. Drought conditions similar to those have been observed in Poland, the Slovak-Hungarian region of the Danube Valley, the Vojvodina in Yugoslavia and in bigger parts of Croatia, Romania, Bulgaria, and Albania. Southern Crimea in Ukraine has also suffered. And we must remember that the largest desert in Europe is located in the Russian Republic of Kalmikya.

Perhaps it seems paradoxical to mention drought occurrences at a time when the region is affected by heavy flooding. But, precisely, irregularity in rainfall

patterns also causes punctual floods and landslides. It is often a case of too much water at the wrong time and not enough at the right time.

1.7 The increased need for alleviating the effects of drought

The main sectors suffering economically from drought are agriculture, horticulture and forestry. Unfavourable farming incomes in all Balkan countries become yet more depressed. The food industry, the tourism sector and their employment capacities are also indirectly affected. Extended drought periods are ecologically harmful for many habitats especially habitats of endangered endemic species. While evaluating the causes underlying the increased frequency of damages from drought incidents, data shows that precipitation deficits extended sunshine duration, distinct winter warmth and heavier winds lead to very low soil moisture contents. The effects of drought to biomass production in agriculture and forestry have in the past often been amplified through improper land uses such as unsuitable soil cultivation, crop rotation, wrong choice of plants and badly managed agrotechnology including irrigation techniques. Measures directed to alleviate impacts of dryness and drought for the agribusiness must start in these areas. Other sectors are forced to adjust to changes of the climatic conditions in very different ways too.

Also the drinking water supply in most of the Balkan countries is closely linked to the annual rainfalls and their effects on hydrological stream flows, ground water tables and recharge of water reservoirs. Complex intervention measures that can help considerably in the reduction of risks from droughts are: the introduction of advanced soil and water conservation methods, improved irrigation technologies, integrated nutrient and pest management in agriculture and programs for afforestation, precise ground water table control and a foresighted use of water reservoirs. The establishment of a drought mitigation strategy for the region could be facilitated under the UNCCD. It would require that a risk assessment determines the sectors of the environment, economy and society in which drought causes the major damages. The approach should not miss an estimation of the impacts on national parks and other areas with high ecological value for the protection of nature despite of obviously difficult methodological problems.

1.8 Involvement of scientific and state institutions in drought mitigation

Monitoring climate patterns including frequencies, intensity and duration of drought occurrence and the elaboration of technologies that allow to adjust to changing climatic conditions are well-established branches of agricultural and environmental science in all of these countries. Scientists of different disciplines are participating in the activities of the International Commission on Irrigation and Drainage (ICID). Drought mitigation is an important issue for this association. ICID recently installed a European Regional working Team on Drought (ERWTD) that comprises Balkan countries.

Environment and Water Management ministries in these countries are familiar with problems arising from dry periods and serious droughts, as they have to

launch measures that can support farmers and other people in acute situations. It is the common opinion of scientists and decision makers that a National Drought Commission (NDC) should be established which addresses research gaps and conducts guidelines and plans for prevention measures and concerted action in cases of damages from extended dry periods and drought. A UNCCD framework could assist scientists and ministry officials involved in the discussion of a Balkan Drought Mitigation Strategy and in organising international cooperation. A Hungarian NDC will be set up next year as Hungary takes a leading interest in this topic. Plans under consideration include:

- NDC's will be established in each Balkan country aimed for elaborating plans for the prevention of droughts and for mitigation measures in cases of their occurrence,
- a Balkan Regional Drought Committee should be called into being consisting of members from the NDC capable of organising exchange of information, coordinating research and elaborating concerted action for drought prevention and intervention measures,
- a Balkan Regional Drought Center should be created to cover all aspects of drought prevention and mitigation of drought effects including
 - surveying and forecasting climatic and hydrological changes,
 - management of water resources, irrigation and soil conservation,
 - agricultural crop production, animal husbandry and forest management,
 - environmental and socioeconomic impacts,
 - policy and legislation recommendations.

The center should be situated at an appropriate existing institution, networked with associated institutions in other countries. An important task of this center will be to establish links with international organizations as with the Center for Agricultural Research in Dry Areas (ICARDA), ICID, World Meteorological Organisation (WMO), International Standardisation Organisation (ISO), International Soil Science Society (ISSS), Secretariat of the UNCCD and others.

The aim of setting up a strategy that enables the prevention of droughts, the alleviation of the effects of droughts and the planned institutional structure for realising this task, are in full conformity with the objectives of the UNCCD for the fight against desertification. The Convention can stimulate concerted action and collaboration to meet the challenge. A well-elaborated comprehensive drought mitigation strategy could be a pillar of the National Action Program (NAP) required from affected parties to the Convention and a distinct element of a Regional Action Programme.

1.9 Responses of scientific and political-administrative institutions to the threat of land degradation

The break down of the communist regime provided for the Central and Eastern European countries an opportunity to set up a political and administrative system that is committed to improved efficiency and

participation of the people; this applies also to the realms of environmental protection and management of natural resources. Land reform has been already mentioned. Most countries renewed their legislation for soil, water and air protection as well as for land conservation and the maintenance of habitats for their specific flora and fauna. Almost all countries have acceded to the international agreements corresponding to these tasks on the international level as to the UNFCCC, UNCBD, the Ramsar Convention and many others. The majority of countries of Central and Eastern Europe will in the course of this year or next year also join the UNCCD. The enforcement of the law through appropriate directives is equally important.

A crucial step was the transition from the planning processes to democratically supervised procedures. All governments launched and published Environmental Policy Plans and Environmental Action Programs. Most of them are strictly linked to budget and medium term financial planning. The plans make the objectives of governments and parliaments transparent and provide the opportunity of public discussion and intervention. Local communities and non-governmental organizations have to play their part so those plans meet the interests of the people. In some countries with a strong communist legacy, these participatory processes are further evolving.

Plans for better management of natural resources and environmental protection can only be successfully implemented when they are professionally sound and apply justifiable rules. The understanding and modes of land use planning were to be changed fundamentally. It is an indispensable political task that land use planning follows principles of sustainability. Its objectives have to be adjusted accordingly and new means must be elaborated. This is also a challenge for Central and Eastern European countries as well as for the countries of the existing European Union.

Land use planning should achieve targets in distinct geographical regions that can be described as follows:

- Targets for the land use in peripheral regions with a low population density.
- Large scale preservation of material cycles and energy fluxes in the environment and of the biological diversity, which restricts human intervention and allows for the evolution of soil organisms and wild flora and fauna.
- Protection of sufficiently large areas in which anthropogenic substance inputs and other interventions are only slightly or not in the least detrimental to dynamic equilibria and where habitats are not fragmented.

Targets for land use in rural areas:

- Preservation of soil quality for biomass production appropriate to the site.
- Preservation of the water infiltration and retention capacity as well as of the biological diversity and activity of soils.
- Enhancement of sequestration of carbon in soils and vegetation and the prevention of greenhouse gases.
- Preservation of wild plants and animals also in agricultural landscapes.

Maintaining the nutrient balance and regeneration of depleted soils through fertilising.

- Avoiding the accumulation of persistent toxic substances in soils, the food chain, salinization and eutrophication of areas worthy of nature protection.

Targets for land use in urban areas:

- Minimisation of sealed land and preservation of the infiltration capacity of rainfall, biological activity and the gas exchange of soils.
- Preservation of habitats for wild plants, animals and soils for the production of certain foodstuffs also in urban landscapes.
- Cycling of nutrient flows from supply and discharge from the urban population as far as possible in the same region.
- Reduction in the depositing of toxic substances in soils, water, air and the avoidance of the enrichment of persistent substances in soils and sediments.

Central and Eastern European countries have established or are on the way to developing a high level of institutional capacity in science, policy making and administration. Agriculture, forestry and environmental science have a long tradition and a high standard in these countries so that the accomplishment of these targets will be feasible in the future.

CHAPTER TWO

FEATURES AND POTENTIAL OF THE UNCCD IMPLEMENTATION PROCESS IN CENTRAL AND EASTERN EUROPE

2.1 Background: The road from Rio

The United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992 was far-reaching in addressing the tasks to protect the climate and biological diversity and to find ways for the sustainable use of soil and water resources. It laid the foundation for joint political efforts to establish international agreements in these fields. The United Nations Convention to Combat Desertification (UNCCD) is a milestone on the path the Community of Nations has taken to implement measures for the responsible use of natural resources and sound economic development in the dry regions of the world. The spirit of this Convention was the political will to remedy the causes of the great famines in dry regions, particularly in Africa, that is why the name of the Convention is linked with this challenge though its aims were more comprehensive from the beginning.

The implementation of the Convention to Combat Desertification offers new opportunities for the struggle against land degradation also for the governments and also for the people in the Central and Eastern European countries. The large membership of the Convention and the praxis of its implementation have demonstrated that the Convention not only addresses desertification, the most serious form of land degradation, but a wide range of

other phenomena leading to the destruction of ecological, economic and social functions related to land and landscapes.

2.2 Specific features of the Convention

The main objective of the UNCCD is to combat desertification and mitigate the effects of drought through effective action at all levels, supported by international cooperation and partnership arrangements with a view to contributing to the achievement of sustainable development in affected areas. While presenting a definition of desertification climatically linked to arid zones, the Convention aims at also combatting all other forms of land degradation, developing sustainable technologies for agriculture and forestry, improving land use rights and promoting participation of rural people- particularly women - in land use planning and decision making.

Soil protection although a very complex problem is necessary for sound ecological balance and sustainable land use; consequently, there is an urgent need for closer scientific, institutional and legal cooperation in this area. The Convention provides the necessary framework for the exchange of experiences on measures to protect soil and water resources and to develop sustainable forms of land use between countries which are not affected by long periods of serious drought and desertification. It also provides rules and mechanisms for technical and financial support to attain these goals. Its instruments provide the basis for an integrated approach in finding solutions to the socio-economic and ecological challenges. Though they have been developed mainly for dry areas, with the application of the Convention it becomes evident that they can be used also for combatting land degradation and promoting sustainable land use in other geo-climatic regions, including Central and Eastern Europe.

The Convention recognises that, without coordinated and cooperative responses to desertification and land degradation and its consequences, the effectiveness of multilateral remedial action would continue to be limited and dominated by lack of coordination and duplication of efforts. A cooperative international instrument was therefore considered the best way of overcoming such problems. The UNCCD has been specifically designated to encourage partnership agreements and coordination, and is unique as a legally binding international instrument, which explicitly stresses partnerships rather than aid.

2.3 Membership of the UNCCD

The Convention has entered into force and became legally binding for country Parties on the 26 December 1996. As of today, 163 countries and the European Union are Parties to the Convention (see annex 1). It remains open for accession by all other countries.

The global nature of the Convention should be expressed in its universal membership. It is important to ensure a wider participation of countries of all regions in the UNCCD since this Convention is dealing with a key long term ecological challenge linked to the sustainable management of land based natural resources. The political decision-makers and scientists recognise that

there are close professional and operational linkages between the three Conventions (UNFCCC, UNCBD and UNCCD) launched at UNCED and that all countries should actively participate in all of them.

The Convention is a complex document whose implementation calls for innovative methods requiring active social interaction between various actors. A thorough knowledge of the Convention's provision, especially by countries which relied previously on central planning, was therefore a prerequisite for its effective implementation at the national level. That is why in order to facilitate the process of accession to the Convention by countries of Central and Eastern Europe the CCD Secretariat organized national awareness seminars and national awareness days in interested countries of the region, with the financial assistance from The Netherlands and Switzerland. These took place during the period from 1996 to 1999 (Armenia, Azerbaijan, Belarus, Bulgaria, Estonia, Georgia, Latvia, Lithuania, Moldova, Russian Federation, Romania and Ukraine). At present, out of 22 countries of Central and Eastern Europe seven countries acceded to the Convention and became its Parties (Armenia, Azerbaijan, Czech Republic, Georgia, Hungary, Moldova and Romania). It is expected that by the end of the year 2000 a majority of the countries from this region will become Parties to the Convention. This clearly demonstrates that there is a strong political will to fully participate in the institutions and further agreements with regard to the follow-up of the UNCED.

2.4 Benefits resulting from participation in the UNCCD

Being a legally binding multilateral instrument the UNCCD contains provisions related to the rights and obligations of participating countries. Advantages of accession to the Convention might be as follows.

By acceding to the UNCCD a country becomes a Party to the main international instrument dealing with the urgent and growing global problem of land degradation which allows it to:

- gain from cooperation with other countries in designing and implementing its own programmes to combat land degradation and mitigate the effects of drought;
- improve access to relevant technologies and data for appropriate measures by participation in the work of the Committee on Science and Technology established under the Convention ;
- nominate scientists for inclusion in the roster of experts from which ad hoc panels are being established to deal with specific scientific and technical issues;
- take part in encouraging funding and promoting financial mechanisms that can help to ensure that adequate financial resources are available for programmes to combat land degradation.

Accession to the UNCCD may greatly enhance the national programming framework for the sustainable development of land based natural resources. Parties to the Convention are entitled to participate in the networking of relevant institutions to be established to support the implementation of the

Convention. These networks may be expanded to include the various aspects of land degradation relevant to countries of Central and Eastern Europe.

By acceding to the UNCCD a country will receive a good opportunity to cooperate closely with all Rio conventions. It will also show solidarity with other countries in facing the effects of land degradation and droughts especially in its most serious form as desertification. It is an urgent and growing task of global dimension and helping to conceive the implementation of the UNCCD and of other UN related conventions as an interlocking approach to sustainable development.

2.5 Additional regional implementation annex to the UNCCD for countries of Central and Eastern Europe

During the first session of the Conference of the Parties to the Convention (COP-1) in 1997, some countries of Central and Eastern Europe made statements concerning their wish to establish an additional regional implementation annex to the UNCCD that would cover the specific concerns of these countries. Those statements were understood as an indication of the firm resolve of those countries soon to become Parties to the Convention.

Informal consultations for countries of Central and Eastern Europe were organized by Ambassador Bo Kjellen of Sweden, former Chairman of the Intergovernmental Negotiating Committee. A preliminary outline of an annex, as prepared by Ambassador Bo Kjellen, was considered. A broad agreement was reached on it and there was a general agreement that it should be submitted to COP with the understanding that this draft was not binding for any country of the region, but represented a general consensus on the contents and structure of an annex. Consequently, Armenia, as a Party to the Convention, transmitted it for consideration by the COP-3.

At its third session the Conference of the Parties in its Decision 7/COP.3 invited the countries of Central and Eastern Europe and all Parties to the Convention to continue, under the auspices of the Bureau of the Conference, the process of consultations on this draft with a view to adopting it at its fourth session. The Conference also invited the countries of Central and Eastern Europe to continue their efforts towards their accession to the Convention. The Bureau of the Conference at its meeting held on 23 March this year decided that the draft regional implementation annex for countries of Central and Eastern Europe - as submitted at the third session of the Conference of the Parties (COP 3) by Armenia - constitutes a proposed amendment to the Convention and that no further notification to Parties is required for its consideration and possible adoption at the fourth session of the Conference. This draft is available in the room.

The general purpose of such an annex is to provide guidelines and arrangements for the effective implementation of the Convention in affected country Parties of the region in the light of its particular conditions. It is expected that this annex would encourage Parties in Eastern and Central

Europe to cooperate among themselves in implementing the UNCCD. The specific purposes of this annex are to provide guidelines for the preparation and implementation of the National Action Programmes (NAPs) to combat land degradation; desertification and drought in affected the Parties of the region. Provisions of an annex will also provide guidelines for the preparation of subregional, regional and joint action programmes.

It is expected that such programmes will stimulate the technical, scientific and technological cooperation in the region of Central and Eastern Europe. It will promote development of monitoring indicators and of information systems at all levels and their integration in worldwide systems of information. A new annex may also provide a basis for the development, adaptation and transfer of relevant environmentally sound technologies within and outside the region.

The programmes could be prepared and implemented in collaboration with other Parties or regions. These provisions would encourage Parties in Eastern and Central Europe to cooperate with other countries, including, for example, in a pan European context, the countries from Western Europe. It might be expected that a new annex would stimulate, inter alia, exchanges in Europe on issues of land degradation. Under a new annex international cooperation requirements in support of national efforts will be identified, thereby creating, for example, an enabling environment for investments and encouraging active investment policies. It is expected that under a new annex, cooperation between countries of the region and bilateral and multilateral partners, as well as financial cooperation institutions will be better focused.

2.6 Obligations of country Parties to the UNCCD

Being a binding multilateral instrument the UNCCD contains provisions that are also related to obligations of the participating countries. There are several categories of obligations under the Convention. The common obligations of all Parties, including those unaffected by desertification, are spelled out mainly in articles 2, 3, 4, 5, 6, 8, 12, 14, 16, 17, 18, 19 and 20 of the Convention. They relate principally to international cooperation in implementing the UNCCD at all levels, particularly in the areas of information collection, analysis and exchange, research, technology transfer, capacity building and awareness building, to promoting an integrated approach in developing national strategies to combat desertification/land degradation, and to ensuring that adequate financial resources are available for programmes to combat desertification and mitigate the effects of drought.

Within the framework of the Convention, affected country Parties who notify their intention to do so are requested to prepare and implement National Action Programmes to combat desertification. They have also the option of establishing strategies and priorities for sustainable development that focus on the prevention of land degradation or rehabilitation of degraded lands. Affected countries undertake to promote awareness and facilitate the participation of local population in efforts to combat land degradation and mitigate the effects of drought. These countries are also requested to strengthen relevant existing legislation. It is expected that options for

cooperation in promoting sustainable development will be greatly enhanced under the Convention.

Developed country Parties would cooperate with affected countries in the fields of technology transfer, scientific research and development, information collection and financial resources.

All Parties can implement their obligations jointly, either through existing or prospective bilateral and multilateral arrangements. These provisions would encourage Parties in Eastern and Central Europe to cooperate among themselves in implementing the CCD and to establish cooperative arrangements with other countries.

One of the obligations of Parties to the Convention is to contribute to the core budget of the Convention. These contributions are made annually on the basis of an indicative scale approved by the Conference and based on the UN scale of contributions.

2.7 National Action Programmes (NAPs) and National Reports (NRs)

The purpose of National Action Programme is to identify the factors contributing to desertification/land degradation and practical measures necessary to combat desertification, land degradation and to mitigate the effects of drought. NAPs are considered as the central element of the strategy to combat desertification and mitigate the effects of drought. These Programmes should incorporate long-term strategies and be integrated with national policies for sustainable development. In NAPs, the respective roles of government, local communities and land users, as well as resources needed are being specified.

Having become parties to the UNCCD, affected countries of Eastern Europe started the process of NAPs preparation (Armenia, Azerbaijan, Georgia, Moldova and Romania). Due to financial difficulties in these countries and further to their request the CCD Secretariat and some other organizations (UNSO, UNEP) are providing them with financial assistance. In 1999 such assistance was provided by the CCD Secretariat to Armenia, Azerbaijan, Georgia and Moldova using voluntary contribution from Switzerland. The Secretariat sought the close involvement of the UNDP country offices. This year Moldova completed the preparation of its NAP. The Government approved the programme and soon Moldova will start its implementation.

Accession to the Convention and preparation of NAPs gave an important impetus to coordinated actions in countries of Eastern Europe at national levels aimed at combating desertification and land degradation.

The flow of information is crucial to the successful implementation of the Convention and the CCD Secretariat has striven to maximise the information reaching country Parties. Developed country Parties are interested in obtaining as much information as possible on activities, legal frameworks, and infrastructure of countries that seek assistance.

In accordance with provisions of the Convention and decisions of the Conference, the affected country Parties are required to periodically prepare national reports on the implementation of the UNCCD for consideration by the Conference. The countries are provided with the UNCCD Help Guide, which constitutes a widely accepted baseline of information that is needed for the evolution of the process of the UNCCD implementation. This Help Guide may be used, as appropriate, also by Eastern European countries, wishing to prepare their NRs, which are needed for initiating a process that will eventually lead to a comprehensive elaboration of activities incorporated in NAPs. In this sense, it can be used as a baseline for potential work programmes that can be reviewed with donor countries in the context of partnership arrangements.

The NRs can be considered as the first step of a longer term management effort to collect, analyse, disseminate and exploit the range of environmental information needed for the sustainable use of land based natural resources. This document is a cornerstone on which efforts and commitment will be measured by all relevant organisations outside the region and especially by donor countries that have acceded to the Convention. The NR can thus be regarded as a tool that will create a link between national focal points, their respective Ministries and concerned developed country Parties.

In 2000, the Secretariat has provided financial assistance to affected country Parties from Eastern Europe (Armenia, Azerbaijan, Georgia, and Moldova) to prepare such reports (Source of funding – Finland and Switzerland). A regional consultative meeting on NR preparation was organized by the Secretariat to synchronise the processes of preparation and presentation of their national reports. The Secretariat is preparing synthesis of these reports and will submit it to the fourth session of the Conference of the Parties (COP-4) to be held this year in Adelaide, Australia from 25 September to 6 October.

2.8 Interregional cooperation

In accordance with provisions of the Convention affected country Parties may prepare, *inter alia*, sub-regional and/or interregional action programmes to combat desertification with a view to harmonise, complement and increase the efficiency of their national programmes. Further to this provision the CCD Secretariat convened in Tashkent, Uzbekistan in June 1997 an Interregional Conference on the Implementation of the UNCCD in CIS countries. The Conference endorsed the need for the preparation of an Interregional Action Programme (IRAP) involving the countries of Central Asia and Eastern Europe. The Conference decided that the following areas could be considered as priority elements of the IRAP :

- Improvement of management tools for economic development and environmental protection;
- Awareness raising and ecological education, including the promotion of information systems;

- Assessment, monitoring and early warning systems for combatting desertification and mitigating the impact of drought;
- Use of transboundary water resources and monitoring of their usage on interstate levels;
- Use and rehabilitation of pastures;
- Rehabilitation of forests;
- Rehabilitation of natural resources and cultural heritage including mechanisms to combat wind and water erosion, the preservation of biodiversity and restoring of indigenous knowledge systems;
- Environmental degradation and improvement of public health;
- Rehabilitation of lands degraded due to wars, industrial activities and nuclear wastes;
- Energy; and
- Desertification induced migration and its socio economic impact.

The countries' proposals on the IRAP are reproduced in a document available in this room. Due to the fact that some major countries from Eastern Europe, which participated in the Tashkent Conference, are still not Parties to the Convention the Secretariat had to postpone elaboration of the IRAP. The next stage of preparing the IRAP, which should be based on the adequate representation from all three regions, i.e. from Central Asia, Eastern Europe and Transcaucasus, calls for the necessary membership of these countries in the Convention.

There are other possibilities for interregional cooperation. At present, several countries from Central and Eastern Europe are current or potential candidates for adhesion to the European Union. As such, they would seek convergence with European Union legislation concerning environment and sustainable development. The CCD could facilitate a potential framework for cooperation between them and other European Union countries, including the members of the Northern Mediterranean Annex of the CCD.

CHAPTER THREE LINKAGES AND SYNERGIES WITH OTHER ENVIRONMENTAL CONVENTIONS

Climate is the most critical factor in determining the sustainability of agricultural systems, and the hot, dry areas are the most difficult to achieve sustainability. Much attention is being directed towards maintaining the multi-functionality of soils but this will become more difficult in warmer, drier climates. Climate change will almost certainly change a region's soils with respect to carrying capacity, resilience, sensitivity to stress and the potential reversibility of damage to them. It is important that the impact of climate change on soils is considered in parallel with impacts caused by unsustainable land management. Similarly, many land use practices (biomass burning, deforestation, overgrazing, and clearing of vegetation) can impact local climate.

There is a growing recognition that drylands biodiversity represents important biological resources that are essential for the development of those areas,

and whose conservation and sustainable use is therefore imperative. It has been amply demonstrated that desertification, when interacting with climate can have negative impacts on biological diversity, and therefore, the biodiversity of arid regions is faced with threats from among others, desertification and drought. On the other hand, desertification and drought in essence prevent rehabilitation of biodiversity, whereas the loss of biodiversity in the dryland areas indirectly brings about desertification. This cycle becomes difficult to break, as the main culprit is the vagaries of weather, whose consequences are in most cases somewhat unpredictable.

The components of the biodiversity of dryland areas have entered into the pharmaceutical industry as raw materials of various medicaments. Indeed the active principles of several drugs are based on or derived from plants or plant-based materials, whose origins are the arid regions of the world. The cosmetics industry also depends to a significant degree on derivatives of materials from dryland plants or components thereof. Examples abound where whole plants or plant parts, particularly those from the arid environments have been used as sources of the active principle ingredients of the drugs and cosmetics, pointing to the immense value of dryland biodiversity.

3.1 Achieving the goals of the three Rio Conventions by joint action.

The leading idea of the three Conventions is to achieve sustainable development. The requirements to alleviate the social implications of man-made deterioration of the environment and the needs for improving the living conditions of people are described in the UNCCD. It is obvious that combating land degradation and mitigating drought also improves the health of soils, and the condition of vegetation and waters including their habitats for wild organisms. One crucial feature of healthy soil is the organic layer enabling biomass production determined by geological, hydrological and geographical conditions. Through a joint approach for achieving and maintaining sustainable and resilient landscapes, the aim of combatting land degradation within the framework of the UNCCD can be accomplished with the parallel achievement of several goals of the UNFCCC and the UNCBD.

Pursuant to the Kyoto Protocol, terrestrial sinks for carbon dioxide - that means forests, other kinds of vegetation and soils - will become of tremendous political importance to all countries for the endeavour to tackle their obligations in order to mitigate climate change. The same is obvious with regard to the commitments in order to maintain biological diversity. Reshaping soil fertility - the term is used in a broad sense here - and resilient vegetation adapted to the geographical conditions are chief prerequisites to meeting this objective. A joint approach aiming to create synergies with the measures for combating land degradation also for mitigating climate change and ensuring biological diversity requires that opportunities and limitations in each field must be scrutinised. High scientific expertise is needed to determine the realistic extent of the win-win possibilities. The complex issue regarding the quality of biological diversity in the context of a broad spectrum

of performances of land use has to be considered. The quantification and cost-benefit analysis of synergy effects in the different realms of action raise considerable problems. Appropriate proposals for local demonstration and countrywide action have to be developed and implemented. These tasks can only be solved with the help of well-thought-out methods and efficient institutions for land use planning and rural extension.

Despite such challenges, it seems likely that some governments and players in the private sector will become attracted to putting these opportunities, in collaboration with scientific institutions, into practice in the not so far future. It would be of general interest if these synergies could be demonstrated under real conditions and the orders measured in physical and monetary terms. Projects eligible for funding from the Global Environmental Facility should be launched for this purpose also in Central and Eastern European countries. They would prove the significance of these synergies for a process leading to sustainable development much more clearly than theoretical considerations can do.

It is worth mentioning here that the National Action Programmes under the UNCCD encourage action at the local level.

Local area development programmes (LADP) – which are to become an integral part of the UNCCD National Action Programmes – present a tremendous opportunity for combining biodiversity protection and socio-economic promotion of the local population. LADP present a territorial platform where conservation measures can be brought in synergies with development measures foreseen under the UNCCD. Such local level synergies would enhance programme sustainability, participatory decision making, communities empowerment and would reduce the wasteful and costly juxtaposition of uncoordinated projects.

CONCLUSION

This paper describes the background of challenges to be discussed at the workshop. Bearing in mind the major issues, presented as chapter one, the features and potential of the UNCCD implementation process in Central and Eastern Europe, presented as chapter two, and the linkages and synergies with other Environmental Conventions, presented as chapter three, one may conclude as follows:

The UNCCD entered into force on 26 December 1996. Today there are 163 countries and the EU are members of the UNCCD-family. This impressive political commitment documents that there is a rising acceptance for the global dimension of land degradation, desertification and drought throughout the world and it indicates that the Convention is regarded to be a instrument with a strong potential.

The UNCCD improved in its efficiency. The past years showed the flexibility of the instrument and its handling by the Parties. The first session of the Conference of the Parties in 1997 already clearly indicated that there is a

common feeling and consensus to deal with an additional regional implementation annex to cover the specific concerns of the Central and Eastern European countries. The Convention may be amended accordingly at COP4 to take place in Adelaide, Australia from 25 September – 6 October 2000.

Taking into account the above mentioned trends, one may suggest, that, for the moment, there is no need to follow the suggestions from a group of scientists and NGOs to create a new comprehensive “International Soil Convention” which, to meet their concern, should incorporate the existing UNCCD. The potential of the present instrument must fully unfold. On the one hand, common global principles, as for example listed in the UNCCD, are needed. But on the other hand, specific solutions according to the different regional, ecological, and social necessities must be found according to the principle “Think globally, act local!” This principle is embedded in the UNCCD.

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Statement by Mr. Philip Dobie, Director, UNSO

Mr. Chairman,
Dear organisers of this workshop,
Dear friends and colleagues,

It is with great pleasure that I address this workshop on behalf of the United Nations Development Programme. May I take this opportunity to thank the Government of Belgium for their hospitality and the Permanent Secretariat of the Convention, the European Commission and the Hanns-Seidel Foundation for their usual devotion and professionalism in the organisation of this workshop.

Mr. Chairman,
Ladies and Gentlemen,

I trust that some of you are familiar to the limited work that we have been undertaking in this part of the world. I would like to make a statement directed at those participants that have not had the chance to work with us. Some of you may have heard and read a lot about UNDP's new management and transition process that tries to re-define our mandate. What does this mean for our involvement in the implementation of the CCD in this region?

Generally speaking, UNSO's overall mission is to help the countries that are affected by desertification and drought to promote sustainable development in the drylands, and to deal effectively with desertification and drought. Our primary purpose is to provide assistance at national level, through the UNDP country offices, to assist countries implement the CCD primarily by setting policy appropriate policy and by building institutional capacity. In support of this primary function, UNSO is building on and further develop its current status as a leading source of information and knowledge on drylands issues. UNSO is the face of UNDP in advocacy relating to drylands issues (globally, regionally and nationally). In order to fulfill its tasks, UNSO is helping UNDP to thoroughly mainstream the principles of drylands development into its policies and operations in affected countries

As you know, the UN has a short history with the affected CIS countries and the countries of eastern Europe and the UNSO involvement in this same region has been limited until recently. UNSO has supported the five Central Asian Republics since 1998 and has thus enjoyed great credibility because of our outstanding leadership and exposure in the region.

UNSO uses conduits to access policy-makers in these new republics. We first delineate the problem of land-degradation and then persuade policy-makers that the harmful consequences can be reversed. This is accomplished through private meetings with government officials and site visits to affected areas. Once governments accept the need for action, a massive advocacy and social mobilization campaign is launched to publicize the national commitment to attack the causes of poverty in the country. After

successfully building institutional capacity for popular participation, then UNSO can begin the task of planning and designing programs to arrest the degradation of the land.

Currently, virtually all affected CIS countries have initiated implementation of the CCD. Progress to date has been impressive, particularly in light of the brief history of the Convention and the limited funds available for this new region of UNDP/UNSO. The initial phase of NAP implementation in these countries has begun. The result is that UNSO has successfully secured government ownership of the NAP process in a number of countries.

Why is it then that so much of the dry areas of this region are still home to such poverty? The answer is not simple, but I think that much lies in systems of governance. Governance is a term that conjures up images of government structures, institutions and law. All of these are important, but at its root the term “governance” simply means the way in which societies manage themselves. In the drylands we have seen time after time that what is needed are a blend of central policies that favour investment in the poorest people, and the devolution of decision-making to the local level. Civil society must be given a voice and a role in managing resources. The National Action Programme process that emerged from the CCD is an excellent example of governance in action. The emphasis on local decision-making with central policy review is a splendid example of how we can help to bring about change in the drylands. If our policies favour the poor, and we ensure that poor people are empowered to make decisions that affect them, then we will have learned from those dryland countries that have already demonstrated the potential for the future. Where such policies do not exist, we have seen the results, be it in the countries of the former Soviet Union or in Eastern Europe. Over-centralization leads to catastrophic failures of irrigation systems, ignoring the voices of poor people leads to endemic poverty.

In a number of meetings that I recently had in European capitals, I noticed a strong convergence of interests between the donors Governments and UNDP in addressing the issue of mainstreaming CCD related areas into the overall development cooperation planning and policy making processes. Based on the lessons and challenges learnt so far, and in the context of UNDP/UNSO’s experience in the affected countries, there is undisputed need for continued support to dryland development in this region. Most of the affected countries are faced with resource constraints and will in the short-term continue to seek resources from external partners.

All of us are engaged and committed to making the desertification convention not just an intellectual or technocratic exercise but an effective tool for consensus building, partnership and participation. We are Mr. Chairman, working to make the CCD work. In particular, UNDP/UNSO will also in the future be committed to:

- promote local governance and the voice of the grassroots;

- strengthen the good governance capacity of institutions that make policy at national and local level;
- build capacity for improved aid coordination with regard to mainstreaming of NAPs into national development policy issues;
- promote a system of country level impact indicators that reflect the extent to which the NAP and subsequent programmes succeed in influencing policy.

Mr. Chairman,

What does all this mean to you? It means that if we continue, together with my colleagues in the UNDP Country Offices and from the CCD Secretariat, to strive to make this convention work, this region will could well become the showcase of NAP processes that are well integrated within the National Development or anti-poverty strategies. I therefore appeal to the external donor partners, and on whom we rely for funding to help us to use this convention not merely as a technocratic document producing exercise, but as a tool to draw attention to the issues of poverty and sustainable rural livelihoods in a region that is too often forgotten from the agenda of the international community.

Thank you very much for your attention.

Background Paper “EU Policies and Instruments in the field of Land Degradation/Desertification, especially in the CEEC and NIS”, by Ms. Constanze Miller and Mr. Dominik Meier, Miller and Meier GbR, Political Advisory Office, Bonn Germany.

Table of Contents

Abbreviations.....	
Introduction.....	
1. Legal and Political Framework of the EU Environmental Policy.....	
1.1 EU Level.....	
1.2 International Level.....	
1.2.1 International Conventions.....	
1.2.2 Relations to Developing Countries.....	
Lomé Convention/ACP Partnership Agreement and EDF.....	
ALA Agreements and Funds.....	
Mediterranean Agreements and MEDA.....	
1.2.3 NIS and TACIS, CEEC and PHARE.....	
2. EU Accession Strategies for the Environment.....	
3. Community Assistance in Addressing Desertification and Land Degradation.....	
3.1 Agricultural Measures.....	
3.2 Structural Policies.....	
3.2.1 Structural Funds.....	
3.2.2 Cohesion Fund.....	
3.3 EIB Loans.....	
3.4 LIFE.....	
3.5 Research Programmes.....	
3.5.1 Fifth Framework Research Programme.....	
3.5.2 International Co-operation INCO II.....	
3.5.3 Joint Research Centre.....	
3.5.4 European Environment Agency.....	
3.6 TACIS.....	
3.7 PHARE.....	
3.8 ISPA.....	
4. Conclusion.....	
5. Documents and Addresses.....	

Abbreviations

ACP	African, Caribbean and Pacific States of the Partnership Agreement
ALA	Asian and Latin American States having signed EU Co-operation Agreements
AP	Accession Partnership
CAP	Common Agricultural Policy
CCD	Convention to Combat Desertification
CEEC	Central and Eastern European Countries
DISAE	Development of implementation Strategies for Approximation in Environment
EAGGF	European Agricultural Guidance and Guarantee Funds
EAP	Environmental Action Programme
EC	European Community
EDF	European Development Fund
EEA	European Environment Agency
EIB	European Investment Bank
EMP	Euro-Mediterranean Partnership
ERDF	European Regional Development Fund
EU	European Union
FP	Framework Programme
INCD	Intergovernmental Negotiating Committee for the elaboration of an international Convention to Combat Desertification
INCO	International co-operation outside the EU
ISPA	Instrument for Structural Policies for Pre-Accession
JRC	Joint Research Centre
LIFE	Community Financial Instrument for the Environment
NIS	New Independent States
NPAA	National Programme for the Adoption of the Acquis
PCA	Partnership and Co-operation Agreements
PHARE	Programme of aid for economic reconstruction in Poland and Hungary
RTD	Research and Technological Development
SAPARD	Special Accession Programme for Agriculture and Rural Development
SCR	Common Service for External Relations
SMAP	Short and Medium-term Priority Environmental Action Programme
SME	Small and Medium Enterprises
TACIS	Technical Assistance to the Commonwealth of Independent States of the former Soviet Union
TAIEX	Technical Assistance Information Exchange Office

Introduction¹

By signing the Convention to Combat Desertification (CCD) in 1994 and ratifying it in March 1998, the European Community has committed itself to addressing desertification in developing countries, the candidate countries and within its own Member States and to fulfilling the principles of the convention. During the elaboration phase, the EC has participated in all meetings of the Intergovernmental Negotiating Committee for the elaboration of an international Convention to Combat Desertification (INCD), which has elaborated the text of the convention in five negotiating sessions since 1992.

The EU follows the definition of the CCD and understands by desertification: "Land degradation in arid, semi-arid and dry sub-humid areas resulting from climatic variations and human activities."² On the basis of this definition, desertification³ comprises a great number of processes that lead to a reduced capacity of dryland areas to produce useful outputs. Part of it are the land degradation, soil erosion and declining soil fertility, loss of vegetation cover, reduced availability and decline in the quality of water supplies and a fall in the biological diversity of plant and animal life. Even desertification in the narrower sense, i.e., the extension of deserts at the borders of desert areas, is a serious problem already, but desertification according to the comprehensive definition of the CCD is an even greater threat to millions of farmers and herders.

The process of desertification does not only affect regions in Africa, but also areas in all other continents, including some EU Member States, and has become a world-wide problem. The main focus of the CCD's and also the EU's involvement in addressing desertification remains on regions of the African continent.⁴

Desertification is caused both by anthropogenic factors and by climatic conditions. In combating desertification, the EU therefore follows an integrated approach, which particularly supports projects for improved practices of agricultural land use and water management as well as projects to prevent rural exodus and to promote alternative energies in order to reduce deforesting. In addition, the EU supports a large number of research programmes, which, among others, deal with the following research fields within the desertification process:

- soil conservation and regeneration methods,
- water resource management techniques,
- genetic improvement of tropical dryland crops,
- use of remote sensing technologies to assess land degradation.

¹ The opinions expressed in this document are the sole responsibility of the authors and do not necessarily represent the official position of the European institutions.

² Art. 1 of the CCD.

³ In this background paper the terms "desertification" and "land degradation" will be used interchangeably.

⁴ In 1986 already, the EC adopted an European Action Plan for the Protection of Natural Resources and Combating Desertification in Africa (COM(86)16 final).

The EU has provided financial support to programmes and projects which aim at addressing desertification in its own Member States, candidate countries and third countries. The EU's financial support for its Member States concentrates on the dryland regions of the Northern Mediterranean. Here, the EU promotes measures to combat desertification in the context of the LIFE Programme, the Fifth FP, and the general agricultural and rural development, in accordance with the guidelines of the CCD and the international consensus on best practices in this field.

Since the range of approaches for addressing desertification is so wide, different Directorates General and Services of the European Commission (Development, External Relations, SCR, Environment, Research, Joint Research Centre, Agriculture and Regional Policy) are dealing with this field. In 1998, the European Commission established an Expert Group on Desertification with key officials of the Commission and EU Member State governments, with the Directorate General for Development having the main responsibility. In 1997, the Commission published a review of EC policies, programmes, financial instruments and projects in the field of desertification, entitled "Addressing Desertification", which is now being revised for the fourth Conference of the Parties to the UNCCD to be held in 2000.⁵ In addition, the Commission introduced several mechanisms for co-operation with other international organisations such as the OECD, World Bank, FAO, UNDP and other UN Agencies.

The structure of the background paper is as follows: The first chapter gives a survey of the legal and political framework of the EU environmental policy. At the EU level, the Environmental Action Programme (EAP), which is the basis of the Community's programmes in the environmental field, is of central importance. At the international level, the EU underlines its global political commitment by participating in numerous international conventions and by pursuing an intensive political, financial and legal co-operation with third countries.

Because of the essential importance of the enlargement process to the CEEC, the second chapter centres on the EU's accession strategy in the environmental sector. Here, the complete adoption of the environmental *acquis communautaire*⁶ presents a particular challenge to the candidate countries.

The third and last chapter deals with the Community assistance in the environmental field and presents the relevant EU programmes that comprise, among others, components for addressing desertification and land degradation in EU Member States, the CEEC and NIS.

⁵ European Commission, Addressing Desertification. A review of EC policies, programmes, financial instruments and projects, Luxembourg, May 1997.

⁶ The term *acquis communautaire* describes the primary law of the European Union and Communities, including directives, regulations, and decisions and all the principles, policies, laws and objectives that have been agreed upon by the EU.

1. Legal and Political Framework of the EU Environmental Policy

1.1 EU Level

With the adoption of the Single European Act in 1986, measures in the environmental field obtained their own legal basis and environmental aspects were integrated into other fields of community policy. In the Maastricht Treaty from 1992, the EU defined environmental policy as a community task and introduced qualified majority voting for this field. A new horizontal approach to the implementation of the environmental objectives of the EU was developed. This approach leaves the EU Member States a certain freedom to adapt to the specific circumstances in their countries.

According to Article 174 of the Amsterdam Treaty (1997), the EC environmental policy is based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay.

It is guided by the following objectives:

- preserving, protecting and improving the quality of the environment;
- protecting human health;
- prudent and rational utilisation of natural resources;
- promoting measures at the international level to deal with regional or world-wide environmental problems.

The responsibilities of the Community and the single EU Member States in the field of environmental protection are, like all other Community activities, based on the principle of subsidiarity. The Community only enters into action if certain environmental problems can be solved more efficiently at the Community level than at the Member State level. This mainly affects the areas of atmospheric, marine and radioactive pollution.⁷ The EU also has the possibility of concluding international agreements for all environmental fields that affect more than one Member State. The EU legislation in the environmental field only fixes minimum standards that, according to Article 176, do not prevent the Member States from maintaining or taking reinforced national protection measures if these are compatible with the Amsterdam Treaty.

The framework for Community legislation concerning the environment has over the years been presented in action programmes with specific duration. The Fifth Environmental Action Programme (EAP), entitled "Towards Sustainability" (1992-2000) has been a turning-point in the European environmental policy. This was the first initiative of the Commission to promote sustainable development.

⁷ For example, since the Treaty does not provide a specific legal basis for soil policy, there is no soil policy as such at Community level and therefore no funding instrument aimed directly at soil protection. Nevertheless, the Community has developed policies on agriculture or environment which impact on soil.

The EAP pursues the following five objectives⁸:

- (1) strategies for seven environmental priority issues (climate change, acidification, bio-diversity, water, urban environment, coastal zones and waste) and for the management of risks and accidents;
- (2) target sectors into which environmental concerns should be integrated (industry, energy, transport, agriculture and tourism);
- (3) broadening the range of instruments;
- (4) information, transparency of approach and development of the concept of shared responsibility;
- (5) the international dimension reflecting global issues and the Rio Conference.

The EAP underlines the importance of assessing the environmental impact of programmes and projects. In 1985, an environmental impact assessment in the planning phase has become obligatory for all projects, i.e., the Member States should consider environmental aspects when planning their decisions. The EAP provides a policy background for the reform of the Common Agricultural Policy (CAP) and the Structural Funds, the creation of the Cohesion Fund and the development of the Fifth Framework Programme for Research (FP) and LIFE, which all contain components to address desertification.

Since the Fifth EAP ends in 2000, the Commission presented to the Helsinki Summit in December 1999 the Global Assessment of the implementation of the Fifth Environment Action Programme. This assessment shall provide the basis for an overall review of the progress made with integrating environment and sustainable development in Europe and for the preparation of a sixth action programme to be adopted by 2001. The fields the Community wants to take more into account in the sixth EAP comprise, i.a., the soil erosion and the necessity to integrate the objectives of UNCCD into the EU policies.⁹

The thematic orientation of the environmental policy of the EU covers a wide range of areas, such as ozone depletion, global warming, water and air quality, waste management, waste disposal and processing, novel and genetically-modified foods, chemical substances, industrial risks and biotechnology. The area of nature conservation, which comprises global environmental subjects, such as the reduction in the diversity of species, global climatic changes, the depletion of the ozone layer and the continuing deforestation the world over, includes as well the combat of land degradation and desertification in the narrower sense.

⁸ Commission of the European Communities, Communication from the Commission, Europe's Environment: What directions for the future? The Global Assessment of the European Community Programme of Policy and Action in relation to the environment and sustainable development, 'Towards Sustainability' COM(1999) 543 final, Brussels, 24.11.1999, p. 5.

⁹ "Degradation and loss of soil in particular through erosion, contamination, sealing (buildings, roads, etc) and changes in its structure is worryingly high. Soil loss through human activity is some 10-50 times higher than through natural erosion. There is a need to identify the relationship between Community policies and intervention and soil problems to enable a decision on the development of a coherent approach at Community level. It is also necessary to integrate soil management objectives, in particular objectives of the UN Convention to Combat Desertification into our policies." (COM(1999)543 final, Brussels, 24.11.1999, p.15.)

Among the long-term priorities of the EU environmental policy are the environmental problems in the candidate Countries and the complete implementation of the environmental acquis as well as a more consequent inclusion of the environmental dimension in all EU policies. In the short run, the Commission suggests a gradual approach based on the priority objectives of the Agenda 2000 and the Kyoto Protocol. The Agenda 2000 includes environmental matters in different fields: On the one hand, in the context of the reform of the CAP and the Cohesion Policy, and, on the other hand, in the context of the enlargement strategy for the admission of the CEEC.

1.2 International Level

1.2.1 International Conventions

International co-operation is becoming more and more important for the EU environmental policy. The EU, which is endowed with a legal personality, is a contracting party to 37 environmental Conventions, Protocols and Amendments and has signed another 15. The Commission negotiates agreements in accordance with Article 228 of the EC Treaty and submits them to the European Parliament and the Council of Ministers, which has the final power of decision. In order to tackle both regional and global environmental problems, the Amsterdam Treaty fixes the promotion of measures at the international level as one of the Community's objectives in the field of environmental policy.

The Community has been a driving force in many of the negotiations in the current framework of international environmental law and is involved in the work of international organisations. The legal binding EU regulations determine the norms in agreement with the respective international expert organisations. The European Commission endeavours to harmonise the different national rules by establishing Community directives. Since not all Member States have signed and ratified the numerous international agreements about environmental issues, the Commission acts as a catalyst for developing common policies and practices.¹⁰

In the field of nature protection, flora and fauna the Community is party of seven distinct agreements, three of which have world-wide coverage: the Convention on Biological Diversity, the Convention to Combat Desertification and the Bonn Convention on the Conservation of Migratory Species.¹¹

¹⁰ The EU has signed several international conventions for the protection of fauna and flora and has developed corresponding provisions which cover the protection of wild birds, the conservation of natural habitats and of wild fauna and flora, whaling, the protection of animals prized for their fur, the import of skins of certain seal pups and products derived therefrom, animal experiments, the tropical rainforests, the Community's forests, zoological gardens, desertification and the Alps.

¹¹ The CCD, in accordance with article 34(2) and (3) of the United Nations Convention to combat desertification in countries seriously affected by drought and/or desertification, particularly Africa, was signed by the Community in Paris on 15 October 1994. In a Decision of 1998 (98/216/EC), the Council underlines that desertification is a world-wide environmental problem caused by a complex interaction of different factors. The Council also emphasises the Community's intention to continue and further intensify its engagement in the fields

1.2.2 Relations to Developing Countries

Since the Maastricht Treaty, the relations between the EU and third countries have been largely characterised by the promotion of a sustainable economic and social development in the developing countries. Within the framework of its strategy to integrate environmental matters into all Community policies, the European Commission supports the developing countries' efforts to respond to global environmental issues and to implement the major UN Environmental Conventions on climate, biodiversity and desertification. The EU encourages the developing countries' participation in these agreements, and the Commission will continue to mainstream the requirements of these UN Conventions into EU economic and development policies through strategies and action plans.

The development co-operation policy of the EU is governed by three main policy frameworks which cover different geographical regions and support amongst other fields the funding of projects to address desertification.

Lomé Convention/ACP Partnership Agreement and EDF

The Lomé Convention which is currently in its fourth term provides the legal and policy framework for financial and technical assistance to the ACP states. The main financial instrument of the Lomé Convention is the European Development Fund (EDF). The current eighth EDF provides 12 967 Meuro for development aid and 1 158 Meuro in loan capital. The fourth Lomé Convention will be replaced by a new 20-year partnership agreement, which will be signed in June 2000. The financial envelope agreed for the period 2000 to 2007 amounts to 13.5 billion Euro, and an additional 1.7 billion Euro is available in EIB loans.

This agreement contains environmental protection as a central aspect, which has to be considered in the implementation of structural measures by ACP States. Among the environmental policy objectives, the combat of desertification, the protection of certain species and the preservation of the tropical rainforests are of particular priority.

ALA Agreements and Funds

The EU has signed bilateral and regional Co-operation Agreements with thirty countries in Asia and Latin America (ALA). The co-operation between the EU and the ALA Countries includes trade policy agreements, measures of economic co-operation, the strengthening of the political dialogue as well as technical support. The implementation of the agreements follows specific guidelines for financial and technical co-operation, which comprise projects for the protection of the environment and natural resources. In the context of economic co-operation, measures of education, technological transfer, environmental protection and farming are promoted.

Mediterranean Agreements and MEDA

At the Barcelona conference in November 1995, the EU introduced a Euro-Mediterranean Partnership (EMP) with the countries of the middle Maghreb,

covered by the Convention. In the case of the CCD, all EU Member States have concluded the Convention by depositing their instruments of ratification.

the Mashrik countries, the Palestinian territories, Israel, Cyprus, Malta and Turkey. From 1995 to 1999, the partner countries received financial support amounting to 4 685 Meuro. The financial basis for the EMP is the MEDA Programme which supports financial and technical measures in the economic and social fields. The MEDA Programme is intended to contribute to the common interests in the three sectors of the EMP: the reinforcement of political stability and democracy, the creation of a Euro-Mediterranean Free Trade Area and the development of an economic and social co-operation. Yet in 1990 a Mediterranean Environmental Technical Assistance Programme (METAP) was launched in order to address the environmental problems of the Mediterranean region. In the framework of the EMP, the Short and Medium-term Priority Environmental Action Programme (SMAP) was established in 1997. The SMAP provides the common basis for environmental objectives in the Mediterranean region. One of the five priority areas of this programme concerns the combat of desertification. In addition, the sub-programmes of MEDA, MED-Campus and MED-Urbs, contain components in the field of environmental protection.

These three main policy and financial frameworks for the relations of the EU with developing countries are complemented by thematic and research programmes, such as the budget lines for environment, for action to promote tropical forests, for co-financing NGOs as well as for decentralised co-operation. These budget lines support mainly pilot projects, small-scale NGO projects or research studies and cover, i.a., measures in the field of desertification, such as soil conservation, protection of forests or agricultural techniques in dryland areas.

The much bigger thematic budget line Food and Food Security funds increasingly actions which guarantee long term food security, including soil conservation and forestry measures, the improvement of food stocking as well as other measures to mitigate the effects of drought.

In addition, the EC has launched several programmes for research in developing countries since the 1980s. The International Co-operation programme (INCO), introduced in 1995 within the framework of the fourth Framework Programme for Research (1994-1998), provides the policy and funding framework for research in all developing countries and for international scientific co-operation with all non EU countries.

The first sub-programme for developing countries INCO-DC encouraged a sustainable management of renewable natural resources, research into soils, water and biotic resources and sustainable improvement of agricultural production. The new INCO-DEV sub-programme within the Fifth FP aims to support developing countries in their efforts to keep up with the global challenges, such as technological advance, globalisation, population growth and competition for natural resources. Within INCO-DEV the policy research theme "Natural resource use and economic production; adapting to globalisation and ensuring harmony with the environment" assists research into desertification.

The international co-operation with the Mediterranean region concentrates on the socio-economic modernisation and the management of scarce water resources.

NIS and TACIS, CEEC and PHARE

Since the transformation process in Eastern Europe and Central Asia, the EU has taken on a central role in encouraging the reforms in the CEEC, NIS and Mongolia. The environmental dimension is considered a priority task within the EU relations to these regions, because the political and socio-economic transformation processes have far-reaching consequences on the environmental conditions of these countries.

The PHARE and TACIS programmes cover parts of a wide range of EU initiatives in favour of the CEEC and NIS, aim to assist the process of structural economic reform and provide technical assistance in these regions. By means of trade and co-operation agreements as well as by association agreements (Europe Agreements), the EU develops political relations and extends trade relations but also forces a comprehensive reform policy on its partners. The bilateral Europe Agreements prepare for economic, social, political and cultural rapprochement of the EU and its partner countries.

2. EU Accession Strategies for the Environment

The intended accession of the CEEC to the EU is a greater challenge in the field of environmental policy than all previous EU accessions. This is mainly due to the numerous environmental problems inherited from the socialist past of these countries. However, the applicant countries with their large areas of unspoiled nature contribute to an extension of biological diversity in Europe.

The EU's environmental acquis is an essential starting-point for the creation of economically and ecologically sustainable framework conditions. The full compliance with the environmental acquis, which the Agenda 2000 demands, can only be successful in the long run. As regards the adoption and implementation of the environmental acquis, the EU takes on the role of a mere catalyst for the acceleration of the corresponding measures. The Agenda 2000 gives the EU a new financial framework for the period 2000-2006, sets out an enlargement strategy for the EU and the associated countries and underlines that with the enlargement, cross-border environmental issues will become more important for the EU. The enlargement strategies for the environment identify key priority areas and objectives which are incorporated into the accession treaties.

The candidate countries have already started the adoption of the environmental acquis in national law.¹² The setting up of priorities and realistic schedules requires a comprehensive assessment of the environmental situation of each candidate country. Another priority are the legislative and administrative gaps that must be closed through an exhaustive comparison

¹² The EU has developed a "Guide to the Approximation of the EU Environmental Legislation" (revised and updated version of the Commission Staff Working Document, SEC(97) 1608 of 25.08.1997), which is to serve as a point of reference for the approximation of environmental legislation. In addition, the Commission's TAIEX office for the field of the home market and the DISAE facility for the other areas of the environmental acquis offer support to the candidate countries.

between the existing national laws and EU environmental legislation. The so-called „screening“, which was introduced for the first states in March 1998, and the setting up of „tables of concordance“¹³ are considered central instruments for the identification of legal gaps in the applicant countries.

EU environmental legislation comprises today about 300 legal acts, including directives, regulations, decisions and recommendations. In addition, a large number of policy documents are of relevance for EU environmental policy. However, for the preparation of the accession to the EU, the associated countries in Central and Eastern Europe have to align their national legislation and administrative practices with only about 70 directives and 21 regulations.

The most common form of EU environmental legislation are directives. They are binding for all EU Member States, but at the same time they take into account the legal and administrative traditions as well as the environmental and economic conditions in each EU Member State. Regulations are directly binding acts that cannot be implemented into national law. Thus, regulations only become relevant when a country has already joined the EU. Decisions specify detailed administrative requirements or update technical aspects of regulations or directives.

The implementation of the environmental acquis requires the enlargement of the administrative structures necessary for environmental management. The candidate countries are required to develop, in co-operation with the EU, national strategies for the gradual approximation of the environmental acquis and to start their implementation. In addition, the acquis communautaire is to be considered for any new investments. By establishing these framework conditions, the EU creates the premises for an early integration of environmental aspects into the socio-economic development of the candidate countries, even before they have been admitted to the EU.

In December 1999, the European Commission has definitely accepted the latest versions of the Accession Partnerships (AP) for ten Middle and Eastern European candidate countries. The APs are the central instruments for the reinforced pre-accession strategy, the pre-accession aid and the participation in Community programmes. Thus, they unite all forms of EU support in one single framework for each candidate country. The APs include the areas in which, from the EU's point of view, the countries have to make priority efforts to prepare for accession. Each AP is complemented by a National Programme for the Adoption of the Acquis (NPAA). These NPAA's list the progress that each country has made with the fulfilment of the Copenhagen criteria and with the adoption of the acquis communautaire.

In addition, the European Commission concludes every year a Financing Memorandum with each candidate country, which determines the projects

¹³ In its Guide to the Approximation of European Union Environmental Legislation, the Commission suggests the use of a provision-by-provision Table of Concordance for reporting on transposition of directives. This tabular form helps to compare national laws, institutions and procedures with the requirements of a directive. Such a survey can later be used as a basis for the texts that the Member States have to put at the Commission's disposal to prove the implementation of the EU directives.

within the priority areas of the APs and NPAAAs. In this way, the EU's financial assistance is linked to the progress the candidates have made.

In the year 2000, the accession negotiations with the candidate countries about the chapter "environment" have started. In addition to the adoption of the environmental acquis, the EU requires the candidate countries to take into consideration the environmental dimension in all economic and political areas. Here, the efforts made should rather concentrate on combating the causes of the problem and not only give priority to the elimination of present environmental damages.

The EU has asked the candidate countries to develop their own environmental strategies by the middle of the year 2000 and to implement the programmes for the approximation of their environmental legislation immediately. Moreover, such plans should incorporate strategies for the financing of public and private investments as well as for ensuring their security. Here, the mobilisation of proper national resources is essential, since the Community's financial support in the framework of the approximation strategy can cover only a small part of the need.

The EU's financial instruments assisting the candidate countries are the following: the ISPA Programme for the specific support for the environmental infrastructure, the PHARE Programme for the strengthening of the institutional capacities and the reduction of environmental pollution caused by industry, and the SAPARD Programme for measures of landscape architecture and rural infrastructures.

The candidate countries can only claim the different pre-accession assistances (PHARE, ISPA, SAPARD) if they respect the short-term priorities listed in the APs. One of these priorities is the environmental sector. The European Council in Luxembourg at the end of 1997 has again stressed the importance of the candidate countries' active participation in the accession negotiations so that these countries can continually familiarise with the EU's policies and working methods. After an adequate adoption of the Europe Agreements, all candidate countries from central and eastern Europe can participate in the Community programmes, among which are the programmes in the environmental sector.

3. Community Assistance in Addressing Desertification and Land Degradation

The EU provides different kinds of financial instruments and programmes for the environmental sector for different groups of countries, such as the ACP states, the ALA states, the Mediterranean region, the CEEC, the NIS and the EU Member States. Each of these programmes embodies components to address desertification in the framework of the broad definition of the UNCCD.

To address desertification within dryland areas of the EU Member States, the following programmes have been established, which will be presented in detail in the course of this chapter:

- Agricultural Measures on the basis of the Common Agricultural Policy
- Structural Policies; Structural Funds and Cohesion Fund
- LIFE Programme as part of the European Action Programme for the Environment
- Research Programmes on the basis of the Fifth Framework Programme of the European Community, Joint Research Centre and European Environment Agency

While the agricultural measures and the structural policies are intended exclusively for the EU Member States, the LIFE programme and the Fifth FP are also open to the candidate countries. In addition, both programmes contain specific components for an intensive co-operation with other third countries.

The loans granted by the EIB serve particularly the promotion of investment programmes within the EU, but they are also of benefit to the candidate countries and other third countries.

The programmes TACIS for the NIS and PHARE for the CEEC both incorporate components for the environmental sector. The EU has also established the new financial instrument ISPA as a special preparation for the candidate countries. This instrument supports big infrastructural projects in the fields of environment and traffic.

Geographically, this study focuses mainly on the regions of the CEEC and NIS. Therefore, the financial instruments and thematic budget lines for the ACP Countries, Asia, Latin America and the Mediterranean region, which include fields of projects for addressing desertification, will not be presented in detail in this chapter. Moreover, this chapter provides only a brief survey of the EU's agricultural measures and structural policies, which comprise exclusively programmes for the EU Member States.

3.1 Agricultural Measures

The European Agricultural Guidance and Guarantee Fund (EAGGF) is the financial basis of the Common Agricultural Policy. The Guidance Section of this fund supports mainly measures in the field of common regulation of agricultural sector markets, but also, and to an increasing degree, the development of rural areas. Because of the environmental policy dimension of agricultural measures, the EU is striving for an increased integration of environmental protection into the agricultural and rural development policy. The intensive forms of farming are a major strain on the environment, expand the risk of water pollution, reduce the water supply and lead to soil degradation.

In order to prevent such consequences on the environment, the EU has developed the Agri-environment Programme and the Agro-Forestry Programme in the course of the general reform of the Community's CAP in 1992. The Agri-environment Programme compensates farmers for the losses of income and additional costs they have to bear because of environmental measures and encourages them to introduce farming methods compatible

with environmental protection. The Agro-Forestry Programme aims at supporting the development of forestry activities in agriculture, in particular the improvement in forest resources and new forms of countryside management. Environmental measures that promote the combat of desertification in the agricultural policy sector, are supported by the European Commission in the framework of reforestation and soil conservation programmes, measures to reduce the impact of agricultural production methods on the environment, actions to monitor and prevent forest fires as well as research programmes.

3.2 Structural Policies

3.2.1 Structural Funds

The Structural Funds belong to the most important financial instruments for the support of the priorities of the Amsterdam Treaty of balanced and sustainable development and of a high level of environmental protection. The Structural Funds are aiming at a better socio-economic cohesion within the EU and at the support of the EU's poorest regions. There are four funds, two of which support measures relevant to address desertification: the European Regional Development Fund (ERDF) and the Guidance Section of the EAGGF. Since 1994 already, the Structural Funds have financed projects that unite environmental protection and regional development, measures accompanying the CAP, and measures in the fishery sector. The different regulations governing the implementation of the Guidance Section include the combat of climatic hazards and the development of forests in rural areas.

In the framework of the Structural Funds programme period of 2000-2006, the EU is striving to promote the inclusion of environmental considerations in areas such as transport, energy, agriculture, industry and tourism, by means of regional development strategies. Regional development plans that are to be supported by the Structural Funds have to encompass a description of the prevailing environmental conditions and an assessment of the environmental impact of the measures proposed.

In the framework of the ERDF, the TERRA Programme was launched in 1997 in order to support the development of integrated spatial planning strategies through pilot activities in vulnerable areas of the EU, comprising soil erosion and desertification.

3.2.2 Cohesion Fund

The Maastricht Treaty introduced a financial instrument complementary to the Structural Funds, the Cohesion Fund. Unlike the Structural Funds, which are intended to help reduce regional disparities, the Cohesion Fund contributes to individual projects rather than programmes and supports only the two areas environment and trans-European networks relating to transport infrastructure.

The actual beneficiaries of the Cohesion Fund are Spain, Greece, Portugal and Ireland (states with a per capita GDP of less than 90% of the Union's average). By means of the Cohesion Fund, the European Commission is striving to support especially the implementation of the environmental directives on water supply, urban waste water and urban waste, but also erosion control and reforestation measures and improved management of scarce water resources. The new financial perspective for the period 2000-2006 keeps the priorities of the Cohesion Fund unchanged. It is provided with

3 billion Euro a year, a growing percentage of which (ultimately 50%) will be used for environmental projects.

3.3 EIB Loans

The European Investment Bank (EIB) finances environmental projects within and outside the EU and fosters the environmental dimension in all the other projects the Bank supports. In 1999, the EIB lent a total of 31.8 billion Euro for investment. 27.8 billion Euro supported investment within the EU, 2.4 billion Euro went for integrating the candidate countries with the Union, and 1.6 billion Euro went to other regions. Within the EU, 6.2 billion Euro were intended for environmental protection. Of this sum, 45 % were used for water and waste water projects, more than 40% for improving the urban environment, and the rest for preventing air pollution.

Outside the EU, the EIB concentrated in 1999 on the support of the EU's pre-accession-policy. For the period 2000-2003, an additional pre-accession facility of 8.5 billion Euro, and, for the period 2000-2007, a new EU financial mandate for the CEEC amounting to 8.7 billion Euro have been planned. These loans are intended to reduce the disparities between the candidate countries and the EU and to support economic modernisation and the taking over of the *acquis communautaire*. In 1999 already, 700 million Euro went for projects to improve the environment, to secure the energy supply and to support industrial and SME investment.

3.4 LIFE

With the LIFE Programme, the EU has created its main instrument for support and further development of EU environmental policy and legislation. LIFE aims at co-financing actions both in nature conservation and in other fields of the environment. LIFE was launched in 1992 as a part of the Community's Fifth EAP. Between 1996 and 1999, the EU made a contribution of 450 million Euro for the LIFE-II Programme, 5% of which benefited countries outside the EU. The total number of almost 100 projects contained the action fields of technical support, nature conservation and pilot actions, including projects related to desertification and land degradation.

LIFE II centres on the following three thematic programmes, which also offer support for activities to address desertification:

- LIFE-Environment: innovative and demonstration actions for industry; demonstration, promotion and technical assistance actions for local authorities; and preparatory actions to support community legislation and policies.
- LIFE-Nature: actions aiming at the conservation of natural habitats and of wild fauna and flora of EU interest.
- LIFE-Third Countries: technical assistance in the establishment of environment administrative structures, nature conservation actions and demonstration actions to promote sustainable development. Eligible countries are third countries bordering on the Mediterranean and the Baltic Sea other than the CEEC which have signed association agreements with the European Union. Through its support of institutional and capacity building, LIFE-Third

Countries contributes to the strengthening of national environmental policies and therefore to the increase of environmental protection in the EU-bordering regions. In addition, the programme LIFE-Third Countries is an useful instrument to support the implementation of the EAP objectives and to strengthen relations with international organisations, regional networks and international NGOs.

For the third phase of the LIFE Programme from 2000-2004, a total of 613 Meuro mainly for technical support has been planned, 6% of which are intended for the thematic programme LIFE-Third Countries.

3.5 Research Programmes

3.5.1 Fifth Framework Research Programme

The Community has undertaken research into desertification for years, but mainly outside Europe. The first research initiative in southern Europe was the European Programme on Climatology and Natural Hazards (EPOCH) in 1989. Within the Community's Fourth Framework Programme for Research (1994-1998), the Environment and Climate Programme included research into processes and factors which lead to land degradation and desertification in Europe and supported the implementation of the fourth regional annex of the UNCCD concerning the northern Mediterranean.

These initiatives are continued within the new Fifth Framework Programme (FP) of the European Community for research, technological development and demonstration activities (1998 to 2002) which was approved in December 1998 for a maximum overall amount of 14.96 billion Euro. This programme underlines the need to strengthen the contribution of research to policy making.

The Fifth FP consists of four thematic programmes: Quality of life and management of living resources, user-friendly information society, competitive and sustainable growth as well as energy, environment and sustainable growth. Three horizontal programmes forward the three priorities of Europe's research policy: Confirming the international role of Community research, promoting innovation and encouraging SME participation, and improving human research potential and the socio-economic knowledge base.

The Fifth FP considers the environmental dimension as a key criterion. Within the Fifth FP, central account is given to the environment, including desertification, by the thematic programmes „Quality of life and management of living resources“ and „Energy, environment and sustainable growth“.

The Fifth FP earmarks 2 125 Meuro for the thematic programme “Energy, environment and sustainable development”. Within this programme the key action „Global change, climate and biodiversity“ deals with the areas of desertification and land degradation, including the assessment and understanding of global and climate change processes, the interaction between terrestrial and marine ecosystems, the assessment of biodiversity as well as the enhancement of institutional capabilities for the implementation of international treaties.

Under the same thematic programme the key action „Sustainable management and quality of water“ concentrates on the development of purification technologies, the protection of water resources, such as the

prevention of their salinisation, as well as on the improvement of water management systems in arid regions.¹⁴

3.5.2 International Co-operation INCO II

Within the Fifth FP the international co-operation in the field of research and technological development (RTD) follows two complementary routes:

First, the international co-operation dimension, which is integral to each of the other specific programmes, allows the European research community to benefit from the knowledge and expertise of third countries and institutions, through their participation in projects of the 5th FP. The researchers of many countries in central and eastern Europe can apply in the same way as EU nationals.

Second, the horizontal programme “Confirming the international role of Community research” with a total amount of 475 million Euro fosters only specific FTE measures that are of significance to countries or regions outside the Union and that are not covered by the other parts of the FP. Among these are strategic measures for the candidate countries, other CEECs, the NIS and Mongolia as well as the countries in the Mediterranean region and the developing countries.

The co-operation activities in the horizontal programme which are directed at the candidate countries are limited to certain types of accompanying measures in order to accelerate the reform of the scientific structure and technology sector in the candidate countries and to promote the existing research centres and research capacities. Thus, the candidate countries have the possibility to become fully associated to the Fifth FP.

The Fifth FP supports the efforts made by those NIS and CEEC that are not in the pre-accession phase, (Copernicus 2) as regards the establishment of a pluralistic scientific and technological system. It also advances the existing research results of these countries. Activities under Copernicus 2 tackle regional problems linked to the environment, structural problems of transition and socio-economic development, sustainable use of natural resources as well as the consolidation of the scientific and technological potential in fields where these countries have a recognised excellence. These activities cover also research into management systems and technologies for forecasting and combating man-induced desertification and for mitigating the effects of the on-going phenomenon, especially in Central Asia.¹⁵

In order to encourage the exchange of information amongst researchers in Europe and developing countries, the European Network for Research into Global Change (ENRICH) has been set up by the Community. In addition, to disseminate and exchange the results of European funded research in the

¹⁴ Council Decision of 25.01.99 (1999/170/EC), 12.3.1999 L 64/67 Official Journal of the European Communities

¹⁵ Council Decision of 25.01.99 (1999/171/EC, 12.3.1999 L 64/85 Official Journal of the European Communities

field of addressing desertification, the Community has initiated several Concerted Actions and Conferences.¹⁶

3.5.3 Joint Research Centre

The Joint Research Centre (JRC) is a Directorate General of the European Commission which provides the scientific advice and technical know-how to support EU policies. The structure of the JRC is based on eight specialised institutes, with research co-ordinated by the JRC Programmes Directorate. The activities of the JRC are focused on the Fifth FP for research and concern above all the following themes: Serving the citizen, enhancing sustainability, underpinning European competitiveness as well as safety and security of nuclear energy. The theme „enhancing sustainability“ includes, among others, research measures to address desertification. The Space Application Institute of the JRC implements various research projects in the field of environmental monitoring and management, some of which are related to desertification issues. Furthermore it has been contributing to the use of operational Earth Observation Satellites for the monitoring of vegetation and soil characteristics. The JRC Work Programme for 1999-2002 has 1 020 million Euro at its disposal for the support of the above-mentioned four themes. In addition, the JRC has established a series of programme clusters to group projects that contribute to a scientific, technological or social issue. One of this clusters deals with the area of agri-environment, to which belong geospatial information, integrated assessments and verification of agri-environment measures.

3.5.4 European Environment Agency

The European Environment Agency (EEA), which started work in 1994, focuses on the following tasks:

- to provide technical, scientific and economic information for the elaboration and implementation of measures and laws for environmental protection for the Member States and third countries
- to co-operate in the establishment of a European map showing the areas affected by environmental damage; co-operates in the establishment of monitoring stations
- to establish a common information and control network for soil, air and water as well as for direct information about forest fires and acid rain
- to include European environmental data into international environmental programmes, for example those of the United Nations and its agencies.

In 1995, the EEA edited a report about the environmental situation in 46 European countries, the so-called Dobrás Assessment, which offers a basis for the EU's political discussion about the environmental dimension. In 1998, a second assessment was presented to the Ministerial conference in Aarhus, which concentrates on 12 priority environmental problems. One of these key topics of the second assessment of Europe's Environment is soil degradation. In this report, it is stated that Europe suffers from three main kinds of soil degradation: erosion, acidification and pollution, and that up to now this

¹⁶ In October 1999, the Community organised an International Workshop "Desertification Convention: Data and Information Requirements for Interdisciplinary Research".

central environmental problem has not been taken into account sufficiently in Europe. Since data and common definitions are missing, a complete pan-European survey is not possible. In addition, certain countries lack of strategies to combat soil erosion.

Both reports are considered as patterns for a presentation of information about the environmental situation of a specific country. In the meantime, the EEA has built up close co-operations with the CEEC and other third countries in order to harmonise the collection and processing of environmental information.

3.6 TACIS

The TACIS programme¹⁷ supports the process of structural economic reform and the provision of technical assistance in the New Independent States (NIS) and Mongolia. Since 1991, the EU has provided the TACIS programme with 4 160 million Euro. For the period 2000-2006, the Commission has suggested a new regulation for TACIS, which includes a budget of approximately 4 000 million Euro and establishes the following priorities:

- Greater concentration of the assistance to achieve maximum impact,
- Clearly differentiated country programmes,
- Support to the objectives of the Partnership and Co-operation Agreements (PCAs).

The EU wants to improve the implementation of the TACIS assistance by applying the following principles:

- A move from 'demand-driven' to 'dialogue-driven' programming,
- Increased promotion of investment
- An increase in the number of assistance instruments available, including an increased use of twinnings between EU and NIS institutions and industrial co-operation,
- Improving the quality of the assistance, notably through the creation of an 'incentive' scheme.

The priority areas for the new TACIS programme 2000-2006 are democracy and rule of law, private sector and economic development, social consequences of transition, regional and cross border co-operation, environmental protection, rural economy and nuclear safety

In the field of environmental protection, the EU fosters a strong legislative and regulatory framework and environmental policy and practice in accordance with international standards. The EU is primarily interested in measures directed towards an ecologically sound and efficient exploitation and use of natural resources, an improvement of the environmental infrastructure and an effective reduction of cross border pollution. Moreover, environmental considerations are incorporated into TACIS projects in the areas of agriculture, energy or infrastructure. In addition, the TACIS programme supports the development of common environmental policies and environmental awareness.

¹⁷ Programme Technical Assistance to the Commonwealth of Independent States of the former Soviet Union, OJ L 187, 29.07.1993.

In the framework of the TACIS programme, projects to address environmental degradation and loss of agricultural productivity due to excessive exploitation of water have been implemented in the countries surrounding the Aral Sea. The aim of one of these projects was to provide technical assistance to improve the water resource management between the affected countries.

3.7 PHARE

Up to now, the candidate countries have been supported during the process of adjusting their environmental legislation by the Community's PHARE programme and the multi-disciplinary sub-committees in the framework of the Europe Agreements.

The Phare Programme¹⁸, which was adopted in 1989, is the foundation of the EU's financial and technical co-operation with the CEEC. The PHARE Programme is provided with 1 560 million Euro a year. This sum is granted in the form of non-repayable subsidies, while the European Investment Bank provides loans.

The main focus of PHARE is the strengthening of the administrative structures and capacities as well as the financing of investments in the candidate countries. Excluded from PHARE are investments that the EU finances by means of structural instruments (ISPA) and the agricultural action programme (SAPARD) in the framework of the preparation for accession. The chapter „environment and nuclear safety“ of the PHARE national programmes is subdivided into the following areas:

- support for legislative, policy and institutional work
- provision of equipment for monitoring pollution
- technical feasibility studies and pilot projects for urgent environmental programmes
- setting up environmental funds.

3.8 ISPA

The candidate countries generally face much greater environmental problems than the present Member States, especially as regards water pollution, waste management and air pollution. Because of the enormous challenges the candidate countries have to meet when joining the Union, the EU has adopted the Regulation for an Instrument for Structural Policies for Pre-Accession (ISPA). By means of this instrument, the EU is striving to alleviate the financial burden caused by the taking over of the *acquis communautaire*. According to initial estimations, the investment cost for the adjustment of the environmental legislation will amount to about 120 - 140 billion Euro for all candidate countries.

With the help of ISPA, the EU enlarges its assistance in the environmental sector considerably. For the period 2000-2006, ISPA has 1 040 Meuro a year

¹⁸ Programme of aid for economic reconstruction in Poland and Hungary, OJ L 375, 23.12.1989. Meanwhile, Bulgaria, the Czech Republic, Slovakia, the former GDR (until 3 October 1990), Romania, Albania, Estonia, Latvia, Lithuania and the former Yugoslav republics of Slovenia, The FYR of Macedonia and Bosnia-Herzegovina have participated in this programme.

at its disposal. The allocation of ISPA resources among the recipient countries is based on population, per capita GDP and land surface area. Basically, the EU assumes the financing of infrastructural investments in the environmental and transport sector. One of ISPA's special interests lies in the implementation of directives in the fields of drinking-water supply, waste water treatment, air quality and waste management, which need cost-intensive investment. As regards the implementation of the drinking water directive, the EU supports, for example, projects in regions with scarce water resources or important quality problems, such as surface water pollution and aquifers salinisation.

The majority of the ISPA projects are financed by a co-financing system, with the aim of creating incentives for public-private partnerships. The total cost of every measure amounts to a minimum of 5 million Euro. With ISPA, the EU has developed a pre-cohesion fund, through which the candidate countries can be trained in the procedures of the cohesion fund and the structural funds. As soon as a country has joined the EU, its rights to participate in the ISPA instrument expire.

4. Conclusion

The background paper provides an overview of the EU policies, legal and financial instruments as well as programmes addressing desertification and land degradation. Desertification and land degradation in their comprehensive meaning are recognised by the international community as global problems which call for common initiatives and concerted actions. The CEEC, NIS and Mongolia are also affected by land degradation and need the support of the international community to develop practices and projects to cope with these complex phenomena.

1. The European Union considers desertification as a serious world-wide environmental problem that also affects its Member States in the Northern Mediterranean. The EU has actively supported the coming into being of the CCD, participated in the INCD negotiations and committed itself to implement the Convention's objectives. With the ratification of the Convention, the EU has reinforced its efforts to address desertification in its Member States, the candidate countries and the third countries. The European Commission has begun to mainstream the principles of the CCD into its development co-operation policies and programmes.
2. The European Union assumes the CCD's broad definition of desertification. Thus, it underlines the high priority of the environmental problem of desertification and integrates the combat of desertification as a cross-section task into its policy, legal and financial instruments.
3. Various EU policy and legal instruments provided with different financial resources are the basis of activities to address desertification and to develop best practices in this field.

4. The EU's accession strategy enables the candidate countries to participate in a wide range of EU initiatives and programmes in the environmental field, such as LIFE and the Fifth FP.
5. Within LIFE and the Fifth FP, specific programme components for third countries are available for the non-accession CEEC, the NIS and Mongolia. These countries can also receive support for projects in the environmental field within the TACIS and PHARE programme.
6. The CCD's comprehensive definition of desertification and the implementation of its objectives include important elements and instruments of the EU's environmental policy. The accession to the CCD and a commitment to fulfil its objectives lead to an accelerated approximation to the EU's policy in the environmental sector.

5. Documents and Addresses

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Statement by Ms. Ria Oomen-Ruijten (MEP), European Parliament

Ladies and Gentlemen,

I would like to start by thanking the chairman very warmly for the invitation to speak, at this conference and for such an impressive audience of government officials and experts from over 20 countries.

I was asked to say a few words about the environmental policy of the European Union in relation to the enlargement of the E.U. But before that, let me introduce myself to you.

Since 1989, I have been a member of the European Parliament's Environment Committee, and in August of 1999 I became vice-president of this committee. Before I became a member of the European Parliament, I was a member of the Dutch parliament for 8 years. There, I also was engaged in environmental matters. So, all together I have been active in environmental policy making for almost 20 years. 20 Years, in which many important environmental laws have passed.

Today, the European Union is standing at the edge of a very important new decade. In a few years, countries of Central and Eastern Europe will join the Union. This will have major effects on all European policies. The Environment Committee in the European Parliament is currently preparing various reports on different aspects of the enlargement. I myself was appointed rapporteur for "environment and consumer protection". Today however, I will elaborate shortly on the environmental aspects of the enlargement, the problems that arise and what is being done by the European institutions to resolve them.

In the forthcoming enlargement of the EU, which is a major challenge for all the actors involved, considerably more emphasis is being placed on environmental issues than in the past. The main reason is the obligation imposed by the Treaty of Amsterdam, to take account of environmental protection requirements in defining and implementing Community policy.

The criteria for membership of the applicant countries of Central and Eastern Europe, which are laid down in the Copenhagen European Council, include adopting and implementing the Community's existing legal acts. The whole of these acts is known as *the "acquis communautaire"*. An important part of this acquis is formed by the European Union's environmental legislation, which consists of about 300 acts. These acts are divided into regulations, directives, decisions and recommendations. Numerous communications and policy guidelines join them. However, in the Commission's *White Paper on the preparation of the associated countries of Central and Eastern Europe for integration into the internal market of the European Union from 1995*, the Commission only refers to 36 environmental directives and 21 environmental regulations of the 70 acts forming the core of the *acquis communautaire*. The approximation of by the candidate countries will, on the one hand, lead to a

great cleaning up operation in Central and Eastern Europe, while on the other hand, it will tackle cross-border pollution affecting the European Union.

Although the current level of, for instance, nature conservation in the candidate countries needs to be acknowledged, there is a particularly wide gap between the legislation in the European Union and the candidate countries in the environmental sphere.

The candidates' environmental problems are significant and the resources needed to solve them are not available. The present environmental problems arise from the longstanding shortcomings and neglect in **water** and **waste management** and from **emissions** into the atmosphere from **industry, energy production**, and the rapidly increasing traffic.

Drinking water is generally of low quality and the all-round environmental state of **inland waters** is poor. The quality of air in many densely populated areas poses serious dangers to health because of sulphur dioxide, particulate and heavy metal emissions. In the **nuclear energy** sector, reactor safety has not been properly maintained. There are also major problems associated with the storage of **nuclear waste**, but because of the time and the complexity of the subject, I will not discuss those here.

The environmental situation has, it is true, improved since 1989, but there are still a number of serious problems in the region which endanger human health and the environment. There is also cause for concern that economic growth using existing production methods and current technology will aggravate the environmental problems. So, the differences might lead to a serious distortion of competition in the internal market. Moreover, they might jeopardise any effective environmental policy pursued by an enlarged Community.

Having heard the above, it will be clear that the approximation of the environmental acquis will be accompanied by some serious problems. The European institutions have considered this issue extensively.

In itself, the official position of the Council and the Commission that full compliance with the acquis is essential for accession, is desirable and logical. However, the Commission also stated that, as none of the countries can achieve this objective in the near future, transitional arrangements must be made. In July 1997, the Commission published Agenda 2000, in which the enlargement strategy is set out. For the candidate countries, satisfying the criteria was considered a requirement for accession. In the environmental sphere, however, there appears to have been a softening of that position.

As the main reason, the Commission referred to the serious problems that persist in this area of policy in all the applicant countries. Adopting the acquis would require massive investment, which would be beyond the candidates' national budgets. Under that condition, no new member state would be able to accede for about 20 years.

This is not a desirable position to adopt politically speaking. Or, in terms of environment: the environment will benefit from speedy accession. However, if the gap between future new and current member-states persists, it is so feared that protectionist measures will be taken, with the adverse effects they will have on the internal market and the future development of the environmental policy.

The European Parliament was also critical of the fact that the accession negotiations were beginning with only some of the candidates. The Committee on the Environment, public Health and Consumer Protection stated that the dividing of the candidate countries into two groups (one acceding in the first round, the other in the second), would have an adverse effect on the environment; the former would gain the impression of being up-to-date environmentally speaking and so slacken their efforts, while the latter would have less incentive to try, believing that the criteria for beginning the accession negotiations were primarily political and economic.

Both factors would pose a threat to the environment. The European Parliament noted that "speedy and full accession of all candidate Member States will, in the long term, improve the environment throughout Europe, assuming a more intensive approach to important areas such as the environment, transport and energy.

What then about the criterium of approximating the whole environmental acquis?

As the European Parliament believed that full compliance with the environmental acquis will be impossible in the near future, it requested, in its resolution of 1997, the European Commission to draw up a list of the most important elements of EU environmental legislation geared to environmental criteria. Priority in this context should be given to rules safeguarding the quality of air, water and soil, food safety and health protection. Derogations must not, in the EP's opinion, be permitted in any circumstances, and transitional provisions should be allowed only in moderation and restricted to "duly justified cases". Negotiations must be held with each applicant country separately on a realistic timetable based on the country's situation, and where there is clearly a need for transitional periods, the applicant country must point this out during the negotiations. Decisions on transitional periods must be made only after a thorough analysis on an individual basis and in accordance with a precise timetable. The European Parliament has adopted an opinion stating that transitional periods exceeding five years must not be permitted under any circumstances.

As regards the application and public enforcement of environmental legislation, I agree with the Parliament's opinion that priority should be given to the improvement of administration in the candidate countries, since the existing administrative structures do not guarantee effective application and enforcement.

From what I just told you, it will be very clear that action is needed. As the Commission stated, the main problem is a budgetary issue. The total investment cost of implementing the environmental acquis in all the applicant states has been estimated by the Commission at some 120 billion Euro. Fortunately, the European Union has recognised this enormous need of funding at a very early stage. As a reaction, the E.U. developed some ambitious funding programmes. I will shortly highlight the most important ones.

Adapting EU legislation involves more than simply transposing European legislation into national legislation. EU legislation also needs to be implemented and monitored. A high priority must therefore be given to reforming and expanding the administrative capacity. Implementing bodies need extra manpower and more money: at the national level and also, and more importantly, at regional and local levels. This will require a lot of support, particularly during the period prior to accession.

Immediately after the collapse of the Communist regimes in the countries of Central and Eastern Europe, the European Union launched the **PHARE** aid programme for Hungary and Poland. This programme was then expanded to include the whole region and complemented by other instruments, which I will discuss later. The PHARE programme is and remains the most important instrument for the financial promotion of preparations for accession. It was originally designed to assist the former Communist countries with the restructuring of their economies and the development of democratic structures. The PHARE aid is granted in the form of non-repayable grants and is geared to the transfer of know-how and the provision of technical assistance.

The implementation of environmental legislation involves not only money but also know-how, especially administrative know-how. In addition to environmental investments there is a need both for strengthened environmental institutions and careful long-term planning. In the revised PHARE programme an attempt will be made to increase the administrative efficiency of the applicant states by renewing and developing structures and training officials. More aid from the programme should be given to infrastructure investments needed to comply with environmental legislation. Care must be taken to target aid properly, so that regional and environmental authorities are also heavily involved both at the planning and the decision-making stages. An open society also calls for non-governmental organizations to be represented in decision-making and for support to be given to enable these organizations to participate actively in the decision making process including as instigators.

This year, a new instrument of structural policy, named **ISPA** will also come into operation. ISPA stands for *Instrument for Structural Policies for Pre-accession Assistance* and is a special aid instrument for the development of environmental and transport infrastructure. The funding needs in these areas are enormous in comparison to the resources available. The cost of bringing one set of environmental legislation into line with another has been estimated

at 120 billion Euro, while 50 to 90 billion Euro is required for transport investment over 15 years.

The main concern of ISPA ought to be for transport investments which will be of cross-border, regional and worldwide benefit to the environment. Particular emphasis should be placed on supporting rail transport. From an environmental point of view it would be a really great loss if the effective railway system were to fall into decay and be replaced by road transport.

The Commission has made a start on creating a cooperation network between the applicant countries. This will function in the same way as **IMPEL** (*Implementation, and Enforcement of Environmental Law*) founded in 1992. The aim of IMPEL is to generate impulses to ensure that environmental legislation is effectively applied. The cooperation network is closely linked to IMPEL and uses its experience in matters relating to the enforcement of Community environmental legislation.

The applicant countries have already been able to participate in the **LIFE** programme and receive aid under that programme. To help these countries to preserve their natural diversity even to a moderate extent, the LIFE fund needs additional investment to meet the countries' needs.

Regional cooperation as part of the cross-border cooperation in the form of Interregional and pilot projects may also increase the effectiveness of the use of resources targeted at the EU's neighbouring areas. Thus a greater effort is still needed to attain coordination and compatibility between **Interreg-Phare and Interreg-Tacis**. Particularly in the Baltic Sea area, environmental issues are increasingly important as enlargement progresses, since the area is bordered by four current Member States (Finland, Sweden, Denmark and Germany), four applicant countries (Estonia, Latvia, Lithuania and Poland) and one non-applicant state (Russia).

Bilateral programmes between the Member States and the applicant states will also attain an important position in the pre-accession strategy. The coordination of programmes with EU programmes will improve and increase the efficiency of their activities.

In order for the various pre-accession instruments to be effective, they must be consistent. The regulation concerning coordination of aid to the applicant countries seeks to achieve this. The goal of consistency must also be borne in mind when it comes to environmental impact. In all the various elements, applicant countries' ability to comply with the environmental requirements which are preconditions for accession must be promoted. The same requirements should also apply to private funding and to loans from and investments by international financial institutions.

Ladies and Gentlemen, let me make some concluding remarks.

The enlargement of the European Union is a very complex, yet desirable and irreversible process. A process that, I fully advocate. Yet, it has to be

acknowledged that there are numerous problems in approximating the legislation of the *aquis communautaire*. The main problems in the environmental field were highlighted before.

The environment is one of the most important issues in the enlargement negotiations and the enlargement presents a major opportunity to improve the state of Europe's environment. The aim should be sustainable development, which should be attempted by developing and implementing environmental legislation and taking account of the environmental aspect in all fields of policy such as transport , agriculture and every production. The incorporation of the environmental *aquis* into the applicant countries' legislation will not mark the end of the process of working towards more sustainable development in Europe, but will constitute only a necessary intermediate stage.

It is therefore very important that the whole *aquis* is being incorporated by the candidate countries as soon as possible and with as few exceptions as possible. The European Union will, through various funding programmes, assist the candidate countries as much as possible, stressing, however, their own responsibility.

I thank you for your attention.

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Ukraine	Mr. Igor IVANENKO Deputy Head of Department of Integrated Regulation of Protection, Use and Restoration of Nature Resources of Ukraine 5 Khreshchatyk str. 01601 Kyiv-1 Mr. Volodymyr RESHETNIAK Counsellor, Department of International Organizations Ministry of Foreign Affairs 1 Mykhaylivska sq. Kiev 01018	phone: (380) 44 224 2239 fax: (380) 44 229 8383 email: uawetl@carrier.kiev.ua phone: (380 44) 212 8603/212 8381 fax: (380 44) 212 20 40 email: umo@mfa.gov.ua

UNCCD	Mr. Hama Arba DIALLO Executive Secretary UNCCD P.O Box 260129 D-53153 Bonn, Germany Mr. Gregoire DE KALBERMATTEN Coordinator for Policy and Programme Development UNCCD P.O Box 260129 D-53153 Bonn Germany Mr. Mikhail OUTKINE Programme Officer UNCCD P.O Box 260129 D-53153 Bonn Germany	phone: (49 228) 815 2802 fax: (49 228) 815 2898/99 email: adiallo@unccd.de phone: (49 228) 815 2824 fax: (49 228) 815 2898/99 email: gdekalmatten@unccd.de phone: (49 228) 815 2850 fax: (49 228) 815 2898/99 email: moutkine@unccd.de
UNSO	Mr. Philip DOBIE Director UNSO/United Nations Development Programme One United Nations Plaza New York, NY 10017 USA	phone: (1 212) 906 5755 fax: (1 212) 906 6345/6916 email: philip.dobie@undp.org

Resource Persons	Dr. Eckehard FLEISCHHAUER Consultant for Land Assessment and Land Use Planning Muffendorfer Hauptstr. 46 53177 Bonn Germany	phone: (49 228) 328 629 fax: (49 228) 328 629 email: ecocom@aol.com
	Mr. Dominik MEIER Manager Miller und Meier Mozartstrasse 46 D-53115 Bonn Germany	phone: (49 228) 692 511 fax: (49 228) 692 554 email: dmeier@miller-meier.de
	Ms. Constance MILLER Consultant Miller und Meier Mozartstrasse 46 D-53115 Bonn Germany	phone: (49 228) 69 25 11 fax: (49 228) 69 25 54 email: cmiller@miller-meier.de
	Prof. Dr. Ryszard DEBICKI Department of Soil Science University of Maria Curie- Sklodowska Akademicka 19 20-003 Lublin Poland	phone: (48 81) 537 5026/5027 /744 5061 fax: (48 81) 537 5045 /744 5067 email: rdebicki@biotop.umcs.lublin.pl
	Dr. Ing. Anna Rita GENTILE European Environment Agency Kongens Nytorv 6 K-1050 Copenhagen Denmark	phone: (45) 3336 7209 fax: (45) 3336 7199 email: anna.rita.gentile@eea.eu.int
	Dr. Andrey STEINER ETP Slovakia Smetanova 1 04001 Kosice Slovak Republic	phone: (42 1) 957 60107 fax: (42 1) 957 60107 email: steiner@changenet.sk
	Dr. Joachim WOIWODE Head of Division Federal Ministry of the Environment, Nature Conservation and Nuclear Safety P.O Box 120 629 D- 53048 Bonn Germany	phone: (48 228) 305 2681 fax: (49 228) 305 2396 email: woiwode.joachim@bmu.de

Contributing Guests	Dr. Rainer GEPPERTH Institute for International Contact and Cooperation Hanns Seidel Stiftung Lazarettstrasse 33 80636 Munich Germany	phone: (49 89) 1258 280/281 fax: (49 89) 1258 359/356 email: info@hss.de http://www.hss.de
	Mr. Peter Schönfisch Hanns Seidel Foundation Franz Josef Strauss Haus Rue de Pascale straat 45/47 B-1040 Brussels,Belgium	phone: (32 2) 230 5081 fax: (32 2) 230 7027 email:hssbrussel@compuserve.com
	Mr. Christophe BAIL Head of Unit DG Environment European Commission Rue de la Loi/Wetstraat 200 B-1049 Brussels Belgium	phone: (32 2) 299 111 (central) direct: (32 2) 296 9557
	Dr. Fritz HOLZWARTH Director Federal Ministry for the Environment, Nature Conservation and Nuclear Safety P.O.Box 120629 53048 Bonn Germany	phone: (49 228) 305 3506 fax: (49 228) 305 2396 email: holzwarth.Fritz@bmu.de
	Mr. A.F. Marques de CARVALHO Counsellor – Environment Permanent Representation of Portugal Avenue de Cortenberg 12-22 B-1040 Brussels Belgium	phone: (32 2) 286 42 11 fax: (32 2) 231 00 26
	Ms. Ria OOMEN-RUIJTEN (MEP) Member of Parliament European Parliament Rue de Wiertz 1047 Brussels,Belgium	phone: (32 2) 284 5863 Brussels fax: (32 2) 284 9863 Brussels phone: (33 3) 881 75863 Strasbourg fax: (33 3) 881 79863 Strasbourg
	Mr. Michael HAMELL DG Agriculture D/2 European Commission Rue de la Loi/Wetstraat 200 B-1049 Brussels, Belgium	phone: (32 2) 295 9826 fax: (32 2)296 8825

List of Scientific Institutions Involved in Research on Land Degradation

Albania

Institution	Function & Activities
Institute of Soil Research Director: Prof. Dr. Sherif Lushaj Rruga e Durrësit Tirana Tel/Fax: (355 4) 22 8367	- Collection of database for land degradation - State of erosion and the measures to combat it - State of soil feeding - Soil pollution - Water pollution

Belarus

Universities

Belarussian State University Department of Geography Lab. of Landscape Ecology Av. Skoryaa 4 220050 Minsk	Tel: (017) 226 57 73 Fax: (017) 206 61 19 Email: landlab@geo.bsu.unibel.by
Belarussian Agriculture University Department of Agronomy Department of Land Management Str. Michurina 5 123410 Gorky Mogilev Region	Tel: (02233) 228 49 Fax: (02233) 215 87
Belarussian Technological University Department of Forestry Str. Sverdlova 13a 220050 Minsk	Tel: (017) 227 74 52 Fax: (017) 227 62 17 Email: forest@bstu.unibel.by

Research Institutes

Institute of Soil Science and Agrochemistry Str. Kazintsa 86 220086 Minsk	Tel: (017) 277 08 11 Fax: (017) 277 44 80
Institute of Nature Utilization and Ecology of Academy of Sciences of Belarus Staroborisovsky trakt 10 220114 Minsk	Tel: (017) 264 26 32 Fax: (017) 264 24 13 e-mail: ipnrne@ne.ecology.as.by

Bosnia & Herzegovina

Institution	Function & Activities
University of Sarajevo Institute of Agropedology Prof. Dr. Esad Bukalo - Director Dolina 6 33000 Sarajevo Tel: (387 33) 667 659 Fax: (387 33) 526 222	- Soil mapping - Recultivation - Drainage - Irrigation - Soil fertility
University of Sarajevo	- Irrigation

Prof. Dr. Hamid Bogucanin Faculty of Agriculture Zmaj od Bosne 8 33000 Sarajevo Tel: (387 33) 653 033 Fax: (387 33) 66 74 29 University of Sarajevo Prof. Dr. Sukrija Sakovic – Director, Dean Faculty of Forestry Zagrebacka 20 33000 Sarajevo Tel: (387 33) 614 003 Fax: (387 33) 611 349	- Drainage - Soil erosion - Soil fertility - Teaching of post graduate courses in the field of soil protection.
University of Mostar Faculty of Mediterranean Cultures Prof. Dr. Elvedin Hanic University Campus 88000 Mostar Tel: (387 36) 570 727 Fax: (387 36) 570 032	- Irrigation - Erosion - Fertility - Glasshouses

BULGARIA

Institution	Function & Activities
Research Institute of Soil Science and Agroecology Director: V.Valev Address: 7, Chaussee Bankya str. N.Pushkarov Institute of Soil Science and Agroecology 1080 Sofia, Bulgaria Tel: (359 2) 22 46 141, 359-2- 22 52 Fax: (359 2) 22 48 937	The scientific and research program of the Institute includes fundamental and applied investigations in agricultural science, as e.g.: - Soil type and productive potential of the farmyard - Processes causing soil degradation - Physico-chemical and biological capacity of soils concerning retention and transformation of fertilizers - Diffusion of pesticides and secondary waste products of household, animal husbandry and industry - Survey and development of technologies for soil fertility restoration and reclamation of disturbed lands and contaminated soils
University of Architecture, Civil Engineering and Geodesy Director: Prof. Eng. Ivan Papazhev Address: 1, Hristo Smirnenki blvd. 1421 Sofia Tel: (359 2) 63321 Fax: (359 2) 65 68 63 E-mail: aceadm@bgace5.uacd.acad.bg Web page: www.uacg.acad.bg	Activities - training and research: - soil science - soil melioration - soil rehabilitation - soil degradation processes
Plovdivski University "Paisiy Hilendarski" Director: Prof. Lubomir Futekov Address: 24, Tzar Asen St. Tel: (359 32) 23 86 61 Fax: (359 32) 23 86 07	Activities - training and research: - soil science - soil melioration - soil rehabilitation - soil degradation processes
University of Forest Director: Prof. Dimitar Kolarov Address: 10, Kliment Ohridski blvd. 1756 Sofia Tel: (359 2) 91 907 Fax: (359 2) 62 28 30	Main topics: - Ecological assessment - Environmental monitoring - Protected areas - Reclamation of damaged terrenes

Ministry of Agriculture and Forest, National Soil Service Manager: Alenksandar Kulikov Address: 7, Chaussee Bankya St. 1331 Sofia Tel: (359 2) 24 87 98 Fax: (359 2) 24 02 39	Activities: - Soil assessment - Information Systems of agricultural land recurs
Executive Environmental Agency Executive Manager: Dimitar Kantardjiev Address: 136, Tzar Boris III blvd. 1618 Sofia Tel: (359 2) 955 90 11 Fax: (359 2) 955 90 15 E-mail: ncesd@nfp-bg.eionet.eu.int Web page: http://nfp-bg.eionet.eu.int/	Activities: - National Environmental Monitoring Network & GIS- Information Systems & Kadastar - Environmental assessment

Croatia

Institute	Phone/Fax/Email	Function
Meteorological and Hydrological Service of Croatia Director: Dr. sc. Branko Gelo Grič 3 31000 Zagreb	Tel: (385 1) 456 5693 Fax: (385 1) 485 1901 Gelo@cirus.dhz.hr	Meteorology, weather, climate change, agrometeorology, weather forecast, drought, climate monitoring, climate assessment, climate convention, state authority
State Water Directorate Director: Mr. Zorislav Balić, B. Sc Ulica grada Vukovara 220 10 000 Zagreb	Tel: (385 1) 6307 333 Fax: (385 1) 615 1821 Du.vode@zg.tel.hr	Water management, flood deference, water pollution/protection, state authority, protection from water erosion and torrents, regulation of water courses and other water bodies, protection from the harmful effects of water
University of Zagreb Faculty of Agriculture Prof. Dr. Sc. Zvonko Mustapić Svetosimunska 25 10 000 Zagreb	Tel: (385 1) 2393 777 Fax: (385 1) 23158 300 Dekanat@agr.hr	Research, education, soil science, agriculture, land reclamation, land management, soil destruction, assessment and prevention of soil degradation, accelerated erosion by water, the mapping of vulnerability and degradation etc.
University of Osijek Faculty of Agriculture Dean Prof Dr Sc Željko Bukvić Trg Svetog Trojstva 3 31 000 Osijek	Tel: (385 31)221 299 Fax: (385 31) 207 017 Gvesna@suncokret.pfos.hr	Research, education, soil science, agriculture, plant protection, agroecology, plant breeding, agromelioration
Institute for Adriatic Crops and Karst Reclamation Director: Dr.Sc. Slavko Perica Put Duilova 11 21 000 Split	Tel: (385 21) 31 64 58 Fax: (385 21) 31 65 84 Office@krs.hr	Research, Mediterranean crops, viticulture, olives, soil science, soil cartography, soil conservation, soil, plant nutrition, forestry, agriculture.
Institute of Agriculture and Tourism Director: Dr. Sc. Dordano Peršurić Carla Huguesa 8 52 440 Poreč	Tel: (385 52) 408 300 Fax: (385 52) 431 659	Research, soil science, agriculture, tourism, ecology, erosion, plant nutrients, irrigation, physical planning studies, agricultural crops, soil management
University of Zagreb Faculty of Forestry Dean: Prof. Dr. Sc. Joso Vukelić Svetošimunska 25 10 000 Zagreb	Tel: (385 1) 2352 555 Fax: (385 1) 2318 616	Research, education, forestry, soil science, forest management, forest protection
Forest Research Institute – Jastrebarsko Director: Dr. Sc. Joso Gračan Cvetno naselje 41 10 150 Jastrebarsko	Tel: (385 1) 628 1022 Fax: (385 1) 628 1493 Ured@sumins.hr	Research, forestry, forest management, forest seed production, soil science

Czech Republic

Institute	Phone/Fax/Email	Function
Research Institute for Soil and Water Conservation Director: Doc. Ing. Miloslav Janecek DrSc Ing. Jaromir Kubat Zabovreska 250 156 27 Praha 5 Zbraslav	Tel: (420 2) 5792 1640 Fax: (420 2) 5792 1246 Sekretariat@vumop.tel.cz Tel: (420 2) 3302 2353 Fax: (420 2) 3331 0636	Specialist on soil degradation
Research Institute of Crop Production Mgr. Jan Lipavsky CSc Drtnovska 507 161 06 Prague 6 Ruzyne	Tel: (420 2) 3302 2111 Fax: (420 2) 3331 0636 cropscience@hb.vurv.cz	
Czech University of Agriculture Prof. Ing. Josef Kozak DrSc Kamycka 129 165 21 Prague 6 Suchbát	Tel: (420 2) 2438 1111 Fax: (420 2) 2092 0431 kozak@af.czu.cz	
Mendel University of Agriculture Prof. Ing. Stanislav Prochazka DrSc Zemědělská 1 61300 Brno	Tel: (420 5) 4513 1111 Fax: (420 5) 4521 1128 rektor@mendelu.cz	
University of South Bohemia Faculty of Agriculture Prof. Ing. Jan Frelich CSc Branisovická 31 37005 České Budejovice	Tel: (420 38) 777 1111 Fax: (420 38) 530 0122 frelich@zf.jcu.cz	

Georgia

Full address contact details can be found at the following web site:

<http://bigx.agforbes.arizona.edu/cgi-bin/cstccd.cgi>

Institute	Function
Institute of Geophysics, Georgian Academy of Sciences	- lab research, field research - Main topical areas: climate change, water resources management - remote sensing/cartography/information systems
Noahs Ark Center For The Recovery Of Endangered Species (NACRES)	- implementation of field projects - lab research - field research Main topical areas: wildlife management - ecology/botany/zoology
Department of Geography-Geology, Iv Javakhishvili State University	- extension/community education Main topical areas: climate change, water resources management, rangeland - management, natural resources management, education/literacy, renewable energy - ecology/botany/zoology, soil conservation
GIS&RS Scientific-Training Center ` ' HGD P IWD`	- lab research - extension/community education - field research - instruction/training

	Main topical areas: • remote sensing/cartography/information systems
GRID Tbilisi	• Advocacy • capacity building • fundraising • policy development/reform • technology transfer • instruction/training Main topical areas: human dimensions of desertification, drought early warning • migration/conflict management • natural resources management • education/literacy • remote sensing/cartography/information systems • environmental/natural resources • monitoring • demography/population
Georgian scientific-research Institute of Soil, Agrochemistry and Melioration	• advocacy • lab research • field research • Main topical areas: soil conservation
Institute of Botany, Academy of Science of Georgia	• Advocacy • capacity building • policy development/reform • field research Main topical areas: • local economic development • climate change • public/environmental health • water resources management • drought early warning • rangeland management • natural resources management • education/literacy • wildlife management • remote sensing/cartography/information systems • environmental/natural resources monitoring • ecology/botany/zoology, soil conservation
Institute of Environment	• advocacy • lab research • extension/community education Main topical areas: • public/environmental health • drought early warning • migration/conflict management • demography/population
National Climate Research Centre	• advocacy • lab research Main topical areas • climate change • renewable energy • ecology/botany/zoology
Open Humanitarian University of Georgia	• lab research Main topical areas • human dimensions of desertification • human rights • indigenous knowledge

RIO Environmental Information and Sustainable Development Centre	• advocacy • community development • fundraising • implementation of field projects • policy development/reform • extension/community education Main topical areas: • local economic development, food security/relief delivery, • Gender issues, natural resources management, education/literacy, human rights, • Renewable energy, soil conservation
Research Centre of Natural Disasters and Engineering-Geology	• Advocacy • Fundraising • implementation of field projects • lab research • policy development/reform • field research • technology transfer Main topical areas: • local economic development • appropriate technology • public/environmental health • rangeland management • natural resources management • education/literacy • remote sensing/cartography/information systems • environmental/natural resources monitoring • demography/population • ecology/botany/zoology, soil conservation
6\$(0 ~ ~* H R U I D < R X W EcoMovement	• advocacy • community development • implementation of field projects • policy development/reform • extension/community education • instruction/training Main topical areas: • appropriate technology • climate change • human dimensions of desertification • migration/conflict management, natural resources management, • education/literacy • wildlife management • human rights
The Fund of Life	• advocacy • implementation of field projects • field research Main topical areas: • public/environmental health • migration/conflict management • education/literacy • wildlife management remote sensing/cartography/information systems
The Institute of Melioration, Georgian Academy of Science	• advocacy • capacity building

	• fundraising • implementation of field projects • lab research • policy development/reform • extension/community education • field research, • instruction/training Main topical areas • food security/relief delivery • rangeland management • natural resources management • ecology/botany/zoology soil conservation
Vakhushti Bagrationi Institute of Geography, Academy of Sciences of Georgia	• field research Main topical areas: • local economic development • climate change, • public/environmental health • water resources management • drought early warning • migration/conflict management • gender issues • natural resources management • environmental/natural resources monitoring • demography/population • renewable energy

Hungary

Institution	Phone/Fax/Email
Research Institute for Soil Science and Agricultural Chemistry of the Hungaria Academy of Sciences Director: Dr. Tamas Nemeth Herman Otto ut 15 1022 Budapest Postal Address as follows: P.O Box 35 1525 Budapest	Tel & Fax: (36 1) 356 4682 T_NEMETH@RISSAC.HU
Plant Health and Soil Conservation Station Director: Mr. Janos Szabo Budaorsi ut 141-145 1118 Budapest	Tel: (36 1) 309 1010 Fax: (36 1) 246 2960 Email: lotus@bfnta.datanet.hu
Climate Research Division of the Meteorological Service of the Republic of Hungary Director: Mr. Sandor Szalai P.O Box 38 1525 Budapest	Tel: (36 1) 346 4624 Fax: (36 1) 346 4687 Email: szalai@met.hu

Lithuania

Institution	Function and Activities
Research Station of KALTINENAI Director: Juozas Staputis, Specialist-scientist: Benediktas Jankauskas	Mechanical soil erosion
Agriculture Institute of DOTNUVA Director Zenonas Dabkevičius, Specialist-scientist Vanda Žekoniene	Tillage erosion
Land survey Institute KAUNAS Soil Division Director Jonas Jasinskas	Mechanical soil erosion, soil destruction
VILNIUS Institute of Geography Director Ričardas Baubinas Specialist-scientist Algimantas Česnulevicius, Algis Dilys	Water, wind soil erosion

FYR of Macedonia

Institution	Phone/Fax/Email
Faculty of Agriculture <u>Department of Field Crop Production</u> Dean: Prof.Dr. Eftim Ancevs Bul. Aleksandar Makedonski b.b., Contact person: Prof. Dr Goce Vasilevski 1000 Skopje, FYR of Macedonia	Tel: (389 91) 115 277 Fax: (389 91)134 310
<u>Department of Irrigation</u> Doc.Dr. Cukaliev Jordan Bul. Aleksandar Makedonski b.b., 1000 Skopje, FYR of Macedonia	Tel: (389 91) 115 277 Fax: (389 91) 134 310
Faculty of Forestry <u>Department of Erosion</u> Dean: Prof.Dr. Blagoja Ivanov Contact person: Prof. Dr Ivan Blinkov Bul. Aleksandar Makedonski b.b., 1000 Skopje, FYR of Macedonia	Tel: (389 91) 135 033 Fax: (389 91) 234 560
State Department of Geodesy Director: Mr. Gorgi Lazeski Ul. Trifun Hadzi Janev 4, 1000 Skopje, FYR of Macedonia	Tel: (389 91) 171 668 Fax: (389 91) 171 673
State Hidrometeorological Institute Director: Mr.Levko Mancevski Contact person: Mr. Zoran Karamanolevski Ul. Skopje bb, 1000 Skopje,.FYR of Macedonia	Tel: (389 91) 397 004 Fax: (389 91) 397 118
Water Development Institute of FYR of Macedonia Director: Mr. Ivanco Kaevski Contact person:Mr. Teodor Conevski Ul. Zeleznicka 62, 1000 Skopje, FYR of Macedonia	Tel: (389 91) 122 287 Fax: (389 91) 239 401

Public Water Management Enterprise “Water Management of the FYR of Macedonia Director: Mr. Ilija Kitanovski Contact person: Mr. Teodor Conevski Ul. Makedonska Brigada 10, 1000 Skopje, The FYR of Macedonia	Tel/Fax: (389 91) 236 564; (389 91) 232 404 ; (389 91) 114 537
Pulic Enterprise for Physical Planning Director: Mr. Kliment Zarov Contact person: Ms. Viktorija Eremeeva Ul. Veljko Vlahovic 2/4, 1000 Skopje, The FYR of Macedonia	Tel/Fax: (389 91) 113 144
Public Enterprise “Macedonian Forests” Department of Forest Management Director: Mr. Angele Spirovski Ul. Sava Kovacevic 15 A 1000 Skopje, The FYR of Macedonia	Tel: (389 91) 137 111 Fax: (389 91) 136 426
Public Enterprise for Pasture Utilisation Director: Mr. Ismet Limani Contact person: Viktorija Eremeeva Bul. partizanski Odredi 145 1000 Skopje, The FYR of Macedonia	Tel: (389 91) 364 382 Fax: (389 91) 364 382
Public Scientific Institution Institute of Agriculture Director: Dr. Stojmen Boskov Contact person: MSc. Dusko Mukaetov, Pedologist Bul. Aleksandar makedonski bb 1000 Skopje, The FYR of Macedonia	Tel: (389 91) 230 910 Fax: (389 91) 114 283
Responsible Ministries	
Ministry of Environment and Physical Planning H.E. Toni Popovski – Minister Ul. Drezdenska 52, 1000 Skopje, The FYR of Macedonia 1001	Tel: (389 91) 366 930 Fax: (389 91) 366 931
Ministry of Agriculture, Forestry and Watersupply H. E. Mr. Marjan Gorcev – Minister Ul. Leninova 2, 1000 Skopje, The FYR of Macedonia	
Water Economy Administration Director: Voislav Popov Ul. Leninova 2, 1000 Skopje, The FYR of Macedonia	Tel/Fax: (389 91) 134 477

Moldova

Institution	Function & Activities
“Hydrometeo” Service Director: Dr. V. Sofroni Grenoble Str., 193, Chisinau Tel: (323 2) 773611 Fax: (323 2) 773636	Drought Monitoring

Institute of Geography of AS Director: Acad.T.Constantinova Academie Str. 3 Chisinau Tel: (323 2) 739838 Fax: (323 2) 739838	Resource of Natural
National Institute of Ecology Director: Acad I.Dediu Dacia Str., 58 Chisinau Tel: (323 2) 762430 Fax:	Ecology of land
Institute of Pedology, Agrochemistry and Hydrology Director: Acad.S.Andries Ialoveny Str.,100 Chisinau Tel: (323 2) 72 50 43 Fax: (323 2) 72 50 44	Land Degradation
University Agrarian Rector: Prof. G.Cimpoies Mircesti Str.,44 Chisinau Tel: (323 2) 246422 Fax: (323 2)246326	Education
Institute of Plant Protection Director: Dr. V Voineac Dacia Str., 58 Chisinau Tel:(323 2) 770485	Studying plants on droughty land

Poland

Institution	Phone/Fax/Email	Function & Activities
Institute of Meteorology and Water Management Director: Prof. Dr. Jan Zieliński Podleśna 61, 01-673 Warsaw, Postal address: P.O.Box 79 Warsaw	sekretariat@imgw.pl	• meteorology • hydrology • water engineering and management • physics and chemistry of atmosphere • climatology • weather forecasting • prognosis and risks
Institute of Melioration and Grassland Farming Director: Prof. Dr. Edmund Kaca Falenty 05-090 Raszyn		• water management and water economy in agriculture and rural areas • rural and agricultural spatial planning • drainage systems • water quality and protection in agriculture • grassland functions and management systems
State Institute of Geology	http://www.pgl.waw.pl	• geology

Director: Prof. Dr. Stanisław Speczik Rakowiecka 4, 00-975 Warsaw		• mapping • natural resources (mineral and water) • hydrogeology, environment protection.
Institute of Soil Science and Plant Cultivation Director: Prof. Dr. Seweryn Kukula Czartoryskich 8, 24-100 Puławy	iung@iung.pulawy.pl	• soil science • plant cultivation • soil management and protection • water erosion • agricultural and rural environment protection • agricultural and rural spatial planning
Institute of Environment Protection Director: Prof. Dr. Barbara Gworek Krucza 5/11, 00-548 Warsaw	ios@plearn.edu.pl	• water, land and air protection • landscape protection • climate change • water and waste water management • waste management • land degradation and rehabilitation • environment protection and monitoring • socio-economic principles of environment protection • legislation.
Institute of Agrophysics, Polish Academy of Sciences Director: Prof. Dr. Jan Gliński Doświadczalna 4, 20-236 Lublin	agrof@demeter.ipan.lublin.pl	• physical and physicochemical processes in soil-plant-atmosphere systems • physical basis of plant production and quality • physical principles of environment monitoring, modelling and metrology
Institute of Geophysics, Polish Academy of Sciences Director: Prof. Dr. Jerzy Jankowski Księcia Janusza 64, 01-452 Warsaw	sn@igf.edu.pl	• physical processes in the Earth crust • meso- and macroscale processes in atmosphere • climate change • analysis of water systems and their optimal management
Institute of Geography and Spatial Planning, Polish Academy of Sciences Director: Prof. Dr. Piotr Korcelli Twarda 51/55, 00-818 Warsaw		• geomorphology • hydrology • climatology • geoecology • spatial planning.
Research Institute of Forestry Director: Prof. Dr. Andrzej Kłoczek Witwy Warszawskiej 1920 r. 3, 00-973 Warsaw	ibl@ibles.waw.pl	• natural, technical, economic and social aspects of forest management • forest functions • forest ecology and protection
Research Institute of Agriculture and Forest Environment Polish Academy of Sciences Director: Prof. Dr. Lech Ryszkowski Bukowska 19, 60-809 Poznań	zbsril@rose.man.poznan.pl	• Ecological principles of agricultural environment management and protection • mass and energy flow in agriculture landscape • protection of biological reserves

		• climate change • environment protection
Institute of Environment Engineering, Polish Academy of Sciences Director: Dr. Jan Kapala M. Skłodowskiej Curie 34, 41-819 Zabrze	usctoux1@cto.us.edu.pl	• mechanics and physicochemistry of environment contamination • transport of pollutants • land, air and water pollution, degradation, rehabilitation, protection, etc. • waste management • dynamics of geographical environment changes • risk assessment • environment impact assessment.
Institute of Nature Conservation, Polish Academy of Sciences Director: Prof. Dr. Zygmunt Denisiuk Lubicz 46, 1-512 Kraków		• strategy of nature conservation • biodiversity • spatial protection systems, functioning and degradation of ecosystems.
Polish Society of Soil Science President: Prof. Dr. Piotr Skłodowski Wiśniowa 61, 00-950 Warsaw		• soil genesis • soil physics • soil chemistry • soil biology • soil management • soil degradation and protection, • soil monitoring • land use.
Institute of Earth Sciences University of Maria Curie-Skłodowska Director: Prof. Dr. Zdzisław Michalczyk Akademicka 19, 20-033 Lublin	soil@biotop.umcs.lublin.pl	• soil management and protection • land degradation • environment protection • global climate change • water management • environment monitoring.
and many other institutes of various universities, polytechnics, agricultural academies, etc		

Romania

Forest Research and Management Institute SOS. Stefanesti, No. 128, sector 2 RO - 72904 Bucharest	CONTACT: Manager: Mr.George Man, M. Sc Phone: (40 1) 2406095; 004-01-2406845 Scientific director: Mr.Ovidiu BADEA, Ph.D Fax: (40 1) 2406095; 004-01-2406845 Scientific secretary: Mr. Gheorghe Parnuta, Ph.D E-mail: icas@com.pcnet.ro
Functions & Activities Romanian Forest Research and Management Institute, since his establishment in 1933, fulfill activities of planification and research in forestry. Wholly, the experience in the area of ecological reconstruction has been lasting since years '40. The branching of the ecological reconstruction activity was continually improved as new types of environment degradations occurred. <i>Main types of activities in ecological reconstruction (years of experience):</i> Forest belts and windbreaks, prevent desertification (49) Afforestation and lands reclamation (51) Watershed management (49) Ecological reconstruction by forest means of polluted lands (17) Along the existence of Forest Research and Management Institute, his ecological restoration staff solved as many as thousands of projects of different types in many areas around the country, such as: ▪ Typical ecological reconstruction by forest means on sandy soils in those areas of Romania exposed to drought and desertification – 4 projects covering about 1100 ha (over the last 4 years). ▪ The feasibility study on forests restoration in Romanian plain (cooperation with JICA-Japonia) ▪ Ecological reconstruction of forest areas affected by industrial pollution – 7 projects covering about 400 ha over the last 5 years; ▪ Ecological reconstruction in low land flooding areas along the Danube river - 20 projects covering about 4000 ha over the last 5 years; ▪ Riverside forest belts on inside-country rivers - about 10 projects covering about 2500 ha; ▪ Ecological reconstruction of forest affected by windfalls – 2 projects covering 400 ha; ▪ Ecological reconstruction in natural causes declined forests – 3 projects covering 10 000 ha; ▪ Afforestation of industrial (mining, heating or coal power plant) waste heap – 20 projects; ▪ Watershed management and erosion control – 200 projects over the last 5 years; ▪ Afforestation of degraded lands (by water and wind erosion,landslides, salt land) – 10 projects covering 200 ha; ▪ Forest belts and windbreaks to halt desertification processes – 5 projects covering 3000 ha. Besides, some specialists of Forest Research and Management Institute - Ecological Reconstruction staff, have been worked abroad, in different countries: ▪ Forest management planning and forest roads designing in different Arabian countries; ▪ Study on Bir-Ayyad natural reserve management in Libya (in 1982).	

National Research – Development Institute for Environmental Protection – I. C. I. M Spl. Independentei, No. 294, sector 6 RO - 77703 Bucharest	CONTACT: Manager: Mr.Ioan Jelev, Ph.D Phone: (4 01) 2210909; Fax: (40 1) 2219204 E-mail: icim@nfp-ro.eionet.eu.int
Function & Activities National Research – Development Institute for Environmental Protection – I.C.I.M. has a rich experience in the field of land degradation combating, and drought and desertification effect limiting, drawing up numerous theoretical and experimental studies concerning: ▪ quantitative and qualitative management of water resources (data bank, equipment for sample taking and processing, mathematical models regarding water resource use and preservation, water demand and pollution level forecast, etc.); ▪ designing, execution and use of water development works with multiple uses (theoretical and laboratory research activity, mathematical and physical modeling, solutions, forecasts, measuring and control devices); ▪ study, prevention and combating the land slides (field observations, development of adequate equipment for in situ measurements, methodologies to assess the risk, solutions to limit the land slide effects); ▪ irrigation system working (hydraulic calculations, experimental laboratory studies, control equipment, automation devices); rehabilitation of irrigation systems in order to reduce the water consumption and loss from the irrigation canals as well as the adaptation of these systems to the existing social and economic conditions; ▪ up - dating and completion of the Romanian legislation in the field of environmental protection to comply with the European Community legislation.	
National Institute of Meteorology, Hydrology and Water Management Sos. Bucuresti-Ploiesti, No. 97 RO - 71552 Bucharest	CONTACT: Manager: Mr.Ion Sandu, Ph.D Phone: (40 1) 2303116; Fax: (40 1) 2303143; Web site: http://www.inmh.ro E-mail: relatii@meteo.inmh.ro
Function & Activites National Institute of Meteorology, Hydrology and Water Management, subordinated to the Ministry of Waters, Forests and Environmental Protection performs a wide variety of activities in the field of drought monitoring and mitigation, such as: ▪ Climate monitoring of drought based on various methods, among these, beside the old one like Helman (deviation of the precipitation from normal in percent), are used new one like Decile and Standard Deviation, which are more adequately to the statistic distribution of the amount of precipitation; a particular attention is paid to the calculation of the potential evapotranspiration by using Penman's method. ▪ Agrometeorological monitoring system based on daily data processing concerning minimum, maximum and mean air and soil temperature, precipitation and evapotranspiration, in order to daily update of the certain agrometeorological indices; ▪ Elaboration of the Agrometeorological Bulletins, that contains agrometeorological diagnoses and forecasts related to the vegetation status and soil water availability evaluation for agricultural crops, as well as soil water deficit and their zonal distribution over the Romanian territory; this information are weekly edited and diffused to the end-users via internet, mass media, weekly agricultural magazines, etc.	
Research Institute for Soil Science and Agrochemistry B-dul. MARASTI, No. 61, SECTOR 1 RO - 71331	CONTACT: Manager: Mr. Mihail Dumitru, Ph.D Phone: (40 1) 2229442; Fax: (40 1) 2225979;

Bucharest	E-mail: mdumitru@icpa.ro
Function & Activities The Research Institute for Soil Science and Agrochemistry has the following researches and activities related to The United Nation Convention to Combat Desertification in Countries of Central and Eastern Europe: • nation-wide inventory (classification, mapping, data-bases, etc.) and quality monitoring of the soil as natural basic resource; • fostering research for a deeper understanding and a better prediction of different processes implying soil, land and plant nutrition related to drought effects and land degradation; • collecting, interpreting and supplying data on soil, land and plant nutrition; • providing objective and independent expert advise for drought and land degradation related aspects; • developing mitigation actions and methods for drought and land degradation; • developing simulation methods to forecast the effects of drought and land degradation in the context of global changes; • training of stakeholders affected by drought and land degradation.	
Institute of Studies and Design for Reclamation Projects 35-37 Avenue Oltenitei, sector 4 RO - 79656 Bucharest	CONTACT: Manager: Mr. Danut Maria Phone: (40 1) 3322920; (4 01) 3323670 Fax: (40 1) 3321000; E-mail: ispifcen@dial.kappa.ro
Function & Activities As general expertise, ISPIF SA is specialized both in providing consulting through general or feasibility studies in various fields of activity and in carrying out studies and projects. ISPIF SA also provides technical assistance in construction, operation and maintenance for all kinds of land reclamation works such as irrigation, drainage, soil erosion control, fisheries, environmental protection, rural development and applied informatics. In order for lands degradation control and limitation of dryness effects and of extending desert areas, ISPIF SA can perform the following studies and projects for: ▪ Surface soil erosion and deep soil erosion (ravines and torrents) control works; ▪ Wind erosion control works; ▪ Landslides control and slope stabilization; ▪ Turning back to agricultural production of some lands damaged by moisture excess; ▪ Reclamation and improvement of lands that have partially or totally lost the agricultural productivity, induced by abnormal exploitation of irrigation and drainage works; ▪ Environment protection of degraded lands by human activities; ▪ Irrigation works on areas affected by water deficit; ▪ Degradated lands stabilization, as effect of extending desert areas.	

Slovakia

Institute	Function & Activities
Research Institute for Mellioration and Landscape Engineering Director: Dr. Štefan REHÁK, CSc. Vrakunská 29 825 63 Bratislava Tel: (421 7) 43 293 528 Fax: (421 7) 45 248 946 E-mail: vuzh@vuzh.sk	

Water Research Institute Director: Ing. Juraj BRTKO, Csc Nábr. arm. gen. L. Svobodu 5 812 49 Bratislava Tel: (421 7) 5934 3336 Fax: (421 7) 5441 5743, 5441 8479 website: www.vuvh.sk	
Research Institute of Agro-ecology Director: Ing. Rastislav MATI, CSc. Špitálská 1273 071 01 Michalovce Tel: (421 946) 64 20689 Fax: (421 946) 64 20205	
Horticulture and Landscape Engineering Faculty Director: Prof. Ing. Dušan HÚSKA, CSc. Tulipánova 7 949 01 Nitra Tel: (421 87) 6522 741 Fax: (421 87) 6522 741 E-mail: dekfzki@uniag.sk website: www.fzki.uniag.sk	
Slovak Hydrometeorological Institute General Director: Ing. Štefan ŠKULEC, CSc Jeséniova 17 833 15 Bratislava Tel: (421 7) 5477 1247 Fax: (421 7) 5477 4593 E-mail: Pavel.Stastny@mail.shmu.sk website: www.shmu.sk	- climate and hydrological data series analyse,- - Climate change detection, - adaptation of scenarios of climate change
Soil Science and Conservation Research Institute Director: Doc. RNDr. Pavol BIELEK, DrSc Gagarinova 10 827 13 Bratislava Tel: (421 7) 43 420 866 Fax: (421 7) 43 295 487 E-mail: sci@vupu.sk	- soil survey, soil - land use evaluation and optimization, - Geographical Information System about soils, monitoring of soil properties, soil degradation, - soil pollution and risk assessments, - agrochemistry, - plant nutrition, - soil reclamation, - soil conservation

Slovenia

Institution	Function & Activities
Biotechnical Faculty Center for Soil and Environmental Sciences Jamnikarjeva 101 1000 Ljubljana Slovenia Tel: (386 61) 123 1161 Fax: (386 61) 123 1088 Franc Lobnik Ph.D. Professor of Pedology, Land Use, Soil Conservation	All information about the main research and training activities of this institution can be found on the following web site: http://www.bf.uni-lj.si/cpvo.htm e-mail: franc.lobnik@bf.uni-lj.si