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on Sustainable Development**

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**ASSESSMENT OF PROGRESS IN SUSTAINABLE DEVELOPMENT SINCE RIO 1992 FOR
MEMBER STATES OF THE UNITED NATIONS
ECONOMIC COMMISSION FOR EUROPE**

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LIST OF ACRONYMS

AC	accession countries
BOD	biological oxygen demand
CA	Committee on Agriculture of OECD
CAP	Common Agricultural Policy
CBC	TACIS Cross-Border Co-operation
CBD	Convention on Biological Diversity
CEEC	Central and Eastern Europe / Central and Eastern European countries
CEP	Committee on Environmental Policy (UNECE)
CFCs	chlorofluorocarbons
CIS	Commonwealth of Independent States
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLRAE	Council of Europe's Congress of Local and Regional Authorities of Europe
CLRTAP	Convention on Long-range Transboundary Air Pollution (ECE)
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CO ₂	carbon dioxide
CORINAIR	Coordination of Information on the Environment AIR emissions (former EC programme), since 1995 an EEA-ETC/AE programme (CORE Inventory of AIR emissions)
COP	Conference of the Parties
CSD	Commission on Sustainable Development of the United Nations
DAC	Development Assistance Committee of OECD
DG	Directorate General
EAP	Environmental Action Programmes of EU
EBRD	European Bank for Reconstruction and Development
EC	European Community
ECE	United Nations Economic Commission for Europe
ECNC	European Centre for Nature Conservation
EEA	European Environment Agency
EIA	Environmental impact assessment
EfE	Environment for Europe
EFTA	European Free Trade Association
EMAS	European Union's Environmental Management and Audit Scheme
EMEP	Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollution in Europe
EMF	European Mountain Forum
EPOC	Environmental Policy Committee of OECD
EPRs	Environmental Performance Reviews
ESDP	European Spatial Development Perspective initiative
ETC/AE	European Topic Centre on Air Emissions (EEA)
ETC/NC	European Topic Centre on Nature Conservation (EEA)
ETC/W	European Topic Centre on Waste (EEA)
EU	European Union
EUCC	European Union for Coastal Conservation
FAO	Food and Agriculture Organization of the United Nations
FDRP	Flood Damage Reduction Program
FEMA	U.S. Federal Emergency Management Agency
GDP	gross domestic product
GEF	Global Environment Facility
GEO	Global Environment Outlook, biennial environment report of UNEP
GHG	greenhouse gases
GM	genetically modified
GMOs	genetically modified organisms
HBFCs	hydrobromofluorocarbons
HCFCs	hydrochlorofluorocarbons
HELCOM	Helsinki Commission
HFCs	hydrofluorocarbons
ICCAT	International Commission for the Conservation of Atlantic Tuna

ICZM	Integrated Coastal Zone Management
IDN	International Development Network
IEA	International Energy Agency
IFI	International Financial Institution
ISDR	International Strategy for Disaster Reduction
ISEW	Index of Sustainable Economic Welfare
ISPA	Instrument for Structural Policies for Pre-Accession
IPCC	Intergovernmental Panel for Climate Change
ISRIC	International Soil Reference and Information Centre
ITE	Institute for Terrestrial Ecology
IYM	International Year of the Mountains
LUCAS	European Land Use / Land Cover Statistical Survey project
MAP	Mediterranean Action Plan (Barcelona Convention)
MARS	Major Accident Reporting System of EU
MCPFE	Ministerial Conference on the Protection of Forests in Europe
MCSD	Mediterranean Commission on Sustainable Development
MEAs	multilateral environmental agreements
MIRABEL	Models for Integrated Review and Assessment of Biodiversity in European Landscapes
NAAEC	North American Agreement on Environmental Cooperation
NAFTA	North American Free Trade Agreement
NASCO	North Atlantic Salmon Conservation Organization
NBSAP	National Biodiversity Strategies and Action Plans
NEAFC	North-East Atlantic Fisheries Commission
NEAPS	National Environmental Action Plans
NECD	Directive on National Emission Ceilings for Certain Atmospheric Pollutants (EU)
NEHAPS	National Environmental Health Action Plans
NH ₃	ammonia
NIS	Newly Independent States
NMVOCs	non-methane volatile organic compounds
NO _x	nitrogen oxides, including nitric oxide (NO) and nitrogen dioxide (NO ₂)
NRCs	national reference centres
OD	official assistance
ODA	official development assistance
ODS	ozone-depleting substances
OECD	Organisation for Economic Cooperation and Development
OSCE	Organization for Security and Cooperation in Europe
OSPAR	Oslo and Paris Commission
PCBs	polychlorinated biphenyls
PCDDs	polychlorinated dibenzo-p-dioxins
PCDFs	polychlorinated dibenzofurans
PEBLDS	Pan-European Biodiversity and Landscape Diversity Strategy
PEEN	Pan-European Ecological Network
PEPA	Priority Environment Programme for Accession
PFCs	perfluorocarbons
PHARE	EU assistance to the countries of Central and Eastern Europe
POPs	persistent organic pollutants
PPPs	public private partnerships
PRTRs	pollutant release and transfer registers
Ramsar	Convention on Wetlands of International Importance especially as Waterfowl Habitat
REC	Regional Environmental Center for Central and Eastern Europe
REReP	Regional Environmental Reconstruction Programme for South East Europe
SAP	Strategic Action Programme to Address Pollution from Land-based Activities
SAPARD	Special Accession Programme for Agriculture and Rural Development
SEA	strategic environmental assessment
SMEs	small and medium-sized enterprises
SO ₂	sulphur dioxide
SPIR	State - Pressure - Impact – Response
SPIRS	Seveso Plants Information Retrieval System (EU)
TACIS	Technical Assistance to the Commonwealth of Independent States (EU)

TSP	total suspended particulates
UK	United Kingdom
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
UV	ultra-violet
VOCs	volatile organic compounds
WB	World Bank
WHO	World Health Organization
WMO	World Meteorological Organization
WRI	World Resources Institute
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization

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PREFACE

In its decision A/RES/55/199 of 20 December 2000, the UN General Assembly called for a ten-year review of progress achieved in the implementation of the outcome of the United Nations Conference on Environment and Development (UNCED) in 2002 at the Summit level to reinvigorate, at the highest political level, the global commitment to sustainable development. In doing so, it maintained that the Summit, including its preparatory process, should ensure a balance between economic development, social development and environmental protection as interdependent and mutually reinforcing components of sustainable development. It also stressed the importance of early and effective preparations for the Summit and a comprehensive assessment of progress achieved in the implementation of Agenda 21 and the other outcomes of the UNCED to be carried out at the local, national, regional and international levels.

This report is an attempt to provide that assessment of progress for the region of Europe, Central Asia¹ and North America² over the past decade. It discusses some of the major social and economic trends with implications for sustainable development. It examines major processes, such as accession to the EU and transition to market economies, describes a number of production sectors that drive developments in our societies, analyses recent changes in the state of the environment, and assesses a number of national, sub-regional and regional responses that have been developed to try to bring the region closer to sustainable development. Some of these responses are sectoral, some are multi-sectoral and, increasingly, some are integrative. Finally, it describes financing issues for sustainable development with emphasis on environmental management.

The report comprises a brief introduction that focuses on integration and the tentative steps towards sustainable development, seven major sections dealing with the issues listed above, and a concluding summary. Most sections are sub-divided into subsections. Where possible, policy responses have been grouped at the end of each sub-section. Conclusions are summarised at the end of each of the seven major sections, as well as in an overall summarising text at the beginning of the report.

The report is based on existing documents and publications. No specific data were collected or questionnaires sent out for the drafting of the text. It has been prepared jointly by UNECE and UNEP staff and consultants, with inputs from several experts, among others in UNDP-Bratislava, UNIDO and WHO. The consultants could be recruited thanks to the generous contribution of the Swiss Government. Much of the environment-related text is based on EEA's Environmental Signals 2000 and its draft Signals 2001 reports and on UNEP's draft GEO-3 texts. Besides, throughout the report many examples are extracted from UNECE's Environmental Performance Reviews.

Drafting took place between mid-January and mid-April 2001. A first draft was sent out for review end of April and discussed during an extended meeting of the Bureau of the UNECE Committee on Environmental Policy and the Executive Committee of the Working Group of Senior Officials "Environment for Europe", convened on 3 May 2001 to discuss regional preparations for WSSD. Comments received during the meeting, as well as written comments and new input received afterwards, were incorporated between mid-May and mid-June 2001, after which the report was translated into three ECE languages and distributed as an official document for the High-Level Regional Meeting for the World Summit on Sustainable Development, 24-25 September 2001.

Efforts have been made to reflect the enormous heterogeneity in the ECE region, politically, economically, socially and from an environmental point of view. Among the ECE member countries there are those with the richest economies of the world as well as some of the poorest nations; those with long and strong democratic traditions as well as those in transition from centrally planned

¹ Central Asian States that are members of UNECE include Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan.

² Throughout the text, North America refers to the United States and Canada only. Mexico is not a member State of UNECE.

regimes to more open market-economy-based societies; those with environments almost completely altered by men and women as well as those with still large proportions of their territory under natural and semi-natural conditions; those with more innovative new economies and those with traditional production economies; those ahead of implementing policy reforms towards a more sustainable future and those clearly lagging behind. Differences in the ECE region are largely due to this complexity of the political and socio-economic situation in the region.

The most important changes that have taken place within the ECE region over the past decade are the changing of political boundaries (see box below) and the political, economic, social and institutional process of transition, which dominates the policies of thirty per cent of ECE's Member States. These changes have had profound effects on sustainable development in all of the countries concerned, on sub-regions and on the region as a whole.

Changes in political boundaries and UN membership ECE region since 1991

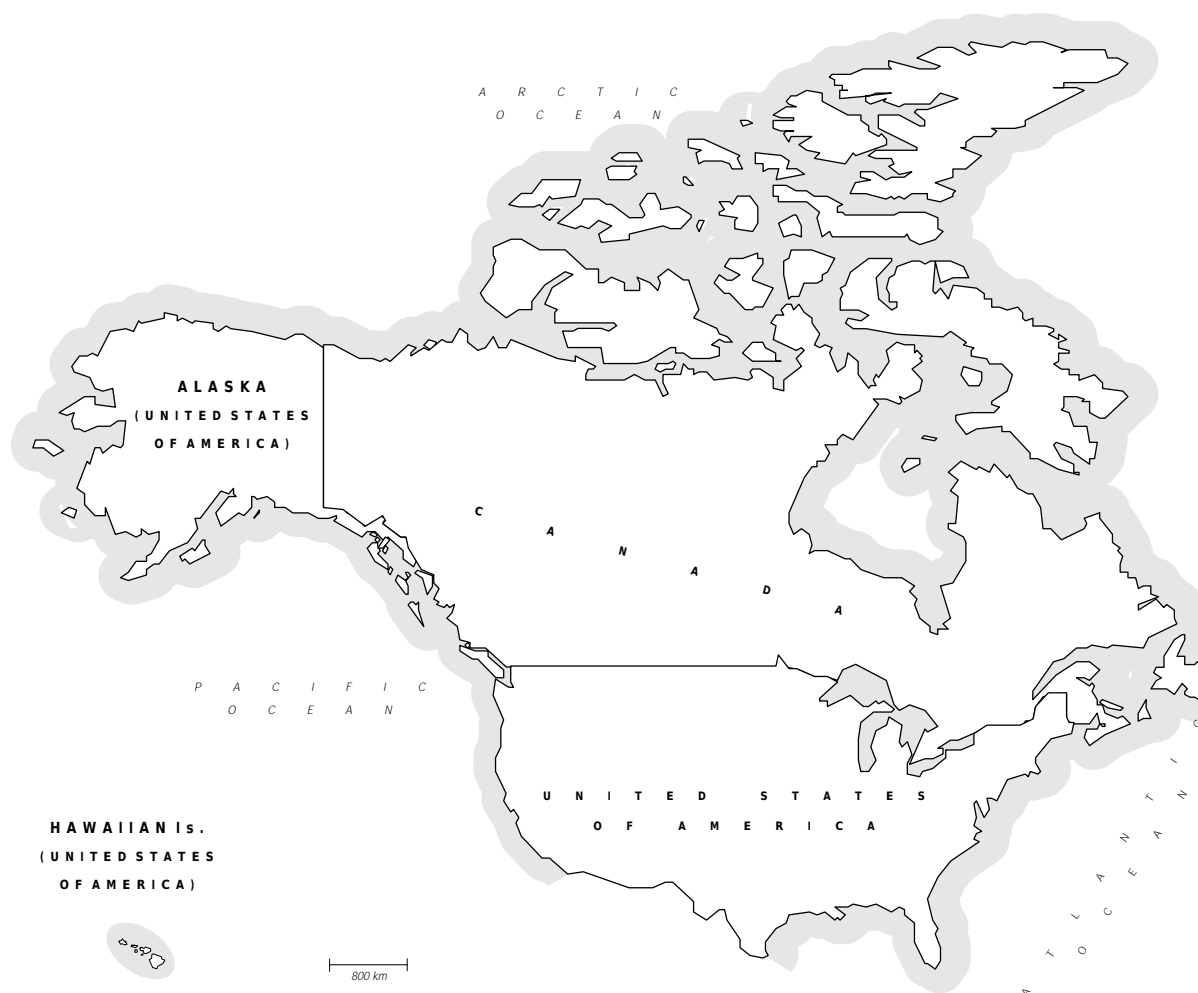
Since 1991, twenty additional countries have joined ECE. Three had already existed as independent States. These are Andorra, Monaco and San Marino, which joined ECE in 1993. Twelve of the new States were formerly a part of the Soviet Union: the three Baltic States of Estonia, Latvia and Lithuania, as well as Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, the Republic of Moldova, Tajikistan, Turkmenistan and Uzbekistan. Four were formerly a part of the Federal Republic of Yugoslavia: Bosnia and Herzegovina, Croatia, Slovenia and the former Yugoslav Republic of Macedonia. The former State of Czechoslovakia divided into two: the Czech Republic and Slovakia.

Where possible facts and trends are described per sub-region. For this report four sub-regions have been distinguished for the ECE region: North America, Western Europe, Central and Eastern Europe (CEEC) and the Newly Independent States (NIS) (see the map below for the location of countries). Depending on data availability and on the specific subject, slightly different groupings had to be used in some cases. Systematic reporting, comprehensive throughout the heterogeneous region, was not always possible mainly due to the lack of compatible data (see also "information, monitoring and evaluation" in section V D).

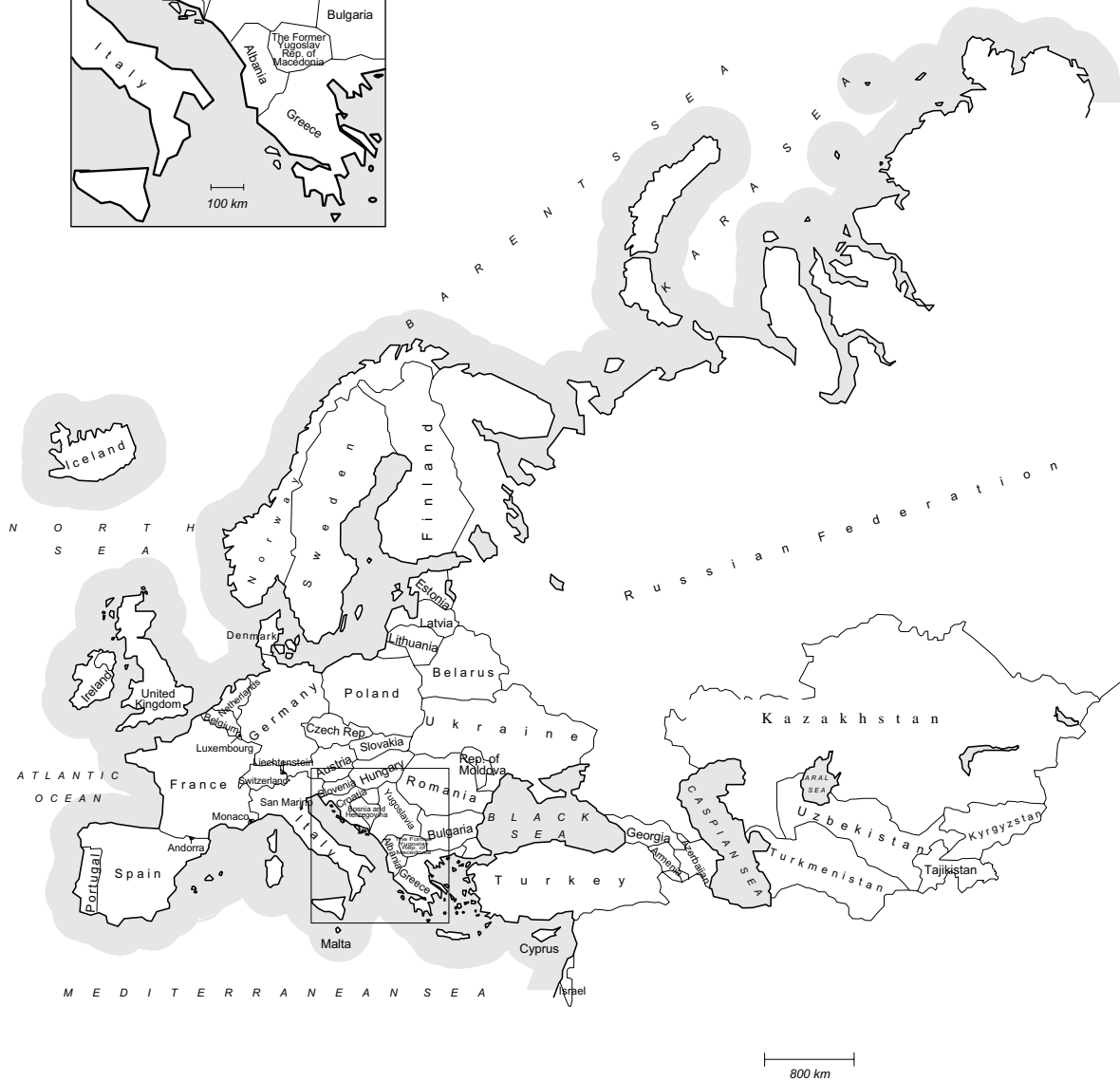
MEMBER COUNTRIES

Economic Commission for Europe

- | | | | |
|--------------|--------------------------|-----------|--------------|
| ● Albania | ● Bosnia and Herzegovina | ● Estonia | ● Iceland |
| ● Andorra | ● Bulgaria | ● Finland | ● Ireland |
| ● Armenia | ● Canada | ● France | ● Israel |
| ● Austria | ● Croatia | ● Georgia | ● Italy |
| ● Azerbaijan | ● Cyprus | ● Germany | ● Kazakhstan |
| ● Belarus | ● Czech Republic | ● Greece | ● Kyrgyzstan |
| ● Belgium | ● Denmark | ● Hungary | ● Latvia |



- | | | | |
|-----------------|-----------------------|--|------------------|
| ● Liechtenstein | ● Poland | ● Slovenia | ● Turkey |
| ● Lithuania | ● Portugal | ● Spain | ● Turkmenistan |
| ● Luxembourg | ● Republic of Moldova | ● Sweden | ● Ukraine |
| ● Malta | ● Romania | ● Switzerland | ● United Kingdom |
| ● Monaco | ● Russian Federation | ● Tajikistan | ● United States |
| ● Netherlands | ● San Marino | ● The former Yugoslav
Republic of Macedonia | ● Uzbekistan |
| ● Norway | ● Slovakia | | ● Yugoslavia |



SUMMARY AND CONCLUSIONS

Towards Integration and Sustainable Development (see Introduction)

In recent years, the third link of the sustainability triangle, the social interface, has received increasing attention in the ECE region. Governments, consumers and major businesses alike are beginning to realise that sustainable development implies changes in patterns of development, production and consumption, and that this requires changes in value systems, in attitudes and in social behaviour.

Progress has been made in improving the eco-efficiency of societies and in decoupling environmental and economic developments, but these gains have been offset by overall trends in production, consumption and economic instability. More natural resources are being consumed; more pollution and waste are being generated; transport and tourism have grown excessively; poverty and inequity continue as major factors in the region.

Ten years after Rio, one has to conclude that the intentions and actions taken to achieve integration of economic, social and environmental aspects are moving in the right direction, but that sustainable development is only beginning to be put into practice. It is still too often viewed as an “add-on” to environmental issues. Short-term concerns still take precedence over long-term principles of intergenerational equity or the precautionary approach.

Social, Economic and Political Trends (see Sections I and II)

The rate of population growth has declined in the region due mainly to low fertility rates. In the countries in transition, the decline in birth rates relates to acute economic hardship and is accompanied by rising mortality rates. In a large part of the region the population is ageing. These changes will have an impact on the environment and society as a whole, particularly in terms of consumption patterns, pensions and work-force participation.

The gradual increase in the already-high urban population creates greater demands for space and transport infrastructure, generates large quantities of waste and emissions to soil, water and air. At the same time, large metropolitan areas often suffer from high levels of unemployment, poverty and urban dereliction, all linked to many social and environmental problems.

Local authorities have become more active in the 1990s, emphasising integrated action and collaboration among cities and a wide array of local actors. Though some positive lessons can be learned from Local Agenda 21-related activities, practical measures on the ground are not yet sufficient. Poverty continues to be a major social problem in many parts of the region. In several countries in transition more than half the population lives below the national poverty line. Relatively high unemployment in Europe raises questions about the sustainability of growth and human development in the region. In many economies in transition the female labour force has shrunk dramatically. Poverty and unemployment often lead to human insecurity, ill health, loss of self-respect, a sense of failure and social exclusion.

The development of democratic institutions and societies has been one of the main challenges of the transition process and many countries across the region have made important progress in establishing more democratic systems. Information, participation and access to justice are seen as essential elements of a true participatory democracy. There is room for improvement in public participation laws and practices in all countries of the region.

Environmental pressures from consumption have intensified and may worsen in many areas as a result of increasing per capita incomes and resource- and pollution-intensive lifestyles. Although

there are still large differences in some consumption patterns between western countries and countries in transition, it may be expected that consumption patterns in central and eastern Europe and the newly independent States will follow the same path as they have done in the West.

Significant growth in GDP per capita and industrial production in western Europe and North America over the past decade has been accompanied by structural changes in the production system, with a shift from material- and energy-intensive sectors to services. Progress has been made in improving society's eco-efficiency and in decoupling resource use and economic growth, but these gains have been offset by overall increases in the volume of goods and services consumed and discarded. Eco-efficiency gains in the energy sector in western Europe and North America are offset by an increasing use of oil, generating more emissions of CO₂ and other pollutants.

The central and east European countries and the newly independent States are beginning to recover from the economic collapse of the early 1990s. Yet, only a few of these countries have surpassed their 1989 output level. Their GDP per capita remains much lower than the average in western countries. All economies in transition aim to accelerate their growth, restructure heavy industries, phase out obsolete technologies, raise energy efficiency while re-establishing welfare systems and strengthening environmental protection. Given the low level of domestic resources, the restricted access of many economies in transition to the international financial markets and the limited amounts of official assistance they have received, some of these countries face severe resource constraints, hampering their progress towards sustainable development.

The environmental possibilities of the EU accession process is also a legal, institutional and investment challenge. The candidate countries are well on their way in environmental management reforms and in adapting their environmental management to EU requirements. Investment requirements to implement this new legislation are enormous though. In many cases, investments are also justified for economic reasons, as they result in more efficient natural resources use and savings in energy and material use. A big challenge in the process is to ensure that the candidate countries avoid unsustainable EU practices in their energy, transport and agriculture policies.

Public participation-related initiatives increased substantially beginning around 1994, partly due to increasing understanding of the links among environmental civil society, democratisation and market reforms in the countries in transition. Strengthening the public participation process in environmental matters is a central element in the pan-European "Environment for Europe" process (see also below). The Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters is probably the most significant development since Rio in the ECE region with respect to strengthening public rights to information and participation. Many transition countries have made important progress to establish more participatory democratic systems, but there is room for improvement in public participation laws and practices in all ECE member countries. Also cultural changes are needed, especially in countries with deeply entrenched customs based on official secrecy.

The globalisation process has led to increased regional trade integration (NAFTA, EU), and to substantial flows of foreign direct investment. International co-operation increased through multilateral environmental agreements (MEAs). Implementation of regional environmental legal instruments has positive impacts on the state of the environment, and levels the competitive field as countries accede to the same environmental rules.

The region continues to face severe local, transboundary and international environmental problems. These include emissions of greenhouse gases, air and water pollution, biodiversity loss, waste generation, technological hazards and risks to human health caused by harmful chemicals and genetically modified organisms. Despite progress in some of these areas, such as the reduction in emissions of some air pollutants, additional measures will still be needed to protect the environment

and human health. Pollution of surface and groundwater is still a serious issue in the whole region. Furthermore, access to water both for drinking and for agriculture is a major problem in some parts of the region, particularly where desertification is spreading. Damage to the region's landscapes and soil is increasing. The regional seas surrounding Europe and North America continue to suffer from coastal pollution and degradation, in particular through the impact of tourism.

Significant new legally-binding regional and subregional environmental conventions have come into force. These have successfully integrated all three pillars of sustainable development. However, even though this is a clear indication of progress, the difficulties of some parties in ratifying of and complying with these conventions, weaken overall implementation.

The ECE region can and should play a leading role in global governance by streamlining MEAs and secretariats such as the biodiversity-related conventions or by, for instance, promoting globalization the Aarhus Convention. Specific activities like environmental monitoring and forecasting should be harmonised.

Mobility is expected to increase further, both within the ECE region and between other regions in the world. Increases in economic refugees, political refugees, refugees from natural disaster areas and from armed conflicts are all trends that have serious impacts on societies, both in the countries that these people leave behind and in the recipient countries. Increased mobility in tourism and business has clear impacts on the environment.

Driving Forces and Sustainable Development (see Section III)

Major production and consumption sectors driving developments in the ECE region are: energy, transport, industry, agriculture, tourism and, related to all those, households. Four of these driving forces have been covered in more detail in this report:

- Fuel switching and efficiency gains - mainly thanks to technological improvements - have helped some countries of the region to move towards decoupling environmental effects of energy use and economic growth. Nevertheless, energy production and use continue to be the main contributors to anthropogenic greenhouse-gas emissions and air pollution. The countries in the region should ensure that increased energy consumption does not outweigh efficiency gains. Greater efforts will have to be made to further improve energy efficiency, especially in economies in transition, to save energy, to use more renewable energy sources, and to ensure that energy prices reflect the environmental costs. There is a huge potential for reducing the very high energy intensity and improving low energy efficiency in economies in transition.
- Transport developments are jeopardising the ability of countries to achieve their environmental and human health policy targets. Much of the road and air transport infrastructure is used beyond its capacity. Congestion causes significant economic and health losses. Car-related pollution causes yearly thousands of premature deaths. The number of passenger kilometres and of bigger cars continues to increase. The shift from rail and other public transport to car and air travel is continuing, even during the economic recession in transition countries. Low road transport prices and inconvenient public transport provide no incentives for consumers to change their behaviour.
- The serious health and environmental effects of the high growth in road transport, in particular climate change and air pollution, must be reduced. The environmental impacts of transport infrastructure should also be limited, especially by more widely applying strategic environmental assessment. Particular emphasis should be given to limiting the negative

environmental and health impacts of road transport in urban areas. Environmental and health objectives need to be integrated into the transport sector. Policy packages are required combining economic incentives, land use planning, demand management, information and education, new technology, and regulation.

- Environmental pressures from industrial production has intensified and will probably worsen over the coming years, despite shifts from heavy industry to services and the successes booked by scientists and the corporate sector to reduce energy and material intensity of consumer goods. It is expected that consumption patterns in CEE countries and NIS will follow the same path as they have in the West. However, in these countries there is a large potential for introducing cleaner technology and less damaging industrial production.

More needs to be done to put cleaner production and integrated pollution control concepts into practice. Uncertainty about toxicity of new chemicals and waste, disposal of new materials, risk of accidents related to new technology all need to be addressed. Large companies are becoming more sensitive to sustainable development, especially in Europe. Corporate responsibility of small and medium-sized enterprises needs to improve though.

Western European and North American agriculture has become more specialized, intensified, chemical dependent and concentrated in areas with low production costs. The transition in CEE countries and NIS has led to a decline in intensity of agricultural production. Despite agricultural policy reforms, the threat of continued polarization between industrial agriculture and marginal agriculture remains, impacting negatively on the environment, in particular on biodiversity and water quality, and society as a whole.

Both governments and the general public realise that drastic reforms will be required for agriculture and food production to become sustainable, with more “humane” approaches rather than focussing on the economics of production only. The multi-functionality of agriculture needs to be emphasised more (food production, guarding cultural heritage and landscapes, providing space for flora and fauna, recreational areas).

Major Environmental Challenges and Responses (see Section IV)

To tackle climate change, the EU has announced it is on track to achieve the 1997 Kyoto targets to reduce CO₂ emissions, assuming additional policy and measures. Opinions still differ, though, as to whether the “additional policy and measures” will be feasible and sufficient to reach the set target. Current emission levels of most CEE countries and NIS are far below their “Kyoto base year levels”. Emissions trading schemes present interesting possibilities for CEE countries and NIS. In North America curbing emissions will be difficult to achieve with current policy developments. Many feel that the current energy policy debate in the United State is worrisome with respect to future CO₂ emissions. Structural changes will be required in the entire ECE region in the transport and energy sectors.

Policy measures taken to reduce air pollution (for instance through the effective and long-standing framework of the Convention on Long-range Transboundary Air Pollution) have shown a clear positive impact on the environment and human health. SO₂ and NO₂ emissions are decreasing, but particulate matter and ozone precursors still cause serious problems. The average figures mask a large variation among member countries in the ECE region. Despite this clear progress, it is forecast that additional measures will still be needed to protect the environment and human health. Integrated abatement strategies are required to address the interactions between environmental sectors and problems such as climate change, ozone depletion, air, soil and water pollution.

Damage to the region's landscapes and soils is increasing. Policy is primarily aimed at combating pollution in other areas (air, water), affecting soils only indirectly. Better integrated land-use planning and management is required to tackle the problems associated with land cover and land-use change and soil degradation.

More should be done to protect and restore ecosystems and halt the loss of biodiversity. Extending such protection to the wider countryside requires a deeper and effective integration of environment and biodiversity into agriculture, landscape, forestry and marine policies, coupled with new initiatives, for example, to develop a soil strategy for Europe. More attention needs to be given to establishing and maintaining ecological networks as well as to protecting the mountain ecosystems. All countries of the region should ratify and implement the Convention on Biological Diversity. New instruments for the protection and sustainable management of biodiversity, particularly coastal zones and mountain areas, should be developed, as appropriate. A stronger Pan-European Biological and Landscape Diversity Strategy may play an important role in this.

Forest policies, and those for other sectors that affect forests, should promote sustainable forest management as defined at the second Ministerial Conference on the Protection of Forests (Helsinki 1993), striking a balance between the environmental, economic and social roles of the forest. Certification that forest products come from sustainably managed forests, used as a voluntary, market-based tool to promote sustainable forest management, may play an important role in achieving this.

Overall, the environmental management of mountains is inadequate: they suffer from the classic "commons syndrome" in which all seek to benefit, yet stakeholders lack co-ordination, incentives and instruments for joint care.

Progress has been made in reducing freshwater pollution in Western Europe and North America, but the situation is less promising in CEE. Surface and ground water pollution is still a serious issue in the whole region. Water availability problems occur in various parts of the region as well. Much national legislation and various bi- or multilateral agreements exist for the management of freshwater, with various degrees of success. More sustainable watershed management and freshwater protection is needed, integrating water quantity and quality aspects, and including both flood and groundwater protection.

More legally binding, sub-regional conventions for the management of marine and coastal resources have come into force, and sub-regional commissions in this area are working toward sustainable development. There has been progress, but there are difficulties as well in implementing some of the agreements. To date, there is virtually no integrated coastal zone management.

In the ECE region storms and floods are both the most common natural hazards, and the most costly in terms of economic and insured losses. There are clear indications that costs of natural hazards are increasing. A lack of integrated land use planning and management in susceptible areas, such as mountainous areas and floodplains, increase the incidence and severity of hazards. Difficulties in forecasting and prediction, coupled with limited technical or behavioural responses, seem likely to lead to few improvements in risk management.

For many industrial hazards, holistic approaches are becoming more prevalent, with increasing attention to reduction of risk of long-term environmental impacts as well as acute health and property damage. There are still shortcomings in environmental legislation and administration though. Many efforts are still necessary to further reduce the risks related to major accidents.

Sustainable Development at National Level (see Section V)

Since Rio, virtually all countries of the ECE region have established sustainable development policies and strategies and expressed their intentions to integrate economic, environmental and social policies and measures towards sustainability. Implementation varies considerably in both structure and degree of success.

The prevailing institutional framework for formulating proposals for action and choosing policy instruments in the region is one of market-based economies and democratic political institutions. A combination of economic instruments and regulations should be the principal means for making output in market economies more environmentally sustainable.

As for the policy instruments, economic instruments – taxes, charges and tradable permits, for example – to correct market and policy failures, and to internalize environmental and social costs should be further expanded.

Carefully designed and implemented economic instruments can make an important contribution to achieving sustainable development, and can also be used to strengthen the application of multilateral environmental agreements and to develop mutually supportive environmental and trade policies. Direct regulation, for instance through the setting of environmental standards, including outright prohibition, continues to be necessary in a number of areas.

For a range of reasons monitoring and evaluating policy implementation is still difficult. Comprehensive but rationalized and harmonized data collection and reporting programmes with sufficient detail and quality are still weak, both in terms of statistical data and of geo-referenced mapping. Indicators to assess implementation of sustainable development activities and principles need further development.

Integration and Harmonisation at Sub-regional and Regional Levels (see Section VI)

The “Environment for Europe” process represents an innovative and highly productive forum for coordination of efforts to harmonize environmentally sound and sustainable development policies on a pan-European level. By taking advantage of an historical opportunity to establish a pan-European dialogue, it has fulfilled several functions, including the establishment of institutional arrangements for coordination of assistance, adoption of new MEAs and pan-European strategies, evaluation of environmental performance, and outreach to related interministerial processes for integration of environmental and sectoral policies.

MEA efforts have gradually moved away from the transboundary context towards establishing Europe-wide domestic norms for addressing certain problems. In addition the region made significant contributions to the development and promotion of global MEAs, particularly in fields such as biodiversity and nature protection and hazardous waste transport.

EU integration and EU enlargement are strong forces for harmonization of policies. The overall process of harmonisation has been served by several institutional arrangements and international organisations, such as UNECE, UNEP, OECD, the EAP Task Force, the REC (and the sub-regional environment centres), the Council of Europe, and OSCE. Regional efforts are mirrored on the sub-regional level.

Though a more harmonised sustainable development policy has been achieved in the ECE region, some significant problem areas still exist. Some problems involve multi-track processes well under way, such as the development of environmental civil society boosted by the adoption of the Aarhus Convention. Other problem areas are still to be resolved.

The ECE region is home to a number of significant integration processes, relating to transport, health, forestry, agriculture, land use and spatial planning. However difficult this is at the national level, it is even more difficult at the international level.

The ECE region has employed a flexible approach to develop a number of effective tools and processes to deal with emerging issues, whether they relate to harmonised efforts to “green” transport or agriculture, to establish rules for environmental liability, to apply the precautionary principle in connection with biotechnology and biosafety, to regulate genetically modified organisms, to control the effects of introduced variants on biodiversity, or to meet other, future challenges.

Financing for Sustainable Development (see Section VII)

There is no single efficient system or structure of financing sustainable development even in Western countries. Pure market instruments are not sufficient to cover all needs, particularly in the areas of environmental protection and social welfare. Thus State budget interventions seem to be indispensable in all countries of the region.

Financing of environmental investments in Western countries is generally based on market forces (the “polluter and user pay” principles and increasing private investment). Both CEE and, to a greater extent, NIS countries, however, still need to mobilize additional domestic resources and to receive bilateral and multilateral assistance in order to undertake all of the activities required to move toward sustainable development.

There are many actors in the business of financing sustainable development in the ECE region. Funding for sustainable-development-related activities is obtained (1) from national environmental funds and national or local private investments, (2) from bilateral and official development assistance (ODA), (3) through EU assistance like the Phare Programme, ISPA, and TACIS and (4) through multilateral disbursements via international development banks such as the EBRD, the World Bank and programmes like the Global Environment Facility. The report gives extensive details on funding flows over the past decade.

Multilateral institutions should pay more attention to financing sustainable development. The flow of assistance from donor communities to countries in transition in the ECE region is important also in terms of harmonisation of policies, which occupies an important place in the overall scheme of assistance.

The level of financing has been decreasing overall, and foreign direct investment to countries in transition is too low. The CEE countries, and particularly the NIS, should create an environment enabling development of institutions and conditions to mobilise their own financial resources, to attract foreign investments and to improve the effectiveness of foreign assistance.

INTRODUCTION: TOWARDS INTEGRATION AND SUSTAINABLE DEVELOPMENT

The United Nations Conference on the Human Environment, held at Stockholm in 1972, was the first major discussion of environmental issues at the global level. The agenda touched on virtually all aspects of natural resource use, but the focus was primarily on the threat to the natural environment posed by economic growth and industrial pollution.

In 1987, the World Commission on Environment and Development published its report, "Our Common Future," better known as the Brundtland Report. The report set out the concept of "sustainable development," an integrated approach to policy- and decision-making in which environmental protection and long-term economic growth are seen as complementary and mutually dependent. It calls for a development that "meets the needs of the present without compromising the ability of future generations to meet their own needs".

The Brundtland Report set in motion a process which culminated in the United Nations Conference on Environment and Development (UNCED), held at Rio de Janeiro in 1992 (the "Rio Conference"). The Rio Conference adopted a Programme of Action for Sustainable Development, referred to as Agenda 21, and the Rio Declaration on Environment and Development. The Conference also adopted the Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests, and opened for signature both the Framework Convention on Climate Change and the Convention on Biological Diversity.

Agenda 21, Preamble, paragraph 1.1

Agenda 21 is derived from an international recognition that "we are confronted with a perpetuation of disparities between and within nations, a worsening of poverty, hunger, ill health and illiteracy, and the continuing deterioration of the ecosystems on which we depend for our well-being. However, integration of environment and development concerns and greater attention to them will lead to the fulfilment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future. No nation can achieve this on its own; but together we can -- in a global partnership for sustainable development." (emphasis added)

The Rio Declaration and Agenda 21 are the fundamental documents at an international level underlying sustainable development. Together they define "sustainable development." Fundamental to this definition is the integration of environment and development. Sustainable development may be regarded as the progressive and balanced achievement of sustained economic development, improved social equity and environmental sustainability. Accordingly, Agenda 21 stresses the importance of integrated policy development, citizen participation in decision-making including the full participation of women, institutional capacity-building and global partnerships involving many stakeholders.

But the quality of growth is as important as its quantity. It is essential to ask not only, is it contributing to growth, but also, is it promoting equity? Does it contribute to meeting the food, health care, safe water, shelter and educational needs of countries? Does it lead to an environment that is conducive to a healthy and productive life? Does it take a precautionary approach to resource use? Sustainable development should lead to the "*fulfilment of basic needs*", to "*improved living standards for all*", to "*better protected and managed ecosystems*" and to a "*safer, more prosperous future*." (see box above) These are issues that insist on the integration of environment with development and that must balance the needs of the international community with those of the State.

While Rio emphasized integration, the links between economic development and environmental stewardship were better articulated than the link with social equity. Ten years after Rio, the third link of the sustainability triangle, the social interface, is receiving increasing attention. Issues of equity, of poverty eradication, and of social exclusion have been highlighted, particularly in the transition to a

market economy in Central and Eastern Europe and Central Asia, and by the perceived effects of globalization almost everywhere.

It is increasingly understood that the paradigm for sustainable development may imply changes in culture and in patterns of development, production and consumption. These changes could be facilitated by raising awareness and understanding of the implications of current production and consumption levels. It may also require substantive transformation in attitudes and in social behaviour. Within the ECE region, there is a significant movement toward integrative policies and institutions, spurred on by growing scientific knowledge, increased information and public awareness, demonstrable negative impacts of some sectoral approaches, and underscored, to some extent, by the transition process. Sustainable development is still often viewed as primarily an environmental issue or as an “add-on” to environmental issues, but this is less the case than it was ten years ago. Examples of this are particularly evident in several integration instruments initiated since 1992 and in some of the possible new international agreements currently being discussed or negotiated. These are summarized in the box below.

Examples of efforts to put instruments in place for sectoral integration

Existing instruments:

- CLRTAP Protocol on Acidification, Eutrophication and Ground-level Ozone (1999)
 - The Pan-European Biological and Landscape Diversity Strategy (1999)
 - The Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (1998)
 - NAFTA/NAAEC (1994)
 - Agenda MED 21 (1994) and the Mediterranean Commission on Sustainable Development (1996)
 - Baltic Agenda 21 (1998)
 - EU Directives such as the Habitat Directive (1992), the Environmental Impact Assessment Directive (1997), and the Water Framework Directive (2000)
 - The Vienna Programme of Joint Action on Transport and Environment (1996)
 - The Charter on Transport, Environment and Health (1999)
 - Montreal Process for Sustainable Forest Management in Temperate and Boreal Forest Countries
-

New initiatives under negotiation or in formulation phase:

- Possible protocol on strategic environmental assessment
 - Considerations to formulate a regional “transport, environment and health” convention
 - Possible protocol on liability and compensation under both the industrial accidents and the watercourses and international lakes conventions
-

In the current preparations for the Fifth Ministerial Conference “Environment for Europe,” scheduled for Kiev, Ukraine in May 2003, delegations to the Working Group of Senior Officials to prepare the Conference are emphasizing the role of “integration” as a major theme for the Conference. Along the same lines, the European Union, at the Cardiff European Council in June 1998, endorsed a separate Commission on Integration. A sense of “integration” also affects the way in which consumers make decisions, and this has begun to influence production sectors like industry, agriculture, and tourism. The mad cow and foot-and-mouth diseases in the ECE region have made the relationship clear among agriculture, tourism and the environment. Links among transport, climate change and tourism, as well, are also of concern. There is growing public pressure for products and packaging that can be reused, recycled, returned to manufacturers or better disposed of and that are produced under socially acceptable circumstances.

Integrated sustainable production and development has become an increasingly significant factor shaping corporate strategy in Europe and North America. A decade beyond Rio, most of the major businesses in the region have specified environmental and social aims; most of them have detailed environmental programmes and more and more also have social programmes in place. Many of these

companies publish annual environmental reports as well. Indeed, corporate responsibility is increasing in major corporations. Unfortunately, the same is not true for small and medium-sized enterprises (SMEs): most lag far behind in environmental and social action, and many have not even started.

Poor communications and difficult access to useful information are still key factors restricting public awareness of sustainable development issues in most parts of the region and therefore hindering progress towards sustainability. The recent Aarhus Convention is expected to improve the situation in the future.

Overall, though progress has been made in improving the eco-efficiency of societies and in decoupling environmental and economic developments, these gains have unfortunately been offset by trends in production, consumption, and economic instability. More natural resources are being consumed; more pollution is being generated; transport and tourism have grown significantly; poverty and inequity continue as major factors in the region.

Ten years after UNCED, the intentions and preparatory actions taken in the region to achieve integration are moving in the right direction. Sustainable development is only beginning to be put into practice. Short-term concerns still take precedence over long-term principles of intergenerational equity or the precautionary approach. No single country in the region has fully implemented its declarations about integrating environmental considerations into decision-making. There are still obstacles to promoting dialogue between policy makers and civil society and communicating sustainable development issues to decision makers. The enforcement structures and economic systems in the newly independent States are still too weak. Monitoring and evaluating progress towards sustainable development need to be improved. Much remains to be done to put sustainable development into practice.

At the same time, the "Environment for Europe" (Efe) process has helped to move a major part of the region forward, and it is felt that this experience may be relevant for the global process of ensuring a more sustainable development. One example is the UNECE regional Protocol on Persistent Organic Pollutants (POPs) that recently led to the adoption of a global POPs convention. Some other examples of institutional and policy innovations that may be worth consideration by other regions are the use of a catchment approach in management regimes for natural resources (such as applied for the Rhine and for many of the regional seas), the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, which is also open for signature outside the region, national level policy instruments like CO₂ taxes and road payment schemes, voluntary agreements and local level community schemes.

I. SOCIAL AND ECONOMIC TRENDS

A. Population Dynamics

The ECE region had a combined population of nearly 1.2 billion in 2000 (727 million in Europe and 314 million in North America), compared with 6.1 billion in the world (United Nations Population Division, 2001). The rate of population growth has declined in the entire region, due to low fertility rates. In fact, birth rates in almost all ECE countries (except for Albania and Central Asia) are currently below the 2.1 children per woman required to keep a population steady. Birth rates have fallen to as low as 1.1 children per woman in Armenia, Bulgaria and Latvia, and to 1.2 children in Estonia, Italy, the Russian Federation, Slovenia and Spain. In contrast, the population of North America is still growing at an annual rate of 0.8 per cent (United Nations Population Division, 2001).

The decline in growth rate is projected to continue for virtually the whole region since fertility rates are not expected to increase. While growth is expected to be substantial in the United States and Canada, due largely to immigration, a decrease of about 1.7 per cent is projected in Central and Eastern Europe (not including NIS) In the other parts of the UNECE region growth is projected to be minimal (UNECE et al. 1999). The table below shows the contrasts trends in life expectancy in different parts of the region.

(Sub-) region	Life expectancy 1995-2000
North America (and Western Europe)	76.7
Europe as a whole	73.2
Central Asia	66.6

Source: United Nations Population Division (2001)

The transition process in CEEC and NIS has been accompanied by a population crisis never seen before in peacetime in industrial countries. By the late 1990s, fertility rates fell to historically low levels, since couples appear to have chosen not to have children, given their current and expected life options. Where in other parts of the world a decline in birth rates is a sign of improved economic conditions, in the transition countries it relates to acute economic distress. It is accompanied by rising mortality rates, particularly during the early 1990s, most alarmingly among middle-aged men, but even teenage mortality is on the rise. Consequently the natural population growth is negative in many countries in transition (UNDP, 1999).

The structure of a population impacts on the environment and society as a whole, particularly in terms of consumption patterns, pensions and work force participation. The most significant change in population structure currently taking place in a large part of the region is the ageing of the population, as a result of prolonged life expectancy and low fertility rates. The process of ageing will intensify in coming years. There is a rapid increase of people aged 65 years or over, with more women than men over 65, and a decrease of the population under age fifteen, leading to a flattening of the population pyramid (United Nations Population Division 2001). This also means there will be more retired people with longer life expectancy but higher health risks, and often increased revenues who will require more space and resources and have different needs (for instance, to ensure that they are able to stay mobile).

B. Urbanization and Urban Stress

Although the development of urban settlement patterns in North America and Western Europe have differed from those in the East, the general trend of development and the environmental and social consequences are often similar. At present, some 75 per cent of the population in the ECE region lives in urban areas. Especially in North America and Western Europe the footprint of cities extends far beyond their boundaries, causing significant regional and even global impacts, through demands for natural resources and space, forest fragmentation, waste generation (see also section I D) and emissions to soil, water and atmosphere. At the same time, large metropolitan areas and cities often attract high local levels of unemployment, poverty and urban dereliction, all linked to social and environmental problems. These complex urban characteristics and trends are making the achievement of sustainable development increasingly difficult.

Urban sprawl is starting to gain momentum in parts of CEEC and NIS as well, where economic transformation enables wealthy people and the growing middle classes to buy more consumer goods, suburban family houses and private cars to commute to work. . Municipal waste levels are growing, as are air pollution and demands for transport infrastructure, while reliance on public transportation is decreasing (EEA, 1999).

Though the rise in urban population has slowed significantly over the past thirty years, the percentage of the population living in urban settlements in Europe and North America is expected to grow from the current 75-77 per cent to 83-84 per cent in 2030 (United Nations Population Division, 2000). Cities will continue to sprawl, causing land use stresses, social inequities and more traffic congestion. The conditions described in the box below are characteristic for many Western, and increasingly Eastern European urban conglomerates as well.

Urban stress in the United States

Already in the 1970s, the urban settlement pattern in the United States was characterized by low-density, non-contiguous, automobile-dependent suburbs surrounding city cores. This development had been fuelled by post-war economic expansion, and government policies and incentives for home ownership (Baker 2000). Massive federal highway development, government-funded extension of sewers and water lines, emergency services and new schools all provided clear incentives to open up new suburbs (Sierra Club 2000). Also in the 1990s sprawl and car dependency continued to increase through new road building. The high costs of roads deprived public transit services and other transportation options of potential funding (Pope 1999). Artificially low gas prices also benefit the suburban commuter rather than the urban transit user (Baker 2000).

The multiple negative effects of urban sprawl are numerous:

- Vast areas of forests, wetlands, recreational wilderness, and agricultural land are built-over. About 405,000 hectares continue to be lost each year (Dowling 2000).
- The services provided by natural landscape features, such as wildlife habitat, flood and runoff control, and soil productivity, are lost (Parfrey 1999).
- The increased reliance on automobiles has led to air quality problems and related human health impacts. Much cleaner, more efficient cars and more stringent emission regulations generally improved air quality in cities since the 1970s, but these gains are being eroded, largely due to sprawl and the trend toward Sport Utility Vehicles (SUVs).
- United States citizens now drive more than twice as many miles as they did in the 1970s (Dowling 2000; HUD 2000). Transportation is a leading contributor to greenhouse gases and climate change. Sprawl-exacerbated traffic congestion costs an estimated at US\$ 72 billion a year for lost time and fuel in the United States alone (Dowling 2000).
- Social stress in the inner cities, from unemployment, poverty, and crime, usually increases, which further contributes to suburbanization trends. High-tech employment, for example, is growing 30 per cent faster in United States suburbs than in cities, encouraging residential and business development to move to fringe settlements (HUD 2000).

Policy Responses

The problems of urban development and its impact on human health and the environment have been difficult ones for policy-makers. With the current trends in urbanization urban planners are facing challenges not seen before. For some aspects of urban development there are measures and tools that can be implemented by government authorities and through voluntary agreements with industry, as for instance illustrated in the box below on noise exposure (see also a box on public-private-partnerships – PPPs – in section V C).

Local authorities all over Europe have begun to implement Local Agendas 21, and about 400 local governments across Europe have adopted the Charter of European Cities and Towns, which emphasizes integrated approaches towards sustainability and better collaboration between cities, although real practical measures were reported from very few (EEA, 1999). Forty-four of the approximately 350 local government members of the International Council for Local Environmental Initiatives are in North America (ICLEI 2000). The “Smart growth” movement in North America is gradually gaining ground. Compounding the problems in CEE countries and NIS is the fact that in the last 10 years, national governments have transferred a wide array of urban environmental responsibilities to local authorities without providing adequate resources to fulfil them.

Policy responses in Europe to curb noise exposure

Of the almost 80 per cent of European citizens who reside in urban communities, it is estimated that more than 30 per cent live in dwellings with significant exposure to road noise. Long-term impacts of noise pollution on human health for which there is sufficient evidence are hearing damage, hypertension, ischaemic heart, anxiety, lower school performance and self-reported impaired sleep quality (Health Council of the Netherlands, 1994).

The high percentage of noise exposure continues in spite of many measure already taken, such as:

- economic instruments like fines levied for noise pollution, which has been an effective deterrent both in Western Europe and in CEEC;
 - use of better noise isolation material for housing;
 - significant reductions of noise limits from individual sources, such as cars and lorries;
 - phasing out of noisier aircraft;
- noise optimization of flight procedures and airstrip geometry.

The aircraft noise footprint around airports, for instance, has, as a result of such measures, been reduced by a factor of nine, compared with 1970, and it is anticipated that air traffic growth up to 2010 can be accommodated at most main airports without significant increases in noise exposure.

Sources: EEA (1999) and REC (1999)

The Smart Growth movement in North America

In the past ten years, a 'smart growth' movement has emerged in North America to combat the social, economic and environmental ills associated with urban sprawl. Smart growth draws together a broad coalition of supporters including environmental NGOs, social justice activists, local government officials, urban planners and affordable housing advocates (Baker 2000). They promote a more controlled, intelligent urban planning process that encourages sustainable development. The movement advocates high density neighbourhoods characterized by a healthy balance of mixed residential, office and retail land uses in close proximity, with civic buildings clustered in a town centre; the reduction of travel distances, which encourages walking and cycling and privileges public transit; the preservation of open green spaces and farmland; the involvement of residents in the planning process; and respect for the area's history and architecture (Baker 2000; Sierra Club 2000; Parfrey 1999). This agenda emphasizes 'smart' growth, rather than 'no' growth, and seeks to reform codes and ordinances to permit the development of smart growth characteristics and create urban growth boundaries (ULI 1999).

C. Employment

Unemployment

The economies of Western Europe have recovered from the recession of the early 1990s and are currently growing at around 2.5 per cent per year. An important factor has been the realization of the single market. Unemployment, however, is still relatively high. It peaked in 1994 at 10.6 per cent; by late 1999, recovery had reduced unemployment to 8.7 per cent, but this still represents millions of people without work. The unemployment rate in North America reached a thirty-year low of 4.6 per cent in 1999. Western Europe and North America are currently experiencing relatively rapid growth in the service sector, with particular consequences for women.

Unemployment rose sharply in many countries in transition during the 1990s, partly as a result of the restructuring of industrial enterprises and partly because of the overall decline in economic activity. Rough estimates based on incomplete data suggest that between 1989 and 1998 employment fell by more than 14 per cent in all UNECE transition economies together. The largest fall occurred in the early years of transition and was most pronounced in Central and Southeast Europe and in the Baltic countries. By 1994 or 1995, unemployment in CEE countries peaked, but fell as economic growth resumed. In NIS, measured levels of unemployment are still rising and are likely to go much higher

when disguised unemployment is transformed into open unemployment by the closure of bankrupt enterprises.

In the 1990s, the sectoral composition of employment changed. The fall in employment has been greatest in agriculture, industry and construction. Employment in the service sector, however, has increased in almost all countries, creating a considerable number of new jobs, and helping to absorb a substantial share of the labour force displaced from other economic activity sectors (United Nations, 2000a)

Unemployment rates for selected ECE countries (per cent of civilian labour force)								
	1992	1993	1994	1995	1996	1997	1998	1999
Western Europe	8.9	10.2	10.6	10.0	10.0	9.9	9.3	8.7
France	10.4	11.8	12.3	11.7	12.4	12.4	11.7	11.0
Germany	6.6	7.9	8.4	8.2	8.9	9.9	9.4	9.1
United Kingdom	10.1	10.5	9.6	8.7	8.2	7.0	6.3	6.1
Netherlands	5.6	6.6	7.1	6.9	6.3	5.2	4.0	3.1
North America	7.9	7.4	6.5	6.0	5.8	5.4	4.9	4.6
Canada	11.2	11.4	10.4	9.4	9.6	9.1	8.3	7.6
United States	7.5	6.9	6.1	5.6	5.4	4.9	4.5	4.2
CEEC	12.4	14.0	13.6	12.5	11.7	11.9	12.6	14.6
Estonia	2.1	4.5	5.3	6.6	6.4	6.3	7.3	9.1
Bulgaria	15.3	16.4	12.8	11.1	12.5	13.7	12.2	16.0
Romania	8.2	10.4	10.9	9.5	6.6	8.8	10.3	11.5
Slovenia	13.3	15.5	14.2	14.5	14.4	14.8	14.6	13.0
NIS	2.7	3.6	4.4	5.8	6.6	7.6	9.0	8.4
Russian Federation	4.7	5.5	7.5	8.9	10.0	11.2	13.3	12.3
Kazakhstan	0.4	0.6	1.0	2.1	4.1	3.9	3.7	3.9
Kyrgyzstan	0.1	0.2	0.8	3.0	4.5	3.1	3.1	3.0
Uzbekistan	0.1	0.2	0.3	0.3	0.3	0.3	0.4	0.5

Source: United Nations (2000a)

Gender Inequality

There is clear gender inequality in employment. Women and men participate in the labour force in different proportions at different ages, and their participation varies by occupation, sector and status. Fewer women than men are in paid employment at all ages, and more women are unemployed. (UNECE 2000)

During the 1990s, men's activity rates declined in Western Europe and North America, while female labour force participation continued to increase. In transition economies, participation rates of both men and women fell, due to economic restructuring that had a general negative impact on the demand for labour. The trends in female workforce participation in CEE countries and NIS are in stark contrast to those in western countries. Women enjoyed a strong position in the labour force in the centrally planned economies due to a full-employment policy. During the transition period, the labour market changed radically, with the effect that the female labour force shrank dramatically in many of these countries. This has among others contributed to a feminisation trend of poverty.

Working Women

For workingwomen, family and work are still very interrelated. Hence, more women than men work part-time and women put in many more hours of unpaid work. As a result of the increases in women's labour force participation in the past two decades, societal norms have changed with respect to working mothers and increasingly fewer women give up their careers to have children. In general, women still do not work "side by side" with men but work in different sectors and in the lower paid jobs, having different, less interesting career opportunities. Women's salaries are on average 70 per cent of men's salaries: there is not one country in the region where women's salaries equal men's. Notwithstanding the substantial changes for women in relation to work, men's working lives, apart from a tendency towards earlier retirement, have changed little in the same period.

UNECE 2000

D. Trends in Consumption, Production and Waste Management

Private and public consumption and production are responsible for a wide range of impacts on human health and the environment, such as impacts on air and water quality, land use and wild life habitat, climate change and waste generation. Product and technological innovations have helped reduce the energy and material intensity of many consumer goods and a small but growing number of consumers are also making life-style changes to lessen the health and environmental impact of their consumption patterns. However, the increasing volume of goods used and discarded and the structure of consumer demand in key areas such as energy and transport have outweighed many of these gains.

Consumption

Average consumption spending per capita has increased steadily in Western Europe and North America (2.3 per cent annually over the past twenty-five years), although clear differences exist between the two sub-regions (see table).

Real private consumption expenditure in Western Europe and North America
(percentage change over preceding year)

	1992	1993	1994	1995	1996	1997	1998	1999
Western Europe	1.7	0.2	1.4	2.0	2.3	2.4	3.0	2.7
North America	2.8	3.2	3.7	2.9	3.1	3.6	4.6	5.1

Source United Nations2000b

The share of final private expenditure of households in GDP has accounted for almost 60 per cent during the last decade, although this share varies among countries. Consumption in CEE countries and NIS has started to increase in recent years, and part of the population has achieved increases in purchasing power, particularly in Poland (65 per cent increase since 1991), Hungary and Slovenia.

Changing social and cultural contexts influence the scale and structure of consumption patterns. Important trends include an increasing "individualization" within households; the number of single-person households in the region is growing, due to the ageing of people, lifestyle choices and high divorce rates. Whereas the proportion of expenditure on clothing and food of total consumption has significantly decreased, the share of expenditures on rent, fuel and power has increased, as has expenditure on services and transport, among which leisure activities, tourism, and communication feature. These trends are not uniform across the region. There are still large differences in patterns between Western countries and countries in transition. In general, it may be expected that consumption patterns in CEEC and NIS will follow the same path as they have in the West, with a rising share of spending being allocated to the purchase of luxuries and consumer durables.

Managing waste

In North America and Western Europe increases in consumption still result in increases in various forms of pollution and in ever increasing amounts of waste. There is still a major coupling between economic growth and waste generation, especially waste from urban-based activities. In CEEC a comparable trend is developing. Though consumption is often still much lower in the poorer parts of CEEC and NIS, waste is a problem nonetheless due to a lack of proper management, posing clear threats to the environment and human health.

Some statistics on waste in Western Europe

Data on waste are sparse. It is estimated that 1,300 million tonnes of total waste is generated each year in Western Europe alone (excluding agricultural waste), while the amount of hazardous waste is estimated at about 36 million tonnes. The reported total waste generation increased by nearly 10 per cent between 1990 and 1995, while the economic growth was about 6.5 per cent in constant prices. Waste generation per sector is as follows: energy, 4 per cent; municipal, 15 per cent; mining, 18 per cent; construction and demolition, 25 per cent; manufacturing, 26 per cent; and other sectors, 12 per cent

Sources: OECD, 1997 and EEA-ETC-W data.

Waste is also produced as a result of society's attempt to solve other environmental and health problems such as water and air pollution. For instance, the production of sewage sludge coming from urban wastewater treatment plants is expected to increase drastically, making it difficult to absorb through incineration, dumping in landfills, and recycling in agriculture. Compounding the problem, the sludge is more and more contaminated with heavy metals and toxic chemicals. The increasing amount of sludge from urban wastewater treatment plants is already a serious issue in Western Europe and is anticipated to become so as well in CEEC and NIS.

In most western countries of the ECE region the use of landfills is still the most common treatment route for waste. In CEEC and NIS the typical disposal methods of both municipal and industrial waste are landfills and, in case of liquid wastes, accumulation in ponds (see also industrial hazards in Section IV B). In the cities of CEE countries, industrial wastes such as dry sludge and other hazardous materials were also incorporated into concrete building blocks, sometimes emanating harmful substances. These days more and more countries are setting-up recycling processes (see box below).

Managing waste results in pressures and impacts on human health and the environment such as:

- leaching into groundwater of nutrients, heavy metals and toxic compounds from landfills resulting in health problems due to poor drinking water;
- use of land for landfills, threatening landscapes and biodiversity;
- emission of greenhouses gases from landfills, adding to climate change; and
- toxic by-products from secondary waste streams from recycling plants that end up in air and water, impacting on the environment and human health.

The high recycling rates achieved by some member countries indicate the potential for increased recycling and recovery. However, if left only to existing market forces in both Western and Eastern Europe, recycling is not economically viable. Besides, though the achievement of high levels of recycling is in principle a positive development, it is important to weigh the gains achieved of utilizing recovered materials through recycling against costs (fuel, air pollution, manufacture of required equipment, and financial costs).

Recycling in Europe

All EEA member countries have recycling schemes and on average, 13 per cent of municipal waste is collected separately (EEA, 2000a+b). Variation per country is large though, from 38 per cent in the Netherlands to an average of 5 per cent in southern European countries (EEA-ETC/W data). Paper and glass are increasingly recycled. This is only a partial success, because the total amount of waste paper and container glass has also increased (EEA-ETC/W data). Progress with plastics has been poor. Municipal waste is the largest source of plastics waste, generating over 61 per cent of total plastics waste in 1996. There is considerable variation in plastics recycling; for example, the figure is 6 per cent in Denmark compared with 45 per cent in Germany. Paper and plastics recovery is high in countries where energy recovery is the predominant treatment method. In the CEEC and NIS, a deposit and refund system for glass and plastic containers has been in place in most countries for decades and has effected a 70 per cent return rate. Since the 1990s, the return rates have fallen somewhat as the effort to return bottles is perceived as uneconomical (REC 1999).

There are negative aspects to recycling as well. For instance, transport distances for waste recycling are much higher than those for disposal. About 15 per cent of the total weight of freight transported in France in 1993 was waste, and that waste transport accounted for 5 per cent of the total transport sector energy consumption (Ripert 1997). Additional transport also implies additional air pollution.

Production

Regional differences in production patterns in Europe and North America are evident (see mainly section III C on industrial production). Basic heavy industry in Western Europe and North America is giving way to cleaner manufacturing processes with more value-added products and services and with much improved energy and material efficiency per unit of production. As indicated above, however, these gains have been offset by continued growth in consumer demand. As a result of the transition from centrally planned economies to market economies, the CEEC and NIS are expected to follow suit and restructure industrial activities to, for example, improve energy and material efficiency and reduce end-of-pipe pollution.

The continued advance of computer and information technology is at the forefront of the wave of technological innovation. The growth of the Internet is perhaps the single most stunning technological and communications advance of the late 1990s. It leads to numerous, potentially more resource-efficient business opportunities, and it has led to a more informed and empowered civil society. Developments are much more rapid in the Western ECE countries, but CEE countries and NIS are catching up.

Biotechnology in the future could significantly affect agricultural practices, pharmaceuticals and disease prevention. Advanced miniaturized technologies could further revolutionize medical practices, material science, computer performance and many other applications.

The emerging trends in the region make it clear that efficiency improvements alone will not solve all the problems. Technological innovation worldwide has raised new environmental and health concerns. Product substitution has led to an increase in the type and amount of new substances, the effects of which on the environment and human health are often not well known. Increased concerns have emerged for the growing amount of toxicity of waste and the environmental hazards in the recycling and disposal of new materials. Biotechnology raises a host of ethical and environmental issues. The industrialized countries are increasingly recognizing the need to address the full impacts of their production and consumption processes (see also the policy responses in section III C on industrial production).

Policy Responses

In the UNECE region, there has been some work since Rio on developing a clearer understanding of what drives consumption patterns, and how consumption can be analysed and changed in the broader context of sustainable development generally.

At the same time, it appears that sustainable consumption remains conceptually elusive, politically sensitive and practically difficult. There does not appear to be any government in the ECE region that has a major, active policy or action programme to address sustainable consumption, despite strong intergovernmental mandates for work in this area. Policy development work has largely been left to the intergovernmental sector and is in its infancy. At the same time, changing life-styles and consumption patterns are among the most serious challenges that the region faces.

In the area of waste management, there are various directives that impose rules for separate collection and treatment of certain waste streams, such as packaging, batteries and accumulators, sewage sludge and polychlorinated biphenyl's (PCBs). Some success is noted, such as the response to the EU Packaging Directive, which includes measures to prevent waste generation and increase recovery and recycling of packaging waste.

Positive trends from measures such as recycling are, however, countered by a general increase in economic activity. For instance, though some de-linking from economic activity occurred in the 1990s for municipal waste, almost all EEA member countries are some distance from meeting the EU Fifth Environmental Action Programme target of stabilizing municipal waste generation at 300kg/capita by 2000 (EEA-ETC/W data). Environmental pressures from consumption, especially in urban areas, will worsen over the next coming years, driven by increasing per capita incomes and resource- and pollution-intensive life-styles. Considering the current and expected consumption patterns in the entire ECE region, waste management should be considered as a major challenge.

The mainly government-steered command and control regulations to reduce end-of-pipe pollution and the polluter-pays-principle have encouraged the industrial and corporate sector to develop innovative concepts, approaches and tools to make their production processes more sustainable; among these are included cleaner production, life cycle analysis, application of best available technology, integrated pollution control, environmental audits, and codes of conduct. This type of policy response to production issues is briefly discussed in section III C.

E. Rise of Poverty and Human Insecurity

Poverty

Since the beginning of the transition process the countries of CEE and NIS have suffered severe setbacks in human development and a rise in human poverty. In several of the countries more than half the population had incomes below the official poverty line in the period 1989-1995 (UNDP Human Poverty Index). This impoverishment is reflected by a drastic fall in real wages and GDP, high rates of inflation, and a rise in income inequalities, including between men and women; the latter were often the first to lose their jobs. Relative prices of consumer goods have changed, and there has been a sharp widening of wage and earnings.

While poverty is clearly more pervasive and severe in the Eastern countries of the region, it is not absent from the West. According to one common definition, poverty averages 17 per cent in the EU (excluding Finland and Sweden). Vulnerability is more widespread: 32 per cent of Europeans experience at least one annual spell of low income over a period of three years, while 7 per cent

experience persistent poverty during this period (EU Commission Staff Working Paper: Consultation paper for the preparation of a EU Strategy for Sustainable Development.)

Poverty has also been exacerbated by environmental disasters. In the ECE region there are several such examples. The Chernobyl accident is probably the best known and remains one of the worst due to its disastrous impact on the environment and human life and its extremely severe socio-economic implications for hundreds of thousands of people. A second example is the Aral Sea disaster that, among other things, has resulted in the cessation of traditionally important activities connected with fishing, hunting, transportation and recreation. For example, the fishery crisis alone has left over 60,000 persons in the Aral Sea area unemployed (UNECE 2000b). Simultaneously, severe desertification of the exposed seabed has intensified the wind erosion process and caused the destruction of thousands of hectares surrounding arable and pastureland in the sea zone. The result has been a considerable impact on the poverty level of the entire region due to increased unemployment and the on-going population decline. Outward migration towards the more industrialized regions has in turn contributed to the further aggravation of environmental degradation in the polluted areas and to deepening poverty in the hazardous living sites.

Human Insecurity

The human costs of the transition process have also reached beyond poverty. Military conflicts and poor health are clearly reflected in rising death rates. People face many kinds of insecurity – in employment and income, in personal safety, in family relations, in health and education, in pensions and in general social protection. Some groups, such as pensioners and other vulnerable groups, are harder hit than others.

Human insecurity, ill health, loss of self-respect, a sense of failure and social exclusion have seriously decreased the number of opportunities available for many people to live the life they value. Though often linked to income poverty, these non-income aspects of deprivation stand alone as a determinant of a low quality of life, and question the sustainability of growth and human development in the region.

Military conflicts

The collapse of socialism revealed long suppressed ethnic conflicts and tensions. The split of two former federations, the Soviet Union and Yugoslavia, was accompanied by military conflict and violence in the Balkan and Northern Caucasus. As a result, about 45 million people (excluding the Russian Federation) now live in countries affected by war or civil strife. Almost 400,000 have been killed and some 5.5 million have become refugees or are internally displaced.

War is accompanied by increased pressure on ecosystems. Resource productivity collapses in war-affected countries, and environmental damage often affect much wider areas than those directly involved in the conflict. The flow of war-related refugees to neighbouring Balkan countries for instance led to degradation and destruction of forests. Other environmental problems, such as soil erosion and water pollution are major worries as well. An example is the destruction of chemical and petrochemical complexes in Serbia, which led to pollution of the Danube River, causing problems in downstream Bulgaria and Romania.

The decline in personal security is also associated with a proliferation of corruption, fraud, illegal businesses and organized crime. After 1989, corruption and organized crime increased among some of the transition countries. In sharp contrast to conditions before transition, people now find themselves deprived of personal safety and security – often at the mercy of organized criminal forces that have arisen on the basis of collusion with corrupt government officials. The increase in crime reveals a relative weakness in state authority and in public law enforcement. The consequences include a rise in personal insecurity, the failure of many legitimate ventures and social losses.

F. Conclusions

Poverty and human insecurity, mainly in the CEE countries and NIS, are a major problem for the ECE region. They result not only in financial hardship and lack of freedom but also in ill health, loss of self-respect, a sense of failure and social exclusion. All this has seriously decreased the opportunities for many people to live the life they value.

Unemployment is still relatively low in North America and relatively high in Western Europe. It rose sharply to very high levels in many transition countries, but is falling in those countries where economic growth resumed. Employment in agriculture, industry and construction fell and increased in the service sector throughout the region.

The high percentage and gradual growth of the urban population in the entire region and the current ageing of the population in a large part of the region are trends that are expected to continue in future. This causes significant environmental and social stress making the achievement of sustainable development increasingly difficult.

Much of the action required to cope with the expected increase in urbanization and its related problems will have to and can take place at the local level. Planners should capitalize on the skills within communities, and city authorities should ensure that the appropriate legal, financial, technical and support structures are in place. Positive lessons can already be learned from various Local Agenda 21 related examples.

Considering current and expected consumption patterns in the entire ECE region, waste management should be considered as a major challenge. Overall, a major turn-around is needed in order to reach set waste strategy goals, since there has been no general improvement in the waste generation trend in the 1990s. More emphasis and priority needs to be given to waste prevention at the source, the most challenging task of waste management.

The industrialized countries of the region, and more recently also the CEE countries, are increasingly recognizing the need to address the full impacts of their production and consumption processes. The technological research institutions and the corporate sector are developing promising innovative concepts, approaches and tools to make production processes more sustainable. In many of the CEEC and NIS countries financial assistance and capacity building will be required to transfer such knowledge and practices.

II. POLITICAL AND ECONOMIC TRENDS

A. The Transition Process

During the time of the Rio Summit in the early 1990s, the eastern parts of Europe were in the middle of a political, economic and social transition process following the collapse of socialism. The transition toward a market economy had just begun. In the absence of effective pricing mechanisms, the former economic policy had created certain distortions that led, in some instances, both to a waste of natural resources, such as energy and water, both in industry and in public utilities, and to the development of energy- and raw material-intensive production. Priority was given to mining, chemical and metallurgical industries. All of this left many areas and cities of CEEC and NIS with a crumbling and inefficient infrastructure. Heavily polluted sites and areas were widely spread. Industries caused severe air and water pollution and risks related to hazardous also left areas with severe environmental problems.

At the same time, a long tradition of nature conservation combined with vast areas of untouched military zones had left a rich biodiversity in the region. Furthermore, in some parts of Eastern Europe the environmental problems related to intensive farming and congested urban traffic were not yet serious.

The first years of transition in the region were characterized by a change in public financing and a rapid restructuring of economies. In environmental management much emphasis was put on market mechanisms and market-based instruments. It was anticipated that the industrial reconstruction would lead to the collapse of wasteful and polluting industries. A lot of emphasis was put on cost-based pricing of energy and other public utilities and on the use of private capital as a main source of financing for the needed infrastructure rehabilitation investments.

This approach, advocated by the international community, often turned out to be over-optimistic. The old and wasteful power plants and industries continued to operate. Affordability limited possibilities for immediate full-cost recovery in utility services and much needed long-term capital was not available on international or local capital markets. In addition, the regulatory regime did not develop fast enough to enable efficient environmental management. The political development in the region turned out to be mixed. In some countries, there was a strong opposition towards the harsh introduction of market economy due to social consequences. This led to delays in reforms both in economy and in reinforcing the rule of law.

Unfortunately, for many the transition process has been viewed as a “Transition to Underdevelopment”. It is indicative of the critical manner in which the process has been analysed by the broad public. With some notable exceptions in Central Europe, such as Poland, Hungary, and Slovenia and, in part, the Czech Republic, most of the countries have suffered an enormous decline in living standards. Not only has their GDP declined. The transition has also been associated with large changes in the distribution of national wealth and a dramatic redistribution of income. Data on income flows indicate that these were the fastest changes in income inequality ever recorded. It was brought about by fast-rising inequality of wages and income from self-employment and property and a sharp rise in unemployment (Ruminska-Zinmy 1999). This has left large sections of the population with low, and sometimes insufficient, income. There has been a “meltdown of expectations” since the early euphoria when it was widely believed that it would not take very long and that democracy and improved living standards were “just around the corner”.

Opening to the global economy coincided with severe setbacks in human development. Dismantling of the welfare system led to social disintegration, including loss of job security and free access to basic social services. Inequality and a differential access to education and health services was another result. Life expectancy, particularly for men, declined dramatically, and the number of people living

in poverty increased by a factor of ten. Insecurity was also rooted in political instability, including military conflicts, increased crime and drug use, and problems in adjusting to market rules. Many people, in particular the less educated, had difficulties to get used to market behaviours.

It is clear there is no blueprint for sustainable development. Countries in transition have only one common feature – post-communism. Their development paths are likely to move in different directions and at very different paces. Since 1993, for example, ten transition countries (in two groups) have been invited to join the EU accession process. For those countries approximation and integration have become the main incentive.

While different countries have taken different courses of action, a number of common approaches can be found across the range of national initiatives. In particular, many programmes have striven to promote integration of economic, social and environmental priorities into national and local development planning. The choice between short-term economic gains and longer-term concerns for the environment pose a much more difficult challenge for the countries in transition than for the developed countries of the region. Nonetheless, many transitional countries have passed important new laws to improve environmental protection, established both new agencies and developed new sources of public information for monitoring environmental change.

Establishing democratic government that is both equitable and efficient has been the most painful and protracted component of the transformation of the countries in CEE and NIS. A slow and very often ineffective process of carrying through a comprehensive series of reforms and creation of new institutions and regulations give witness to the fact that insufficient attention has been devoted to this complex task. To some extent, this has resulted in a false dichotomy between “state” and “market.”

In the early 1990s many reformers, advisers and institutions advocated a minimalist state, and thus encouraged a sharp reduction in government and public expenditure, and a neglect of the quality of public administration. A weak state often was the result: a state where the public and private services needed for human development were not provided because the institutions and regulations are inadequately resourced, lack accountability and legitimacy and are systematically inequitable. Sharp cuts in public expenditure led to a loss of highly qualified people who sought higher incomes elsewhere. Nonetheless, institutions of democratic governance have been taking shape with success in some countries, in others only slowly and hesitantly.

B. EU Enlargement

From the early days of transition, the former socialist countries of Central Europe and the Baltic countries of the former Soviet Union had high hopes for eventual membership in the European Union. The EU was seen as a means to stabilize the changes and the new rule of law. Above all, EU membership would mean accelerated economic development and wealth. Ten countries of Eastern Europe with an overall population of 100 million submitted formal applications.

The EU accession process poses a tremendous political and economic challenge to the candidates. Economies need to be ready for EU internal markets, legislation has to be harmonized with EU legislation and institutions have to be restructured and strengthened to cope with the EU rule of law requirements.

Environmental management is an area with a wide range of EU level legislation that has to be implemented nationally. At the same time, the EU is in the process of reinforcing its policies to achieve a more sustainable development. Particular challenges will be in the areas of resource management as well as energy, transport and agriculture policies. The aim is to address further air

and water pollution and climate change and to preserve biodiversity. The candidate countries already have to take these developments into account now.

The environmental challenge of the EU accession process is also a legal, institutional and investment challenge. The coverage of EU environmental legislation in relation to national legislation is wide. In many cases, seventy-to-eighty per cent of national law is directly derived from EU law. It ranges from product quality and air and water pollution control to environmental management in industries, EIA procedures, nature protection and nuclear safety. The bulk of international conventions are binding EU law as well. The legislative work as such is a huge task. It is important to make sure that EU requirements are tailor-made to national legal systems in a precise and comprehensive manner and in a concise timetable.

An even bigger challenge is to implement all this new legislation. Institutions securing the implementation have to be reinforced with a particular emphasis on regional and local institutions. Transparency of decisions is one of the key principles of EU EIA and access to information legislation. Urgent actions are needed to safeguard areas of rich biodiversity according to EU nature legislation. Most UNECE conventions and global environmental conventions are binding EU law, and even more serious efforts will be needed for their implementation in the region.

Some of the legislation on industrial pollution control as well as on water, waste and air pollution control requires infrastructure and other investments. The required rehabilitation and extension investment in energy and municipal infrastructure is big across the region and will have to spread over time due to limited affordability. The investments have to be designed in a cost-effective manner, and they will lead to improvements in services and in environment. In many cases, investment programmes are also justified for economic reasons, as they will enable a more efficient use of natural resources and result in savings in energy and raw materials (see also the box on transfer of cleaner technology in the Danube River Basin in section III C on industrial production).

The EU accession process is a logical way forward in the environmental transition that is taking place in the Eastern European candidate countries. This will complement the economic transition process by reinforcing environmental legislation and its enforcement. It will also increase the transparency of decisions on economic policies and individual development projects through EIA procedures, so that environmental degradation can be avoided (see box below). Financial support offered by the EU will accelerate needed actions and offer support for low-income groups in financing the required action. The lack of resources for quick action will require cost-effective and least-cost solutions. Such solutions will mean careful and effective resource management and more sustainable economic activity and service provision.

The threat of accession-related environmental degradation

The economic aspects of EU integration could undermine environmental legislation and projects. For example, Lithuania's ISPA programme includes the channelling of aid worth 50 million euros (some 45 million dollars) annually during 2000-2006, 50 per cent of which will be spent on environmental and 50 per cent on transport projects. Whereas the environmental projects will benefit Lithuania immensely (financing has been approved for the modernization of the Vilnius and Druskininkai wastewater treatment plants), the transport projects are likely to inflict further damage on already fragile ecosystems. The reconstruction of the existing roads selected for ISPA financing is not considered as an 'A category' project, which would require a full environmental impact assessment (EIA). Similarly, while the building of the Via Baltica motorway connecting the three Baltic States to the European road network (partly financed by the EBRD) has undergone an EIA, local NGOs have warned of likely ecological damage.

A first step towards avoiding accession-related environmental degradation would be to institutionalize EIAs further by making them obligatory for all project categories, and by encouraging public involvement in project evaluation. Furthermore, the application of even more wide-ranging strategic environmental assessments (SEAs) could be considered.

Source: Oxford Analytica East Europe Daily Brief, 21 February 2001

C. Public Participation and Democracy

A key element in making progress towards sustainable development in the region is the strengthening of citizens' environmental rights so that civil society can play a full and active role both in the formulation of policies and in their implementation, bringing about the much-needed changes in consumption and production patterns. This is also clearly identified in principle 10 of the 1992 Rio Declaration.

Principle 10 of the 1992 Rio Declaration

Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.

Following the collapse of communism a new era of pan-European cooperation on environmental issues began within the framework of the Environment for Europe process (EfE). Part of the broader political agenda in this process was the goal of supporting and strengthening the democratization processes taking place in the post-communist countries. Information, participation and access to justice were seen as essential elements of a true participatory democracy. These themes therefore became central elements in the Environment for Europe process, resulting in the endorsement of the Sofia Guidelines in 1995 and the adoption of the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters at the Aarhus "Environment for Europe" Ministerial Conference in 1998. See for information issues also section V D on national level information, monitoring and evaluation.

As work on this pan-European process got under way, it became clear that public rights and participation also remain elusive goals in many of the established Western democracies as also illustrated in the box on below.

Doors to democracy in Europe

The main conclusions of a recent study about democracy in Europe, implemented by the Regional Environmental Centre for Central and Eastern Europe (REC) are:

The Right to Information

- Most European countries now apply the right of access to information to any natural or legal person, without their having to prove an interest and irrespective of nationality, citizenship or domicile.
- In countries not having general freedom of information laws, narrow definitions of environmental information can prevent public access to environment-related information (e.g. on human health).
- Broadly defined exempt categories of information give excessive discretion to public authorities to withhold information without good reason ("state secrets" or "official secrets" in NIS and CEEC; "internal communications," "confidential proceedings" or "voluntarily supplied information" in the West; commercial confidentiality everywhere).
- Excessive charges for information tend to be a problem in Western countries more than in CEE countries or NIS countries. In the latter, no access to copying equipment is often a greater problem. Public authorities have no obligation to provide information in electronic form, though putting certain types of information on the Internet is emerging as a good practice in a number of countries.
- Countries do not generally require the private sector to provide information directly to the public except in respect of major hazards or pollution incidents. The introduction of mandatory pollutant release and transfer registers is at an early stage in Europe when compared for example to the U.

The Right to Participation

- Public participation in the preparation of laws and regulations occurs in the parliamentary phase only to a very limited extent. During the executive phase there is slightly more scope for participation
- Public participation in the preparation of policies, programmes and plans is provided for to some extent in most Western and CEE countries, but much less so in the NIS countries.
- A significant number of countries are now using Strategic Environmental Assessment (SEA), involving public participation as a tool in the development of policies, programmes and plans, and a few are using it in the context of developing legislation, though overall its use in the ECE region is still quite limited.

- Provisions for public participation in Environmental Impact Assessment (EIA) of projects in NIS countries are extremely inadequate. Western and CEE countries provide for participation at the stage of reviewing EIA documentation, but in virtually all countries of the ECE region there is a lack of public participation in the crucial scoping phase of EIA.
- Public participation in licensing or permitting of specific activities is quite limited in most countries, especially in the NIS region, with participation often limited to the "affected" public and inadequate mechanisms to ensure that comments are seriously taken into account.
- A small but significant number of countries provide for referenda and the right of legislative initiative as means of involving the public directly as decision makers.

The Right to Justice

- The scope for the public to directly enforce environmental laws through citizen suits is very limited in Europe
- Restrictive standing rules are one of the major factors limiting the degree of access to justice
- Costs are a significant barrier to access to justice in many countries, especially in the NIS region.
- Difficulty in obtaining injunctive relief is one of the major stumbling blocks to achieving access to justice in environmental matters.
- Low cost accessible administrative or quasi-judicial appeals mechanisms (e.g. an ombudsperson) can provide swift and flexible resolution of disputes as well as reducing the burden on the courts.

Source: REC (1998)

The EU Directive on Access to Environmental Information, which came into effect at the end of 1992 and is currently undergoing a review, was an important stimulus in several West European countries. It has encouraged the collection and wider dissemination of environmental information, and through it, the public became entitled to request and receive information on the state of the environment.

In most western countries, many NGOs were established in the early seventies, when the adverse effects of economic growth (polluted water, acid rain, dying forests, etc.) became increasingly apparent. These NGOs gained more power and influence when their initiatives appeared on the political agenda. From that moment onwards NGOs have become an important political factor in the development of environmental laws and policies (REC 1994).

The development of democratic institutions and societies has been one of the main challenges of the transition process and many countries across the region have made important progress to establish more democratic systems. Many of them have seen strong growth in the number of NGOs in the late 1980s and early 1990s, active in areas ranging from cultural activities to social assistance and environmental protection. Nevertheless, their growth seems to have stagnated in recent years. NGOs have tried to act as catalysts for environmental and democratic improvement. They have provided environmental information to the public, undertaken environmental protection projects and participated in government decision-making. In some countries, NGOs are constructively influencing environment policy development. In others, however, the NGO movement so far has had only a limited impact and faces serious difficulties. Most NGOs have been small and poorly funded. Many, particularly in NIS, have relied on grants from foreign donors and foundations for their work. To be effective in the longer term, they will need to develop a stronger base of public support.

The Aarhus Convention is based on the notion that the involvement of the public in decision-making, notably by public authorities, tends to improve the quality and implementation of the final decisions. It guarantees the rights to information, participation and justice in the context of protecting the right of every person of present and future generations to live in an environment adequate to health and well-being. The consistency of the Convention's goals with the Rio Principles and its cross-sectoral nature underscore its value as a tool for promoting sustainable development with potential to positively affect decision-making in many different sectors (transport, energy, agriculture, etc). Furthermore, its broad definition of the public, encompassing any natural or legal person irrespective of their citizenship, nationality or domicile, ensures that its main provisions apply in both transboundary and non-transboundary contexts.

The Aarhus Convention: A "giant step forward"

United Nations Secretary-General Kofi Annan, in the Foreword to "The Aarhus Convention: An Implementation Guide," praised the Convention as "a giant step forward" towards the goal of sustainable, equitable and environmentally sound development, by paving the way for the active engagement of civil society, both in the formulation of policies and in their implementation. A key element in the quest for sustainable development was said to be the "strengthening of citizens' environmental rights so that members of the public and their representative organizations can play a full and active role in bringing about the changes in consumption and production patterns which are so urgently needed." The Secretary General went on to say: "Although regional in scope, the significance of the Aarhus Convention is global. It is by far the most impressive elaboration of principle 10 of the Rio Declaration, which stresses the need for citizens' participation in environmental issues and for access to information on the environment held by public authorities. As such it is the most ambitious venture in the area of 'environmental democracy' so far undertaken under the auspices of the United Nations." He further called on the 2002 Special Session of the United Nations General Assembly marking the 10th anniversary of the Earth Summit to examine the relevance of the Aarhus Convention as a possible model for strengthening the application of principle 10 in other regions of the world.

The Convention has already had an impact in the region, and it has raised considerable interest outside the ECE region, because of its unique nature in the global context as a tool for environmental democracy (it is open for signature to countries outside the region as well). Since the adoption of the Aarhus Convention work is progressing through task forces and working groups to deal with gaps still existing in the coverage of the Convention or where Signatories have considered that further work is needed, particularly in areas related to:

- compliance and rules of procedure;
- pollutant release and transfer registers (PRTRs) (see box below);
- genetically modified organisms (GMOs);
- electronic information tools; and
- access to justice.

Pollutant Release and Transfer Registers

At the first meeting of the Signatories of the Aarhus Convention, a Task Force on pollution inventories or registers was established with the Czech Republic as a lead country to facilitate the implementation of article 5, paragraph 9, of the Aarhus Convention. The mandate of the Task Force was to prepare recommendations for the future work on PRTR to be presented to the Signatories or Parties in accordance with article 10, paragraph 2 (i). At the second meeting of the Signatories, the Task Force presented its findings in the report of its first meeting. Based on these, the meeting of the Signatories decided to propose to the Committee on Environmental Policy that an open-ended intergovernmental working group should be established, charged with the preparation of a legally binding instrument with a view to have a draft ready for the Fifth "Environment for Europe" Ministerial Conference (Kiev 2003). At its seventh session, the Committee on Environmental Policy decided to establish the Working Group on pollutant release and transfer registers.

Progress is also made directly through NGOs. Countries with a thriving NGO sector find that public participation is enhanced and that the public is better informed. NGOs are frontrunners in awareness-raising campaigns through which the public is educated in sustainable development issues.

A separate, but nonetheless related issue, concerns the rights of indigenous people, who, to survive, need to have more influence on the governance of their traditional lands and cultures. Most indigenous peoples favour a move to self-governance. This issue is further described under section IV A 4 on biodiversity.

D. Globalization and the ECE Region

The rapid expansion of international trade, of cross border investment, liberalization of financial markets and diffusion of technology and communication has an important impact on national economies and environmental conditions. Although full implications of this phenomenon known as “globalization” are not yet understood, it is generally held that, throughout the ECE region, trade liberalization, privatization, deregulation and other globalization-induced policy reforms affected those economic activities that have major environmental impacts such as energy, transport and agriculture. For some countries in the region, globalization has brought about rapid growth in trade, investment and national wealth. It has also been shown to have both positive and negative impacts on the environment.

The pace of globalization in the ECE region has been uneven over the past ten years. The developed market economies enjoyed stable economic growth deriving largely from the process of trade and investment liberalization, the expansion of communication, consumer demand for foreign products, and the concentration of know-how and advanced technologies. These positive effects were accompanied, however, by increased overall resource consumption, in particular fossil fuels, increasing volumes of hazardous and other wastes, social problems caused by the disappearance of some domestic markets and activities, and concentration of power in transnational corporations (OECD, 1997a+b).

Economies of scale and conglomeration in the highly integrated economies of Western Europe and North America still provide the major attraction for investors. Some 80 per cent of OECD foreign direct investment (FDI) still flows to other OECD countries and despite the large absolute flows to the rest of the world in the 1990s most portfolio investment in the United States and western Europe still goes into the United States and western European securities respectively. In the 1990s some 60 per cent of all west European FDI has remained within Western Europe with another 3.5 per cent on average going to the ECE transition economies (OECD, 1998a). The general evolution of European trade has been towards a more intense integration with close neighbours. Interdependence among the economies of the region has increased. Well over two thirds of Europe’s exports and imports now consist of intra-west European exchange (WTO, 2000).

Capital flows had positive impact on growth through FDI in a few countries, but created new risks to macroeconomic stability from sudden shifts of short-term capital flows that affected exchange rates, consumer prices, and government expenditures. Cultural opening stimulated entrepreneurial attitudes and motivation to learn, but also encouraged value systems based on personal consumption. Sharing Western consumption patterns and life-styles was not evenly distributed and resulted in new forms of social exclusion.

Globalization indeed affects more than trade and investment. Joblessness and instability have encroached on the middle classes in all countries and have affected certain groups especially hard, particularly young people in Europe. Employment has shifted from industry to services and a large number of services demand highly skilled workers.

The ability of OECD countries to sustain employment

The former ability of OECD countries to sustain full employment was based on a combination of circumstances that no longer exist – an economy driven by industrial mass production and consumption; income redistribution, high market and social wages, which consolidated and evened out demand; and, the full employment commitment, mainly targeted at males, with the wage-setting norm being a ‘family wage’ and social protection tailored to one-earner families.

Quoted from Bakker (1999)

In many countries in transition, movement toward a liberalizing, deregulatory model of economic policy, the reduction of barriers to the free flow of people, goods, services, money and investment, joining the multilateral trading system and relevant international institutions, were accompanied by economic contraction, fall in trade and economic production, decrease in income for the majority of the population, and, in response, more intensive exploitation of natural resources such as forests, fisheries and wildlife.

Previously closed from the world economy and international competition, most transition economies have experienced substantial shifts in production patterns, including the collapse of many uncompetitive and heavily polluting industries. Recovery from economic contraction has not seen pollution returning to former levels. New policies include establishing new or restructuring old industries in a manner that is far more resource-efficient and less pollution-intensive than before. However, scarce financial resources and a quick push to privatize have not led to consistently good results.

Transition countries entered a “globalized” market with several serious disadvantages, including the harsh character of the opening, simultaneous opening to both economic factors and new value systems and life-styles, institutional weakness, and social disintegration. For some countries, East-west European economic integration has proceeded at a very rapid rate since the beginning of the transition process. It has led to a considerable increase in trade integration and to substantial flows of FDI that have paved the way to important production linkages between central and Eastern Europe and Western Europe.

Between 1988 and 1997, Eastern European countries’ trade with developed market economies increased by over one-third, from 38 to 66 per cent of exports and from 41 to 68 per cent of imports. At the same time, their trade with the former Soviet Union declined by more than half. Changes in trade direction have been even sharper for individual countries. The Russian Federation increased trade with the Western countries, but most other NIS have remained less exposed to the global economy, and the Russian Federation continues to be their main trading partner. This is particularly true for Belarus, Kazakhstan, Ukraine, and the Republic of Moldova and Uzbekistan. Intra-regional ties among NIS, except for bilateral trade with the Russian Federation, are weak. This is beginning to change, as these countries turn outward. Armenia and Azerbaijan, for example, have increased their trade with the Islamic Republic of Iran; Kazakhstan and Kyrgyzstan with China and Turkey; and Belarus with Poland, Germany and the Baltic States (Ruminska-Zimmy 1999).

The trade-oriented growth in CEE countries resulted in a shift from heavy (and polluting) industries towards light manufacturing and service activities (UN, 2000). Nevertheless, 50 to 60 per cent of exports to Western Europe of the frontrunners (Czech Republic, Hungary, Poland and Slovakia) still consists of primary products and basic manufactures, mostly intermediate goods (Hoen 1998). Other transition countries, unlikely to join the EU in the near future, have made less progress in opening themselves to the international market, since their political conditions, resource endowments, and trading opportunities differ greatly from those available to the accession countries.

Trade and investment liberalization has led to increased diffusion of new technologies that are generally more eco-efficient. Seventy-five per cent of international technology transfer arises from trade flows (OECD, 1995). International trade in capital equipment is the most direct of these channels. Since firms in Western Europe and North America generally develop products in line with strict environmental regimes of their home countries, exports of capital equipment from these countries should bring “cleaner” technologies into transition economies.

At the same time, the intensification of competition associated with globalization increases the pressure on governments not to imperil the competitiveness of domestic producers by imposing environmental standards on them that are stricter than those faced by foreign competitors. This has

led over the past decade to increased attention by ECE Governments to international cooperation at global, regional and subregional levels. This is evidenced, in particular, in the debates about the integration of environmental considerations into international trade agreements and the use of economic mechanisms in multilateral environmental agreements (OECD, 1998b). Environmental issues are receiving more attention in two major regional economic agreements – the European Union and the North American Free Trade Agreement (NAFTA). The broad adaptation, ratification and implementation of regional environmental legal instruments have important a beneficial impact on environmental policies and the efforts to reduce the pollution load.

As in the rest of the region, globalization has broadly affected the societies in many ways. Lifting restrictions on access to information and on freedom of people's movement within countries and across borders was an important aspect of democratization and liberalization in all transition countries. In the first half of the 1990s, about nine million people moved within or between the 12 countries of the NIS. Such unprecedented migration reflected more than enlarging people's choice of where to live. Huge numbers of migrants in the former Soviet territory included refugees from armed conflicts (such as from Armenia, Azerbaijan and Tajikistan), "ecological migration" to escape from contaminated areas (an estimated 700,000 people from such areas as Chernobyl and the Aral Sea) and Russians and other ethnic groups leaving republics of the former Soviet Union and "going home" (RBEC, 1997).

Indeed mobility in the ECE region is large and is expected to increase, both within the ECE region and between other regions in the world. Increases in labour migration and economic refugees as well as in political refugees and refugees from armed conflicts have serious impacts on societies. Other forms of mobility, such as tourism and business travel, also impacts on both the environment and society at large.

This relates to the cultural dimension to globalization. Many of the above trends result in opening up of societies to ideas and habits from other societies. The exponential growth in the use of the Internet is also a major factor in this.

E. Conclusions

During the transition process many CEE countries and NIS have suffered severe setbacks in human development and a rise in human poverty. It will take many years to create a balanced set of institutions, laws and regulations. A huge effort continues to be required to create an effective, legitimate regulatory framework for an efficient and equitable market economy. Sustainable development in countries-in-transition is still very closely connected with delivering social protection. Lack of resources and a largely ineffective system of governmental institutions have coincided with a rise in poverty and inequality, deterioration of life expectancy in many parts of the region, and an erosion of public health.

The move towards a more sustainable development and equitable society will require much external assistance for capacity building and construction of efficient legal and enforcement institutional infrastructure as well as for financing institutions.

All the candidate accession countries are well on their way in environmental management reforms and in adapting their environmental management to EU requirements. At the same time, the accession process may bring new problems. The expected restructuring of agriculture could threaten the often-richer biodiversity of the candidate countries. Increased consumption resulting from greater prosperity could lead to heavier impacts on the environment, greater use of energy, increased transport needs and more waste. EU investment support has often gone to large-scale and ecologically

unsustainable projects (see box below). As Eastern Europe becomes more prosperous, traffic congestion is becoming a growing problem in that part of the continent, too.

There is room for improvement in public participation laws and practices in all European countries. And laws alone are not sufficient to create a truly participatory democracy. Cultural changes are needed, especially in countries with deeply entrenched customs based on official secrecy. More attention should also be paid to the different roles and needs of men and women when designing communication strategies for awareness raising and behaviour change.

The globalization process has led to increased regional trade integration (NAFTA, EU) and to substantial flows of foreign direct investment. International cooperation also increased, through multilateral environmental agreements. Implementation of regional environmental legal instruments has positive impacts on the state of the environment, and levels the competitive field as countries accede to the same environmental rules. The ECE region has a major role to play in global trade issues such as in the development of a chemicals strategy and implementation of the biosafety protocol

Mobility is expected to increase, both within the ECE region and between this region and other regions in the world. These trends have major significance to the environment, poverty and society as a whole.

III. DRIVING FORCES AND SUSTAINABLE DEVELOPMENT

There are many forces that drive or impact on sustainable development through a complex mix of interactions, which are often difficult to oversee or predict. The relationships among transition and the EU enlargement process, globalization and other social and economic trends, for instance in consumption patterns, have been discussed in earlier sections. In this report, four of the major sectors are considered, focussing on energy and transport, and to a lesser degree, on agriculture and industrial production. This does not imply that other driving forces, such as tourism, household consumption and urbanization are not important. The latter two are dealt with in earlier sections, and tourism, is a rapidly growing sector in the region as a result of increased purchasing power by consumers, more leisure time, improved efficiency of transport and tourism services, and lower costs. In Europe, international tourism receipts were almost three times higher in the late 1990s than they were in the late 1980s. In North America it was even slightly higher. Such rapid growth certainly has implications for sustainable development. It was not possible, however, to discuss all driving forces in this report.

A. Energy

Despite increased efforts toward energy efficiency in Western Europe and North America, the link between growth in GDP and increased energy use has not yet been broken (EEA, 2001b). Energy intensity in Western UNECE countries is falling at a rate of about 1.1-1.3 per cent per year, but the eco-efficiency gains are offset by increased demand for energy that is mainly met with fossil fuels, inducing more emissions of CO₂ and other pollutants. Per capita energy consumption varies considerably in the region, but, in most countries it is increasing. Only Germany is an exception with a per capita energy consumption decrease of 5 per cent between 1987 and 1997. The table below shows clear differences among sub-regions in per capita energy consumption in 1997 and increases since the late 1980s.

Per capita energy consumption in 1997 and increases between 1987 and 1997

Sub-region	Range in 1997 per capita energy consumption (in kg. oil equivalent)	Range in increase between 1987 and 1997 (in percentages)
North American countries	7,500 – 8,000	16 – 17
Northern European countries	5,500 – 6,500	6 – 12
Central Western European countries	3,500 – 5,000	15 – 20
Southern European countries	2,000 – 3,000	35 – 55

Source: IEA as compiled in WRR 2000-2001

In CEEC and NIS the situation varies as well. In some advanced reform CEE countries like the Czech Republic, Hungary, and in particular Poland, Slovakia, and Slovenia, environmental actions appear to have had a positive impact on energy efficiency, but in most countries in which reform has been slower, such as Albania, Bulgaria, the former Yugoslav Republic of Macedonia, Romania and all NIS, little to no progress has been made (OECD, 1999). While per capita energy consumption in these countries is often lower than the Western European average, relative consumption of energy per unit of product (energy intensity) is three or more times higher than in Western European countries. This is due to the high share of heavy industries, obsolete technologies and low efficiency of energy use. The table below shows that in Central Europe the energy consumption for industry is higher than in other parts of the region. The transition from centrally planned economies to market economies is expected to bring substantial changes in industrial activities though. There is a huge potential for reducing energy intensity and improving energy efficiency in these economies in transition.

Energy consumption by industry

Sub-region	Number of countries* in a certain range of energy consumption by industry as percentage of total energy consumption				
	< 20 %	20 – 30 %	30 – 40 %	40 – 50 %	> 50 %
North America	0	1	1	0	0
Western Europe	2	7	7	1	0
Central Europe	2	4	5	3	1
NIS	2	3	4	1	0

* excluding countries for which no data were available

Source: IEA as compiled in WRR 2000-2001

The primary energy source in the region is oil; for example, 43 per cent of energy in Western Europe is derived from oil, compared to on average only 5 to 6 per cent renewable energy sources (IEA in WRR 2000-2001). As shown in the table below, increases in energy *production* from renewable sources since 1987 are significant though. However, so far renewable energy sources only generate significant quantities of electricity in a few Western European countries. Renewable energy *consumption* is still small but varies considerably in the region (see table below). Though wind power contributes only marginally, despite recent high growth rates for instance in Germany, and solar power even less, there is potential for growth in renewable energy production.

Renewable energy production and consumption statistics for 1987-1997

Selected UNECE member countries	Percent change in renewable energy production between 1987 and 1997	Renewable energy consumption as percentage of total 1997 energy consumption
North America	8	6
Canada	12	17
United States	6	5
Europe	56	5
Western Europe		
Austria	7	20
Belgium	147	1
Denmark	67	8
Germany	(4)	2
Greece	92	6
Iceland	20	64
Norway	8	44
Spain	133	6
CEEC + NIS		
Albania	(21)	50
Bulgaria	(8)	2
Hungary	(5)	2
Poland	86	5
Slovakia	44	3
Slovenia	64	8
Ukraine	32	1

Source: IEA as compiled in WRR 2000-2001

Policy Responses

In many respects the best way to reduce energy-related environmental problems is to consume less energy and to improve the efficiency of energy production and use: *the cheapest and environmentally most benign energy is energy that is saved*. In all countries in the region there are various economic instruments that influence energy use (see the box below).

Energy pricing, subsidization and internalization of externalities

Since the fall in crude oil prices in the mid 1980s, the rate of improvement in energy intensity in Western countries has slowed down noticeably. Energy prices, in real terms, are lower than they were during the 1973-1985 period. Governments and the general public have become more ambivalent and less conscientious about the need to promote energy efficiency. In countries with economies in transition energy prices are still kept below economic levels, through specific tariff structures. This lower energy pricing is acceptable for the time being, because of the potential impacts energy price increases could have on inflation, on disposable household income, on employment in vulnerable industries, and on the position of the most disadvantaged groups who often fall through the mazes of inadequate social safety nets. Nevertheless, energy prices will in due course have to be raised to more appropriate levels, meaning that mentalities will have to change, establishing a willingness to pay for services that were much cheaper or even free before.

Subsidies to energy production and consumption, both direct and indirect, affect availability of and demand for energy, distort price signals and contribute to economic inefficiencies. Nonetheless, governments often resort to subsidies to further specific social and economic objectives such as raising domestic energy production to ensure energy security; assisting low income households; encouraging development and use of new and renewable sources of energy; promoting energy efficient practices; and protecting vulnerable industries and their employment base. Over the last decade, direct energy subsidies have been steadily reduced. This is most clearly the case in countries where energy industries have been restructured and energy markets have or are in the process of being liberalised. For example, state support to the Russian coal industry was 27 per cent of production cost in 1998 compared to 83 per cent in 1992. Nevertheless, there are still sizeable direct subsidies in a number of transition countries in electricity, heating, and gas and coal sectors. Besides, many indirect subsidies still exist.

Taxes represent approximately 25 per cent of the price of gasoline in the United States to 60-70 per cent in Western Europe. The trend of taxing energy consumption has also spread to transition countries. Taxes represent 50-65 per cent of the price of gasoline in Poland, Hungary and the Czech Republic. However, the discussion on energy taxation has shifted somewhat in recent years to emphasize the need to change energy consumption patterns by internalizing environmental costs, rather than simply to raise government revenues. Countries like Denmark, Finland, Italy, the Netherlands, Norway, and Sweden have introduced carbon taxes to discourage the use of carbon intensive fuels. Other countries have increased their overall level of energy taxation to discourage energy consumption. Forging a common position on energy taxation is difficult due to the large differences among countries in tax structures, tax levels and energy mix. In the difficult transition period in CEEC and NIS, there is a range of economic and social issues of higher political importance and sensitivity, that need to be addressed before contemplating significant energy consumption taxes (with perhaps the exception of some central European countries). But even in countries with economies in transition, consideration will have to be given in due course to internalizing external social and environmental costs associated with energy production and use. See also the sub-section on Economic Instruments and Voluntary Action under the section Sustainable Development at National Level.

Despite progress made in reducing energy-related environmental impacts to date, much still remains to be done. Continued (or renewed) economic growth will continue to increase absolute demand for additional energy. A renewed effort to accelerate energy efficiency improvements is required or the transition to a more sustainable energy future could prove elusive. To facilitate the transition, vigorous policy action is essential, following a three pillar approach: energy intensity reductions and efficiency improvements; energy pricing, subsidization and internalization of externalities; and cleaner fossil fuels, and renewable sources of energy (see also the box below). More efforts are required in research, development and transfer of technology and in awareness-raising to convince all sections of society (government, business, the public) of the need to change life styles and consumption and production patterns.

Changing the energy mix for energy services

Under present and projected market conditions, the bulk of the energy services will continue to be provided by fossil fuels. To deliver the required level of energy services while at the same time minimizing energy-related environmental degradation the quality of the energy mix should be improved. There are basically four ways of doing so, with varying degrees of challenge:

- switching to more environmentally benign fossil fuels, such as natural gas; however, reserves, though plentiful for the time being, are nevertheless finite.
- switch to nuclear power: safety and costs of nuclear power and reprocessing plants, disposal of nuclear wastes, use of nuclear technology for non peaceful purposes are major issues to consider.

- increased reliance on renewable energy resources (solar, wind, wave, biomass, geothermal and hydro power); political support is growing, but, apart from hydro-power, these energy sources are not likely to contribute in a major way to meeting energy needs over the foreseeable future.
- implementation of advanced, environmentally-sound technologies, with lower fossil fuel consumption and add-on pollution control technologies; this road has specific potential in CEE countries and NIS, but can also still yield additional effect in western UNECE countries.

B. Transport

Transport - and mobility - are jeopardizing the ability of countries in Western Europe and North America to achieve many of their environmental policy targets and sustainable development ambitions. For instance, in Western Europe the energy consumed by all modes of transport increased 47 per cent since 1985 compared to an average rise of 4 to 5 per cent in other sectors (EEA, 2001). Passenger and freight transport volumes more than doubled between 1970 and 1998 (Eurostat database).

Road-traffic-related air pollution in Austria, France and Switzerland

A recent health impact assessment on road-traffic related air pollution in Austria, France and Switzerland reveals that car-related pollution is killing more people in these countries than car accidents. As many as 6 per cent of deaths every year in the studied countries is caused by air pollution, and half of the fatalities -- some 20,000 -- were linked to traffic fumes. The total cost of this health impact is 1.7 per cent of the combined GNP. Detailed figures follow:

- One third of PM₁₀ air pollution is caused by road transport. In cities it is higher – up to 50 per cent.
- In the countries studied, long-term exposure to air pollution from cars to adults over 30 years of age causes an extra 21,000 premature deaths per year from respiratory or heart diseases.
- This is more than the total annual deaths from road traffic accidents (1,031 in Austria, 8,300 in France and 616 in Switzerland: total 9,947).
- Each year air pollution from cars in the three countries causes 300,000 extra cases of bronchitis in children plus 15,000 hospital admissions for heart disease, 395,000 asthma attacks in adults and 162,000 asthma attacks in children.
- This air pollution causes about 16 million person-days of restricted activities for adults over 20 years old because of respiratory problems.
- The total cost of this health impact in the three countries is € 27 billion per year, including the intangible costs for pain, grief, suffering and loss of quality of life from illness or premature mortality, as well as the monetary costs of medical treatment and loss of production.
- This is 1.7 per cent of the combined GNP of the three countries: € 360/person/year.

Source: Kuenzli et al, 2000

This enormous growth has negative impacts related to climate change, transboundary and urban air pollution and related human health, landscapes and biodiversity. Some of the health impacts of transport have emerged only recently, such as the effects of air pollutants on mortality and respiratory and cardiovascular diseases (see also boxes on Road-traffic related air pollution and on Urban Stress, below) and the association of sedentary life-style with increased risk of cardiovascular diseases, hypertension, obesity and diabetes.

Furthermore the transport infrastructure, constantly in expansion, is used beyond its capacity, and congestion causes significant economic losses and social aggression. As detailed in the sub-sections on land and soil and on biodiversity, the infrastructure expansion puts pressure on our remaining space and valuable landscapes. Construction of new motorways in the EU alone during the last decade took up the equivalent of ten soccer fields of land every day.

In passenger transport, improvements in the energy efficiency of engines are not sufficient to offset the upward pressure on energy consumption of three developments: the increased number of passenger kilometres, a shift from train and ship to car and air travel, and the tendency to use bigger cars. Relatively low road transport prices provide no incentive to behave differently. In North America fuel prices are even lower than in Europe. Prices of transport fuels have only increased slightly since 1990 (Eurostat database). A similar development can be seen in freight transport, as, in

spite of policy programmes to support rail and inland shipping (e.g. the EU's Trans-European Network policy), these modes continue to lose ground to road transport (European Commission 1999 from multiple sources). Since the early 1990s freight transport by road and by pipeline has grown much faster than freight transport by rail and inland waterways (UNECE data compiled in Austrian Federal Ministry for Environment, Youth and Family, 1999).

Prior to the 1990s, transport problems in the (now) CEEC and NIS were less significant due to a scarcity of private cars, a general reliance on public transportation, and a concentration of the road network in the heavily industrialized centres. However, with the economic transition in the early 1990s the situation started to change. Despite the economic recession there was a clear growth in the use of private cars at the cost of use of rail and other public transport (see table below). Consumer demand for new, Western (and cleaner) automobiles rose, but the importation of older, more polluting cars from the West also increased. This growing use of cars is making transport an increasingly important problem in CEEC and NIS.

Increase in private car ownership for selected CEEC and NIS countries – 1990-1994	
Selected UNECE member country	Increase in number of private cars during the worst recession years 1990-1994 (in per cent)
Armenia	110
Kazakhstan	123
Russian Federation	143
Ukraine	130

Source: Interstate Statistical Committee of the CIS, 1999

Policy Responses

At the national level, most countries have some form of institutional coordination on transport, health and environment, integrated strategies, planning tools and regulations, national monitoring systems and strategic environmental assessments. There is large variation, though, in details and effectiveness of these approaches to the integration of environmental and health objectives into the transport sector.

Various forms of taxes are being formulated and tried out, and there are efforts to change habits, for instance, by encouraging “car-pooling”, “bike-riding”, and use of public transport. But, as illustrated above, the results are not satisfactory.

There is a need for a policy package containing:

- economic incentives (such as road pricing);
- demand management (for instance by making public transport more attractive for the public) since demand is exceeding what can reasonably be provided without overstepping environmental and social limits;
- urban and land use planning strategies and policies in which human health and environment objectives are a central part;
- education to create awareness that pricing measures aiming at changing lifestyles are really necessary and justified, so that the polluters know why they have to pay more;
- information to feed decision-making processes: better data and indicators are required to monitor progress in achieving targets, to enable comparative analyses among countries and to facilitate communication to the public;
- research and development of new technology;
- institutional mechanisms that give practical directions on above issues through cross-sectoral taskforces, inter-ministerial committees, and international coordination networks.

C. Industrial Production

As already briefly suggested in the section on trends in consumption and production, significant changes have taken place in the industry sector due to globalization, innovation (eco-efficiency), consumer demand and political and economic transition.

There has been significant growth in GDP per capita and industrial production in Western Europe and North America. CEEC and NIS are beginning to recover from the economic collapse of the early 1990s. The economies of most countries are growing, but with large differences between countries. GDP per capita in CEEC and NIS remains much lower than the average in Western European countries.

In North America and Western Europe the growth of economic activities has been accompanied by structural changes in the production system with a shift from material- and energy-intensive sectors to services (see also the often innovative policy responses implemented by the industrial production sector, which are described below). Particularly relevant from an environmental perspective is the development in industrial production, shifting from traditional industries (such as iron and steel and petroleum refining) towards electronic and electrical industries, telecommunication, data processing and fine chemicals. This trend, coupled with some effects of energy efficiency improvements, has led to a significant reduction of polluting emissions and of energy intensity (per unit of GDP) with an improvement of more than 25 per cent in the last 20 years. However, the improvement in efficiency per unit has been offset by increases in the volume of goods and services consumed and discarded and the structure of consumer demand in key areas.

In CEEC and NIS energy intensity of production is still high. While per capita energy consumption in these countries is often lower than the Western European average, relative consumption of energy per unit of product is three or more times higher than in Western European countries, due to the still high share of heavy industries and obsolete technologies and low efficiency of energy use. Furthermore, many manufacturing enterprises in CEEC and NIS are contributing to transboundary pollution in the form of nutrients and persistent organic pollutants (see also the freshwater section and policy responses below).

Policy Responses

Industry's environmental performance is being increasingly held to account by the general public in the Western part of the region. Greater public scrutiny is being facilitated by right-to-know legislation enacted in Canada, the United States and the European Union. The Aarhus Convention is a good example.

New concepts such as cleaner production and integrated pollution control have emerged as strategies to minimize the environmental impact of production and consumption activities in the various stages of the product life cycle. Life-cycle analysis (LCA) methodologies have been implemented and are currently being proposed as a tool to improve product design and manufacturing processes. Increasingly, however, there are concerns about whether this will be enough. A significant change in life-styles and attitudes may be necessary as well.

The polluter pays principle is these days more commonly accepted in Western Europe and North America, as well as in many Central European countries. There has been a general trend towards greater corporate responsibility, realized through self-regulation, corporate environmental policies, voluntary codes of practice (such as the chemical industry's Responsible Care Programme), and the use of environmental audits and open reporting such as the European Union's Environmental

Management and Audit Scheme (EMAS), the British Standards Organization BS7750 and the ISO 14000 series of management standards. Cleaner production has also gained popularity, at least partly because the costs of this approach tend to diminish over time, while the costs of controlling pollution and cleaning up after the event become increasingly high as new regulations are introduced. The World Business Council for Sustainable Development has played a major role in promoting eco-efficiency.

There is a big gap between the environmental and social concerns and performance of leading multinationals and large companies, and that of small and medium-sized enterprises (SMEs). In the EMAS data, for instance, almost no progress can be detected among SMEs apart from positive developments in Germany. The largest companies have both the resources to invest in environmental and social action and the visibility to motivate such action. The industry efforts to advance sustainable forest management among members of the American Forest and Paper Association through its Sustainable Forestry Initiative is one such example. Small companies, which represent a major part of industrial activity around the world, have neither. How to get the positive experience of businesses at the cutting edge of environmental involvement to filter down to the mass of industrial activity in SMEs is one of the unresolved challenges of the moment

Environmentally responsible measures are particularly urgent in the production, processing, end use and discarding of chemicals. The chemical industry in Western Europe is the world leader, accounting for 38 per cent of global turnover, and growing faster than GDP since 1993 (EC, 1997). Production and consumption patterns are ever more dependent on chemicals. This rapid development has been accompanied by uncertainty about the number of chemicals being produced, while data on toxicity are lacking for some 75 per cent of the known chemicals (thereby limiting risk assessment) (NRC 1984, EDF 1997 as quoted in EEA/UNEP 1998). The increasing volume and variety of substances released and accumulating in the environment heighten risks of damage to human health and ecosystems (see air, water, land, biodiversity, and human health sections). The EU has just released a policy paper (a precursor to EU legislation) proposing a plan under which chemical producers would have to prove that tens of thousands of products which are already widely used pose no threat to human health or the environment - or have them banned from the market (EC, 2001).

In this context it is also important to emphasize the importance of the UNECE Protocol on persistent organic pollutants (POPs) that was influential in the development of a new global treaty May. This treaty bans or controls the use of 12 persistent organic pollutants (POPs), the so-called "dirty dozen". These chemicals are mostly pesticides like DDT. Europe is a strong supporter of this treaty, hoping to add new chemicals to the list.

The transition from centrally planned economies to market economies in CEEC and NIS is expected to bring substantial changes towards the restructuring of industrial activities, which could improve energy efficiency and reduce pollution. There is a significant potential for improvement by replacing obsolete technology with the best available technology. Large investments will be required for this and much financial assistance in transferring new technology (see also box below).

Transfer of cleaner technology in the Danube River Basin

The Pollution Reduction Programme of UNDP/GEF has identified 130 major manufacturing enterprises of concern (known as hot spots) within the Danube River Basin; a significant number of these are contributing to transboundary pollution in the form of nutrients and/or persistent organic pollutants. In spite of the environmental problems they are causing, there is a lack of convincing evidence that it is possible to comply with environmental norms while still maintaining or perhaps enhancing their competitive position. A UNIDO project on the Transfer of Environmentally Sound Technology in the Danube River Basin, also funded by the GEF, will build capacity in existing cleaner production institutions in five Danubian countries to introduce a combination of cleaner process technologies and end of pipe pollution control equipment at 20 pilot enterprises. The aim of the assistance is to bring these pilot enterprises into compliance with environmental norms of the Danube River Protection Convention while at the same time taking into account their needs to remain competitive and to deal with the social consequences of major technology upgrading. The enhanced institutional capacity would then be available to assist other enterprises of concern in these countries as well as other Danubian countries.

D. Agriculture

The share of agriculture in GDP and the share of agriculture in national employment is low and quite uniform for Western Europe and North America, while it is much higher and variable in CEEC (see table below). Agricultural land as percentage of the total land area is rather uniform for the entire UNECE region (see table below).

Some recent agriculture-related statistics

Sub-region / country group	Share of agriculture in GDP (in percentage)	Share of agriculture in national employment (in percentage)	Agricultural land (as percentage of total land area)
North America	2	5	50
Western Europe	2	5	40
CEEC Acc. Countries	8.6 *	29 **	45

* between 3.6 and 17.3 per cent

** between 5.2 and 41.7 per cent

Source: World Bank as compiled in WRR 2000-2001

Despite the low share of agriculture in GDP in most parts of the region, farmers traditionally represent a strong section of society, partly because they are the producers of much of the food, but also because they are the guardians of large parts of the space available to society. Agricultural landscapes and rural settlements still have many historical, cultural, and ecological values that are being preserved by farmers. And the open landscapes, shaped by a history of farming, have important recreational and tourism functions.

Indeed, agriculture is broadly multisectoral. It is a major factor for biodiversity conservation, not only because of its vast area but also because part of farmland is important for many plant and animal species that may no longer exist elsewhere. Semi-natural, hardly fertilized permanent grassland often substitutes for natural habitats that have become rare or have disappeared. Such semi-natural lands are still abundant in mountainous areas.

Over the past decades Western European and North American agriculture has become more specialized and concentrated in areas with the lowest production costs. This process, driven largely by technological changes, subsidies, cheaper and faster transport, and the establishment of a common market in Europe, has been accomplished by increasing intensification on the best land and in key production areas near important markets, especially in Western Europe. At the same time it has resulted in marginalization of other less well-located areas.

However, both consumers and governments are becoming more concerned about the way in which agriculture is organized. The recent mad cow and foot-and-mouth disease outbreaks in Europe and the developments in the application of genetically modified organisms (GMOs) in North America and to a less extent in Europe, have resulted in much new debate about agricultural practices and food production. Consumers are beginning to ask for more traditional organic agricultural production methods (see also the box and policy responses below).

The agricultural sector in CEEC and NIS underwent major changes during the 1990s. Farmers faced changes in land ownership (privatization and splitting up of large cooperatives) and in relative prices. Consumer prices for agricultural products increased after food subsidies were abolished, but wages and prices of agricultural output increased considerably less than prices of inputs such as fertilizers and plant protection products. The total consumption of fertilizers more than halved during the first half of the 1990s. All of these factors induced a decline in intensity of production, particularly in the animal sector. Agricultural output from animal production, for instance, decreased between 1990 and 1994 by more than 34 per cent (Baldock *et al*, 1996) in the 10 accession countries. More traditional subsistence food production in suburban areas has increased though (see box below). Such changes have had important consequences for the environment (including biodiversity), the economy and society (including human health).

Urban horticulture and food security

In contrast to subsistence farming, modern agriculture and the commercial food system is geared towards highly processed, all-year round, packaged food. Ease of transport, consistency and standardization appear to take precedence over nutrition, public health, animal welfare, resource efficiency, diversity, regional diversity and even taste. Food can travel thousands of miles before being consumed, a phenomenon sometimes referred to as "food miles" or ecological footprint. This results in excess use of fossil fuels, noise and air pollution and unnecessary packaging. It requires addition of artificial flavours, colours and preservatives. It contributes to declining freshness and wholesomeness, especially in vegetables and fruits, which are most susceptible to damage.

Traditional horticultural food production in urban and peri-urban areas has largely disappeared in North America and Western Europe, with the exception of recreational gardening. In contrast, in CEE countries and NIS, large-scale, commercial, agricultural output from collective farms has decreased, but subsistence food production has increased. Some statistics (de Zeeuw 1998; UNDP 1998; Economic Research Service 1997; and WHO 1998):

- In the Russian Federation town dwellers produce 88 per cent of their potatoes, generated on small plots that together constitute only 4 per cent of the total agricultural land in the Russian Federation.
- In Poland 500,000 tonnes of vegetables and fruits (1/6 of the national consumption) were produced on 8,000 council "employees" gardens in 1997.
- In cities of Georgia home-produced food made up 28 per cent of the income.
- In 1998 in Bulgaria 47 per cent of the population was self-sufficient in fruit and vegetables and 90 per cent of urban families prepared some kind of preserves for the winter

Cities can pursue a greater degree of food self-reliance, by producing more food locally, especially fruits and vegetables. This would have multiple positive impacts, including:

- increased opportunities for local employment and stimulated local economic growth;
- lowering the cost of local foods because of savings made in processing and packaging, transport, storage, use of middlemen and artificial fertilizers, so enhancing access to healthier food for the poorer, more vulnerable section of society;
- a closer link between consumers and producers, enhanced social cohesion, mental and psychological health and increased opportunities for a more active lifestyle;
- improved aesthetics of the city environment; recycled treated water reducing peak discharge in floodplains; recycled organic waste; and reduced energy use for packaging and food transport.

All these positive impacts would lead to more sustainable food, health, and environmental systems. The strategies needed to create desired changes in nutritional and environmental patterns are often complimentary and, if combined, could provide cost-effective, sustainable developments for deprived areas.

Good examples already exist in Western Europe as well. In Sweden new buildings are planned with composting facilities and municipally owned city farms, which use this compost, contribute not only to reducing the environmental impact of waste but also contribute to social cohesion and local economic growth. Municipal authorities in many cities concerned with community development are beginning to link existing projects or networks, e.g. Local Agenda 21 projects, NGO poverty alleviation projects, urban renewal, community development and Healthy Cities networks. Community Supported Agriculture (CSA), Local Exchange Trading Schemes, Food Cooperatives and Drop-Box schemes are all alternative approaches now being tried in Western Europe in an attempt to reverse the adverse trends of the seventies and eighties. Such schemes should be supported with financial, technical and legal incentives. Initiatives linked to food, the vulnerable and community development allow optimum use of resources and creates "added value" and prevents food insecurity while promoting sustainable development.

Policy Responses

There is a clear distinction in agricultural policy development and debate between Western Europe and North America on the one hand and CEEC and NIS on the other. There are also differences within the sub-regions, such as the approach to GMOs.

The EU Common Agricultural Policy (CAP) has undergone substantial reform since 1992 (see also section IV A 3 on land and soil). The EU's Agenda 2000 package, which took effect last year, moves away from supporting commodity prices towards direct payments to farmers that are de-coupled from production. This has helped to reduce pressures towards intensification. In North America agricultural policy is subject to regular adjustments, giving more and more consideration to environmental and human health issues.

Despite current EU reforms and comparable national reforms in non-EU countries in Western Europe and North America, there remains a threat of continued agricultural polarization, a combination of intensive farming and land marginalization - all impacting on society, human health, and the environment (biodiversity, landscapes, pollution from agri-chemicals).

The newly heightened consumer fears over food safety, animal welfare and the environment are leading some governments in the region to lay out new visions of a future agricultural policy. All realize that much more drastic reforms will be required for agriculture and food production to survive.

In the current policy debate focus is on issues such as:

- de-coupling payments to farmers from production;
- that counting as production work with animal welfare, the cultural landscape and similar work;
- delivering quality food to everyone and not only to a few who can afford it;
- shifting resources from large farms to rural development;
- promoting organic farming; implementing well-targeted agro-environmental policies or equivalent measures on the remaining agricultural land with high biodiversity values;
- supporting urban agriculture through financial, technical and legal incentives

E. Conclusions

Eco-efficiency gains in the energy sector in Western Europe and North America are offset by increased demand for energy, which is mainly met with fossil fuels, inducing more emissions of CO₂ and other pollutants.

Vigorous energy policy action is essential, focussing on (1) energy intensity reductions and efficiency improvements; (2) energy pricing; and cleaner fossil fuels, and (3) renewable sources of energy; (4) improving the energy mix; (5) strengthening technology research and development; and (6) increasing awareness raising.

There is a huge potential for reducing the very high-energy intensity and improving the low energy efficiency in economies in transition now that substantial changes in industrial activities are taking place. Transfer of technology will be an important aspect in this context.

Transport developments are jeopardizing the ability of countries in Western Europe and North America to achieve their environmental and human health policy targets. Much of the road and air transport infrastructure is used beyond its capacity. Congestion causes significant economic and health losses. Car-related pollution is killing more people than car accidents. The number of passenger kilometres and of bigger cars continues to increase. There continues to be a shift from rail and other public transport to car and air travel. Low road transport prices and inconvenient public transport provide no incentives for consumers to change their behaviour.

Environmental and health objectives need to be integrated into the transport sector. Policy packages are required combining economic incentives (such as road pricing), urban and land use planning strategies and policies, demand management (for instance by making public transport more attractive), information and education, new technologies, and stricter regulation.

Environmental pressures from industrial production intensified due to the increasing consumption, and it will worsen over the coming years despite the shifts from heavy industry to services and the successes brought about by the corporate sector to reduce energy and material intensity of consumer goods. It is expected that consumption patterns in CEE countries and NIS will follow the same path as they have in the West. However, in these countries there is a large potential for introducing cleaner technology and a less damaging industrial production path. Technology cooperation and transfer is vital.

Cleaner production and integrated pollution control concepts need to be further operationalized. Uncertainty about toxicity of new chemicals and waste, disposal of new materials, risk of accidents all need to be addressed. Large companies are becoming more sensitive to sustainable development, especially in Europe. Corporate responsibility of small and medium-sized enterprises needs to improve.

Western European and North American agriculture has become more specialized, intensified, chemical dependent and concentrated in areas with low production costs. The transition in CEE countries and NIS, on the contrary, has led to a decline in intensity of agricultural production.

Both governments and the general public realize that much more drastic reforms will be required for agriculture and food production. Governments in Western Europe and North America are beginning to lay out new, more "humane" visions of a future agricultural policy, rather than focussing on the economics of production only.

IV. MAJOR ENVIRONMENTAL CHALLENGES AND RESPONSES

A. Managing Natural Resources

1. Climate Change

IPCC recently projected that surface temperature will rise even more between 1990 and 2100 than was estimated in 1995 (IPCC 2001), concluding that climate change due to anthropogenic emissions of greenhouse gasses (GHG) has almost certainly started. CO₂ is by far the largest contributor to greenhouse gas emissions. Per capita CO₂ emissions differ considerably in the UNECE region, as shown in the table below.

Per capita CO₂ emissions (kilogrammes) for 1996 for selected countries			
Austria	7,364	Albania	616
Denmark	10,792	Belarus	5,949
France	6,211	Croatia	3,909
Germany	10,514	Hungary	5,834
Italy	7,029	Latvia	3,714
Netherlands	9,984	Poland	9,229
Sweden	6,130	Romania	5,270
Switzerland	6,144	Russian Federation	10,681
United kingdom	9,532	Ukraine	7,751
Canada	13,669		
USA	19,674		
		Europe	8,414
		North America	19,074

Multiple Sources as compiled in WRR 2000-2001

The latest figures show a decrease between 1990 and 1998 of two per cent in total EU emissions of all six GHG gases, thus meeting the stabilization target set by the EU in its fifth environmental action plan. Country differences are large though, ranging from well below target to seriously above it (EEA, 2001; EC, 2000b+c). Nonetheless, Western Europe shows a clear de-coupling among emissions, economic growth, and inland energy consumption (EEA, 2000b). This decarbonization is especially due to the switch from coal to gas in the United Kingdom, to economic restructuring in the former Democratic Republic of Germany, to increases in energy efficiency and the impact of policies and measures to reduce GHG emissions (EEA, 2000b).

In some of the advanced reform CEE countries economic restructuring and environmental actions also appear to have had an effect in reducing CO₂ (a de-coupling) since CO₂ has decreased (OECD, 1999b) with stable or increasing GDP (UNECE, 1999). In most other CEE countries the recession and its fall in industrial output appears to have been the main factor in CO₂ reduction (no de-coupling) (OECD, 1999a+b, UNECE, 1999). By end 2000 CO₂ emissions in CEEC and NIS are expected to be 22 per cent lower than in 1990 (UN, 1997).

In North America in the past couple of years, there has been a de-linking between economic growth and carbon emissions, with carbon intensity decreasing about 30% in both Canada and the United States over the past two decades. Carbon emissions nevertheless, continue to increase. Most CO₂ emissions are from burning fossil fuels for energy. In North America, the transportation sector accounted for over 38% of the total energy consumption. (US EIA 2000) Low fuel prices and the failure to enact more aggressive energy conservation measures have been a main part of North America's inability to curb its CO₂ emissions in the 1990s (Environment Canada, 1998a; Flavin 1998). In 1998, GHG emissions were still 13 per cent and 11.5 per cent above 1990 levels in Canada and the United States respectively (UNFCCC, 2000).

Assuming *existing* policies and measures (including the agreement with the car industry to reduce carbon dioxide emissions from new passenger cars) a recent EU Commission study projected that total EU GHG emissions will fall by one per cent by 2010 from 1990 levels (EC, 2000b+c+d+e) far short of the 8 per cent Kyoto target. The same study also suggests, however, that the Kyoto Protocol target is achievable, if a range of *additional* cost-effective policies and measures are adopted and implemented. Over half the required reductions in Europe could be achieved at low cost (less than 5 Euro/tonnes) and “non-technical” pollution control measures such as road pricing and tax incentives will become more important (EC, 2000b+c). The European Commission, in its Sixth Environmental Action Plan, also calls for more far-reaching global emission cuts in the order of 20-40 per cent by 2020 (EC, 2001).

Opinions differ, though, as to whether the *additional* policy and measures referred to by the EU will be feasible and sufficient to achieve the Kyoto target. An in-depth policy discussion of these measures is needed, for example within the new European Climate Change Programme. At the same time there is need for structural changes, especially in the transport and energy sectors, for stronger efforts in energy-efficiency and energy-saving, for further research and technological development, and for awareness-raising with citizens so that they can contribute to reducing emissions by changing their consumption patterns (EC, 2001).

Current emission levels of most CEE countries and NIS are far below their “Kyoto base year levels” with an average drop of 30 per cent in 1995 compared to 1990 (Klarer, McNicholas, Knaus 1999). In most NIS it is unlikely that currently weak environmental protection bodies can seriously enforce effective emission reduction strategies in the near future.

Policy Response

Under the 1997 Kyoto agreement, countries were committed to reduce emissions of the main six GHGs by 8 per cent, 6 per cent and 7 per cent respectively from 1990 levels in 2008-2012. Western European and North American countries have adopted various sub-regional and national policies and measures to reduce GHG emissions or to enhance carbon sinks. These relate to energy and CO₂ taxes, reduced CO₂ emissions from new passenger cars, reduced amounts of organic waste landfill, use of best available technology to prevent and control pollution, improved energy efficiency, agreements on minimum energy standards, voluntary programmes, to encourage private sector reductions, and creation of forest carbon sinks.

Furthermore three ‘flexibility’ or ‘Kyoto’ mechanisms were introduced in the Kyoto Protocol to help reach targets, such as emissions trading, joint implementation among industrialized countries and the clean development mechanism for cooperation between countries that have committed to reductions, mainly developing countries. Efforts to forge a compromise on how to meet targets to cut greenhouse gas pollution set out in Kyoto in 1997, which calls for industrialized nations to trim carbon dioxide output by about 5 per cent by 2010, broke down in November after the United States and EU negotiators failed to agree. The United States has favoured allowing countries failing to meet targets to buy credits from countries that have met their goals, and to count carbon sequestered by forests and farms. The EU has opposed both proposals, arguing that nations must make real cuts to greenhouse gas pollution. Meanwhile (end March 2001) the United States abandoned the Kyoto Protocol altogether stating that it does not bind developing nations to curb emissions and that the costs outweigh the benefits of the protocol.

CO₂ emission trading in CEE countries and NIS

Under the Framework Convention on Climate Change (UNFCCC), baseline emission levels are used to set future targets for reductions. The large economic and social shifts that have occurred in CEEC have dissociated the countries from their baseline conditions. The use of previous levels as reference points results in huge apparent gains. Current emission levels of most CEE countries and NIS are far below their "Kyoto base year levels" with an average drop of 30 per cent by 1995 compared to pre-transition levels (Klarer, McNicholas, Knaus 1999).

Emissions trading schemes, which would allow states failing to meet targets to buy credits from countries that have met their goals, could flourish as a result of the unexpected course of transition, presenting particularly interesting possibilities for CEE countries and NIS. They could start "banking" by selling their "reductions" to enterprises in western European countries seeking to achieve their reduction targets. The result would be a flow of money from West to East, however, with decreased actual emission reductions in Western Europe. If this money flow would be used for environmentally friendly redevelopment in the East, it might create a future in which CEEC and NIS becomes cleaner and richer at the same time. However, if economic disruption would continue (or re-occur), the effectiveness of such economic mechanisms would be limited. Earlier periods of rapid currency fluctuations affected any incentives system. Where charges failed to keep pace with inflation, polluters preferred to pay fines rather than change their behaviour. In most CEEC and NIS inflation is now under control, though, or economic measures have been indexed (REC 1999).

Allowing such reduction trade may harm actual reduction achievements in Western Europe in the short term, but those in favour of trading schemes state that there would be a net gain in the long term, as the gap would eventually shrink due to more effective implementation in Western Europe.

However, many observers are sceptical about the ability of markets to prevent abuses. They consider such mechanisms to be dangerous. While the United States, for example, has made successful use of emissions trading, such mechanisms can be destructive where markets do not have well-developed controls in place or are not self-regulating. Within Europe, Western Europe has generally taken a cautious approach to such schemes, while CEEC and NIS may see economic advantages. Nonetheless, the European Commission has recently called for the establishment of an EU-wide emission-trading scheme (EC, 2001).

Countries in the region must renew their commitments to sustainable use of energy resources; otherwise curbing emissions will be difficult to achieve (Environment Canada 1998b). Since CO₂ emissions are so abundant and directly related to fuel use, a substantial change in automobile use, better technologies, and investment in public transport are all needed.

Ozone depleting substances like CFCs and HCFCs are at the same time potent greenhouse gases, as is ozone itself. Since CFCs and HCFCs are already covered under the Montreal Protocol, they are not included in the more recent Kyoto Protocol designed to curb climate change. HFCs, increasingly used to substitute CFCs, are also potent GHGs and their emissions are covered under the Kyoto Protocol rather than the older Montreal Protocol.

2. Air Pollution

Air emissions have declined overall in the region since the early 1980s. Emissions causing acidification and eutrophication, often far away from the source, have also been significantly reduced, mainly due to reductions in SO₂ emissions in the whole region. By the end of 2000, sulphur compound decreases of more than two-thirds from 1980 levels were expected in Western Europe, and decreases of one-third in CEEC/NIS (UNECE 1997). In the United States and Canada SO₂ emissions were reduced by roughly 25 and 40 per cent respectively between 1980 and 1996 (WRR 2000-2001).

For emissions of particulate matter and hazardous (toxic) substances such as heavy metals and persistent organic pollutants there is a serious lack of monitoring, and therefore no significant trends can be observed. Nonetheless, emissions of primary and secondary PM₁₀ in the EU fell by 29 per cent between 1990 and 1998. In North America levels decreased by 40 per cent between 1980 and 1999 (Environment Canada 1999; 2000; OMA 2000). However, recent research reveals that it is the finer airborne particles (PM_{2.5}), released mainly from motor vehicles and power plants that cause the more

serious health concerns, expressed as early deaths and hospital admissions. The ambient concentration of SPM in European cities decreases only slowly (WHO 1999a). A large fraction of the urban population in the UNECE region is still exposed to levels of fine particulate matter causing considerable damage to human health (Environment Canada 1999 and 2000; OMA 2000; EEA, 2001). A substantial part of the particulate air pollution (up to 40 per cent) is attributed to long-range transport of pollution, also causing significant health damage to populations outside large urban agglomerations (WHO 1999b).

Total emissions of ozone precursors are falling in most countries. In the EU as a whole they fell by 22 per cent between 1990 and 1998. In the United States emissions of non-methane volatile organic compounds (NMVOC) alone fell 43 per cent between 1970 and 1999 (USEPA 2000). More diesel and catalytic converters for road vehicles and implementation of the Solvents Directive in industry have contributed most to the ozone precursors and PM₁₀ reduction. Year-to-year fluctuations in the number of days that ozone levels in Europe are exceeding the threshold set for protection of human health suggest that ozone peak concentrations have decreased, but that median values are tending to increase (EEA, 2001). Ground-level ozone continues to be a problem in many regions throughout North America as well (USEPA 1997a+b; Environment Canada 2000).

Overall it is clear that SO₂ and NO₂ emissions are decreasing, but particulate matter and ozone precursors still cause serious problems (EC, 2000a; Environment Canada 2000; USEPA 2000). The average figures mask a large variation among member countries in the UNECE region. For example, while SO₂ emissions were reduced by 56 per cent between 1990 and 1998 for the whole region (UNECE 2000), emissions increased during that period in Greece and Portugal, but significant reductions were observed in Germany and Finland (EEA, 2000a). In cities in the Asian part of the Russian Federation, average SO₂ concentrations were 35 per cent higher than in the European part (State Committee of the Russian Federation for Environmental Protection, 2000). NO_x emissions vary considerably: they remained more or less the same in Western Europe, increased by 17 per cent between 1970 and 1999 in the United States and were reduced in many CEE countries and NIS (EEA-ETC/AE; USEPA 2000; Interstate Statistical Committee of the Commonwealth of Independent States 1999; SOE Poland 1998, SOE Hungary 1997, Czech Environment Institute (ed.) Ministry of Environment (co-ed.) 1996, OECD, 1999a).

The main economic sectors driving air pollution in Western Europe and North America are energy, transport, industry and agriculture (EEA, 2000a). In CEEC and NIS, energy and heavy industry have traditionally been the major pressures, but transport is becoming an increasingly important force in CEE countries as well (see above). Continued growth in consumption in Western Europe and North America and growth in consumption in CEEC drive all of these.

For Western Europe SO₂, NO_x and NH₃ showed a clear de-coupling from GDP growth, pointing towards some degree of effectiveness of measures taken (EEA, 2000a). In some advanced reform CEE countries like the Czech Republic, Hungary, Poland, Slovakia, and Slovenia, economic restructuring and environmental actions also appear to have had an effect in reducing air pollution (OECD, 1999a+b, UNECE 1999). For example, in 1996, the total amount of SO₂ emissions in Poland was about 60 per cent of the 1989 level (SoE Poland, 1998), while the 1998 real GDP index was 117 (1989 index=100) (UNECE 1999). In other countries, such as Albania, Bulgaria, the former Yugoslav Republic of Macedonia, Romania and all NIS, the fall in industrial output due to the recession appears to have been the main factor in air pollution reduction (OECD, 1999a+b, UNECE 1999). In countries like the Russian Federation and Ukraine emissions per unit of GDP even increased, but this was masked by the fall in GDP (State Committee of the Russian Federation for Environmental Protection 2000). Once the economies in these countries recover, it is expected that air pollution will also increase (no de-coupling) (State Committee of the Russian Federation for Environmental Protection 2000). More optimistic outcomes could emerge if the countries in transition develop along a cleaner industrial path than is currently the case.

Policy Response

The complex effects of both local and transboundary air pollution are often interrelated through common causes and common impacts. There are also direct links to climate change and ozone depletion. Policies to reduce emissions use a multi-pollutant, multi-effect approach. Integrated abatement strategies are indeed needed to address the important interactions between major environmental sectors and problems such as climate change, ozone depletion, air, soil and water pollution. The targets set under UNECE Agreements and EU Directives are converging and using the same models and data. However, there is scope for better alignment between European and global agreements. The latter should not result, however, in less strict targets than already exist.

Though no direct link can be established, it is clear that the decrease in air pollutant emissions is at least in part due to the many national and local level measures that have been taken. In UNECE Member countries, these are often part of the implementation of the 1979 UNECE Convention on Long-range Transboundary Air Pollution (CLRTAP) and its Protocols, and other sub-regional policy instruments such as EU Directives linked to air emissions. In North America the 1991 Canada/United States Air Quality Agreement is an important tool to reduce emission levels. And both Canada and the United States also extended their domestic air pollution programmes through the 1997 Canada/United States Programme to Develop a Joint Plan of Action for Addressing Transboundary Air Pollution (CEC1997a).

Among them, these instruments now cover all major sources of air pollution throughout the region and most major air pollutants, although for primary fine particle emissions there is no CLRTAP or EU National Emission Ceiling set.

The CLRTAP Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (adopted in Gothenburg in 1999) and the EU Acidification and Ozone Strategies leading to the EU Directive on National Emission Ceilings for Certain Atmospheric Pollutants (NECD), are two recent regional measures that are expected to achieve further decreases for several air pollutants. By 2010, total emissions of EU countries of NO_x and NMVOC must fall about 51 per cent and 60 per cent respectively, from 1990 levels. Even when these ceilings have been met, however, it is forecast that additional measures will be needed to protect the environment completely (e.g. to meet critical loads of acidification and critical levels for ozone). In addition, concentrations of fine particulates (e.g. PM₁₀) in most urban areas of Europe and North America are expected to remain well above WHO recommended limit values in the near future. To assess these outstanding issues CLRTAP and the EU, through its Clean Air for Europe (CAFE) programme, are working towards the review of their respective instruments over the next few years. The reviews could provide the basis for initiating revision of the instruments to address the outstanding environmental concerns.

To deal with the remaining air pollution problems it will be important to develop improved technology and to increase energy efficiency. As indicated also under climate change, for Western Europe “non-technical” measures for controlling pollution such as road pricing and tax incentives will become more important as well (EC, 2000a). In many CEE countries it is unlikely that currently weak environmental protection bodies can seriously enforce an effective air pollution reduction strategy in the near future.

In addition to pollution abatement measures, it will also be necessary to improve the scientific understanding of pollutant effects. For example, approaches will need to include factors that will account for changing climate and prolonged rates of recovery of some ecosystems. As abatement options become more stringent, they will become more costly. It will be increasingly important to ensure that the scientific basis for decision-making is well founded. Emission reporting has improved markedly in recent years. For pollutants other than SO_x and NO_x, however, data gaps are still

substantial. And in general there still is a clear scope for improvements in the quality of reported data.

3. Land and Soils

All over the UNECE region human activity is responsible for many valued landscape features, but also for growing pressures on landscapes and soils. Urbanization in general and sprawling of urban settlements in particular, transport infrastructure, industrialization, tourism, changes in world commodity prices, agriculture and forestry, all affect the way the land is used. Overall, quite dramatic changes occur at local levels, resulting in a significant growth in built-up areas at the cost of natural, semi-natural and agricultural land. The latter also means that valuable cultural heritage is disappearing.

Although the area under productive agriculture fell slightly in the entire UNECE region between 1987 and 1997 (FAO in WRR 2000-2001), the decrease was accompanied by more specialized, intensive production methods. The driving forces are mainly technological advances, the creation of common markets, such as the EU and NAFTA, globalization of the economy, changing consumer demands, and policies like the Common Agricultural Policy (CAP) in the EU, as well as the NAAEC in North America, which has been a driving forces in increasing intensity of agricultural production methods.

Conversion of agricultural land is following two paths throughout the region. Part of the farmland is being reforested, probably more in Western Europe than elsewhere due to effective European subsidies. Other parts of farmland, however, are subject to increasing pressure from suburban residential development. This is happening to some extent everywhere in the region.

During the 1990s, in many parts of CEEC and NIS, pressure on land resources began to decrease, due mainly to the collapse of centrally-planned economies and the end of state subsidies to large collective farms. This also led to a sharp decrease in the use of agricultural chemicals, abandonment of huge irrigation projects and agricultural land, and decrease in numbers of livestock. All these changes had generally beneficial effects on the environment, apart from biodiversity problems due to abandonment of land. At the same time, the culture of private cars, single-family houses on individual plots and mammoth shopping malls quickly took hold, particularly around major cities. This trend can be expected to increase in the future as economic situations improve unless alternative patterns of consumption and development are pursued.

Overall, damage to the region's soils from modern human activities is increasing, leading to irreversible losses due to sealing of soil surfaces, local chemical pollution resulting in hotspots, diffuse contamination spreading over much larger areas and soil erosion (EEA/UNEP 2000).

A main cause of soil degradation and loss in industrialized and densely populated parts of the region is the sealing of soil surfaces due to increased building of highways, airports and residential and industrial and business areas. The increase in sealed surfaces results in more direct run-off and larger peak discharges, causing flooding. More recent increases in flood damage are also due to increased build-up of floodplains, ignoring their natural function as a buffer for water spills during exceptionally high water levels.

Soil deterioration by contamination is an important issue in the whole region both locally from point sources, such as hazardous waste deposits, industrial and waste dumps and accidents, military waste and war activities, and from diffuse sources, primarily from excessive fertilizer and pesticide use in intensive forms of horticulture, excess manure production from intensive pig farming, and acid rain (EEA/UNEP 2000).

Soil acidification due to acid rain was a major problem in the 1970s and 1980s in north Central Europe, in the Russian North, and in the eastern part of North America around the Great Lakes. Since active policy intervention in the late 1980s the number of locations with sulphur deposition at critical levels has been reduced by 50 per cent in Europe (EEA, 1998).

In Europe soil loss by erosion is mainly due to water and, to a lesser extent, to wind. In North America both forms of soil erosion occur. Major causes are unsustainable modern agricultural practices, large-scale farming and overgrazing in CEEC and poor water and irrigation management (especially in NIS). As topsoil is lost, soil structure, fertility and productivity of the remaining soil are reduced. This creates a vicious cycle whereby farmers apply more fertilizers to compensate for yield losses. Soil erosion is most serious in central Europe, the Caucasus and in the Mediterranean region. At present rates of erosion, considerable areas in the Mediterranean and the Alps may reach a state of irreversible loss within 50-75 years (Van Lynden, 1995). In several NIS, and in Central Asia in particular, poor water management of large irrigation and hydroelectric projects has resulted in severe salinization and water logging of large areas.

Policy Response

There are many sectors impacting on soil, land use and landscapes. Policies and measures explicitly relating to land use planning and management have generally been the responsibility of national and local level governments. At a European level, attention is given to the European landscape through the Environment for Europe (EfE) process. For example, it was at the third EfE Conference in Sofia (1995) that the Pan-European Biological and Landscape Diversity Strategy (PEBLDS) was endorsed (and officially launched during the fourth Conference in Aarhus in 1998).

In the EU, the Common Agricultural Policy has undergone substantial reform since 1992 and since Agenda 2000 (1999), gradually eliminating many subsidies, reinforcing incentives for environmentally sensitive agriculture and including landscape protection for its cultural values. At the same time regulatory measures have been further developed. Examples include the 1991 Nitrate Directive (i.e. relating to use of pesticides and fertilizers) and the 1992 Habitats Directive, though relatively little farmland is designated under the latter. Measures were reinforced and expanded to reward farmers for maintenance of biodiversity and landscapes, and for cleaner production methods, including organic and non-intensive farming (see also the box on agriculture and biodiversity in the next sub-section).

Additional incentives can be expected to come from consumer concerns, recently stimulated through veterinary disasters in Europe. More and more consumers are expressing a preference for food produced using more traditional systems and giving priority to farm-animals' welfare. Increases in such alternative agricultural activities are an indicator of progress towards more environmental-friendly agriculture. Better integrated spatial and land use planning and management is required to tackle the problems associated with such land cover and land use change.

At the national level, many countries have produced legislation, policies or guidelines to ameliorate or prevent soils from further degradation. Integrated sustainable management of soil as a natural resource, together with air and water, is also one of the environmental challenges and priorities in the EU's 5th and 6th Environmental Action Programme.

However, unlike water and air, soil is not explicitly considered when specific objectives and targets are defined. In general, policy measures are primarily aimed at combating pollution in other areas, affecting soils only indirectly. There is legislation indirectly concerned with soil degradation. These measures mostly address general soil degradation and contamination due to agricultural activities and local soil contamination due to industrial activities or waste disposal. The huge number of

contaminated sites is an enormous challenge for the next decades and will need appropriate legal instruments, innovative redemption technologies and practical financial instruments (EEA/UNEP 2000)

Statutory soil monitoring is carried out in a number of countries. In the United States, the Natural Resources Conservation Service has initiated a programme of doing soil surveys and creating incentives for farmers and others to monitor the impact of their efforts on water quality and other areas through best management practices. However, in many countries, soil monitoring is rarely done for the purpose of soil protection per se; performance of policies can therefore not be quantified and comparability at a regional level remains a weakness.

Most international programmes emphasize among others the need to improve statistical monitoring activities (EEA/UNEP 2000). The recently approved European Land Use / Land Cover Statistical Survey project (LUCAS) is a promising response.

4. Biodiversity

Many western European and North American landscapes, including wetlands, ecosystems, and their flora and fauna have been badly damaged or have disappeared completely, and much of the remaining biodiversity is threatened. CEEC and NIS still possess many well-preserved landscapes, ecosystems and species that are rare or extinct elsewhere. Under the socialist centrally planned economies, highly urbanized and industrialized areas were concentrated in specific regions, while agriculture was usually concentrated in collectivized, large farms. In these concentrated areas, landscapes and biodiversity were badly damaged, but area that fell outside of these large farms were relatively untouched. The majority of protected areas in CEEC and NIS still have large buffer zones around them and forest corridors that link sites. Economic growth and social mobility could threaten biodiversity here.

Biodiversity is affected by a complicated combination of driving forces such as agriculture, forestry, fisheries, urbanization, industry, transport, tourism and recreation, poverty, and political or economic instability. Four principal, inter-connected pressures are land use change, climate change, chemical pollution and introduction of alien species (EEA, in prep).

In the whole region *agricultural* intensification has led to uniform and simplified landscapes with a heavy negative impact on habitat and species diversity. Nevertheless, in the ten EU candidate countries semi-natural grasslands still cover on average 12 per cent of the farmland. While in the past intensification of agriculture was a dominant factor, land abandonment is a serious threat to the biodiversity of farmland today.

Despite strict conservation measures to try to avoid declining fish stocks, *fisheries* still have both direct and indirect effects on specific species and on the marine ecosystem as a whole (EEA, 2000, Environment Canada 1999). Marine aquaculture is a rapidly expanding industry in coastal zones where biodiversity is high and where human pressures are increasing and complex. Though initially judged negligible, the impact of aquaculture on biodiversity through feeding, pests and escaping species is considered severe (EEA in prep.).

Forest practices relying on monospecific plantations and even-aged stands of exotic species have been detrimental to biological diversity. The total forest area in the UNECE region is stable or increasing slightly, but old-growth forests and forests of indigenous tree species are decreasing (FAO in WRR 2000-2001). Traditionally forests have been used in a multifunctional way, and even today a large share of the region's forests can still be considered as important nature areas. Strategic

afforestation, including connecting existing forest areas (corridors), may further improve the ecological quality of forests over time.

In Western Europe and North America, *urbanization* and new transport infrastructure, occurring at the cost of agricultural land, forestland and nature areas, result in an ever-growing fragmentation of areas available for flora and fauna.

There has been less fragmentation in CEEC and NIS, but this may change as economic transition progresses. At the same time, with growing *poverty* and loss of traditional employment, protected areas and forests in CEEC and NIS are under attack from poaching and illegal tree felling. In some places this has already threatened the continued existence of certain rare species.

As one of the fastest growing sectors worldwide, *recreation* and *tourism* have heavy direct destructive impacts on habitats and disturbance of species, and indirect impacts through pollution, increased transport and water demand, particularly in coastal and mountain areas. Increasing interest in 'eco-tourism' raises awareness of nature and biodiversity, but considerable damage has already been done in once remote areas.

Chemical pollution, an issue relevant for the whole region, threatens species diversity. For instance, discharges of heavy metals can influence fertility; eutrophication can kill aquatic life and terrestrial eutrophication has direct negative impacts on terrestrial species and their competition for space. *Climate change* is also forecast to have major impacts on habitat distribution and species diversity, especially in northern latitudes and in Eastern Europe. Local species loss under CO₂ doubling may be as high as 20 per cent in the most vulnerable arctic and mountain habitats as a result of habitat fragmentation. Dry habitats in southern Europe may become more arid.

The risk imposed by the introduction of *species alien* to the region's ecosystems – both voluntary and accidental – is exacerbated by globalization of trade and transport. Bioinvasion is these days thought to be the second gravest threat to biodiversity in North America (CEC 2000). Total costs of dealing with invasive species such as noxious weeds, harmful insects and organisms are estimated at about US\$ 125 billion each year in the United States alone (National Agricultural Library 2000).

Most of the above aspects also directly impact on the livelihood of *indigenous people*, whose local habitats and cultures are threatened. Most indigenous people in the UNECE region live in the Arctic, but there are also traditional populations in some of the remote mountainous areas in CEEC and NIS. The Inuit have lived and travelled throughout the Arctic for more than 5,000 years (Lyngne 1993); they still comprise 80 per cent of the population in the Northwest Territories of Canada. The Saami people in Norway are also still quite well represented; they have special rights to grazing land, hunting and fishing in certain territories and the right to primary tuition, TV and radio broadcasts in their own language throughout the country.

Policy Response

The Pan-European Biological and Landscape Diversity Strategy (PEBLDS), endorsed by the third Environment for Europe Conference in Sofia in 1995, addresses major issues of biodiversity loss and conservation in Europe. Since the Pan-European Biodiversity Conference held in Riga in 2000, the Strategy underwent an updating and reform in order to make its work programme the core instrument for the implementation of the Convention on Biological Diversity (CBD) in Europe. The Montreal Process for Sustainable Forest management, adopted by twelve countries with temperate and boreal forests (including, in this region, Canada, the Russian Federation and the United States), addresses the conservation of biological diversity as one of seven criteria for assessing and monitoring progress in each country.

The EU Biodiversity Strategy addresses the requirements of the CBD at the EU level. The Strategy aims to complement biodiversity initiatives at the national level by providing a series of action plans designed to integrate biodiversity into sectoral policies and programmes. NATURA 2000, which will be expanded to include the accession countries, is also designed for protection of habitats and species. Though it has begun slowly, it is expected to have more impact in coming years, with upwards of 10 per cent of EU territory designated for nature conservation purposes and with provisions for protecting species. For non-EU countries in Western Europe, a comparable, though legally less binding, programme (the Emerald network) was set up recently under the Bern Convention. A European Forestry Strategy targets more sustainable forest practices.

Many UNECE countries have adopted national biodiversity strategies and action plans, providing national planning frameworks for the integration of biodiversity conservation and sustainable use of biological resources into sectoral and cross-sectoral land and resource use decisions.

The United States, which has added 42.5 million hectares to federally protected status since 1992, has many examples of successful public-private partnerships for protected natural and cultural areas, including through the National Parks foundation, the National Fish and Wildlife foundation and the National Parks Conservation Association.

The Biodiversity Service

The Biodiversity Service was created to assist countries in CEEC and NIS to implement, monitor and review their National Biodiversity Strategies and Action Plans (NBSAPs) under the Convention on Biological Diversity (CBD). It was established by a consortium of four organizations playing a central role in the conservation and sustainable use of biological diversity in Europe, namely UNEP, IUCN - the World Conservation Union, the European Centre for Nature Conservation (ECNC), and the Regional Environmental Centre for Central and Eastern Europe (REC). It is supported by the Secretariat for the CBD and has been endorsed by the Council of the Pan-European Strategy for Biological and Landscape Diversity (PEBLDS).

The Biodiversity Service offers assistance to Governments in assessing the status of implementation of CBD in their countries, and access to the best available expertise, skills and knowledge in sustainable use and conservation of biodiversity. It organizes training programmes aimed at building and strengthening national capacity for implementing NBSAPs and provides, upon request, information on issues related to NBSAPs and the CBD. Furthermore, it offers to facilitate communication and the development of links among governments, NGOs, relevant international and intergovernmental organizations, and the donor community.

Source : <http://www.strategyguide.org/bioserve/index.html>

The NATURA 2000 and Emerald networks will be a basic part of the proposed pan-European Ecological Network (PEEN) currently being supported by the Pan-European Biological and Landscape Diversity Strategy (PEBLDS). PEEN seeks to create a coherent European ecological network of natural and semi-natural biotopes and will provide, or restore, corridors between existing protected areas throughout Europe. It stresses the importance of landscapes, in which ecosystems form a major structuring and functional role

The CBD and PEBLDS are innovators in promoting an integrated approach to environment and development, by urging countries to introduce biodiversity considerations into overall planning and decision-making. PEBLDS is also working closely with the Ministerial process on Protection of Forests in Europe (PFE). At its first meeting, in May 1996, the Council for PEBLDS decided to contact the PFE ministerial process in order to explore the possibilities for collaboration. This was followed up by formal and informal meetings and, in 1998, a joint Work Programme on the Conservation and Enhancement of Biological and Landscape Diversity in Forest Ecosystems, endorsed at the PFE ministerial meeting in Lisbon and the EfE ministerial meeting in Aarhus.

The more integrated approaches towards biodiversity and landscape protection are still recent. This, and the lack of comprehensive, sufficiently detailed, geo-referenced Europe-wide information, makes it difficult to evaluate effectiveness of the policies. Many of the instruments in place still use

command and control instruments rather than providing incentives. There also seem to be few attempts thus far to involve the private sector.

Agriculture and biodiversity

Agreements on maintaining biodiversity and landscapes while practicing some form of agriculture cover more than 22 million hectares in Western Europe (20 per cent of the utilized agricultural area in the EU). This exceeds the target set in the EU's Fifth Environmental Action Programme. The extent varies considerably though, from more than 60 per cent of farms in Austria, Finland and Sweden, to 7 per cent or less in Belgium, Greece, Spain and Italy. CAP expenditure on such management contracts remains extremely modest with only 4 per cent of the European Agricultural Guidance and Guarantee Fund. Besides, area alone does not give a good indication of environmental performance of these schemes as many programmes lack precision in their objectives and have no monitoring provisions.

Source EEA, 2000

International and bilateral transfers of funds are vital to biological and landscape diversity conservation in CEEC and NIS. And indeed, new sites are protected every year, with international donor assistance. Due to the economic transition it has become more difficult for CEEC governments to police protected areas, and the severe budget constraints of these countries may threaten continued management of protected areas and biodiversity. Nonetheless, positive action towards protecting landscapes and biodiversity continues despite the difficult economic situation. An example of such progress is described in the box below for the Ukraine. A comparable situation exists in other countries, such as the Russian Federation.

Expanding areas of protected territory in Ukraine

Despite the difficult economic situation in Ukraine since the early 1990s, priority has been given to nature conservation at the highest political level. The Ukrainian policy is to expand areas of protected territories, optimize the network for nature protection, improve its management and prevent privatization of valuable natural assets and territories. Seven hundred thousand hectares of scientifically and ecologically precious land was excluded from privatization with a view to subsequently putting it under a protection regime, and a National Programme of Future Development of Nature Conservation Protected Sites to 2005 was adopted in September 1994.

As a result, protected territories have significantly increased since 1991 -- an effort which goes on today. In 1998 alone, 10 new prospective territories for protection were proposed to the Government, of which six have already been adopted. Two new nature reserves were established in the Republic of Crimea, as was a biosphere reserve on the Danube delta in Odessa oblast and a national park in Lviv oblast. The UNESCO Black Sea Biosphere Reserve was expanded and new sanctuaries and nature monuments were designated. Overall, the network of protected areas expanded by 145 000 hectares. Proposals for other new protected monuments by 2005 were formulated and backed by a Presidential Decree of April 1998.

Green belts are protected. They have been planted to split over-sized cultivated fields, to protect the banks of water bodies (including wetlands) and to create green lungs in urban and industrialized places. In January 1997, green belts within cities and towns totalled 500 000 hectares including 118 000 hectares of plantations of general utility.

Source: UNECE EPR Ukraine 2000

State budgets still remain the major financing source. Foreign assistance is often channelled through NGOs, and although instrumental in some cases, like the protection of the Amur tiger, this assistance does not exceed 10-15 per cent of the required funding (OECD, 1999). Attempts to achieve self-financing are of limited success, especially with the drastic decline of domestic tourism (OECD, 1999). A possible source of income that is becoming more important is the involvement of the private sector; but the potential of sponsoring has yet to be fully exploited (RAMSAR web-site).

Non-indigenous interests in the traditional lands are usually manifold. To protect the habitats and cultures of indigenous people efforts are therefore made to arrange for a certain level of self-governance. The box below describes the situation in the Arctic.

Self-governance by Arctic indigenous people

Most indigenous people favour a move to self-governance. The current level of self-governance varies. Greenland, with its Home Rule Government, the formation of the new territory of Nunavut in Canada (1999) and the Norwegian Saami Parliament are the most advanced examples. In the Russian Federation, the Russian Association of Indigenous People of the North, Far East and Siberia links 30 indigenous minority groups and helps them to present a united voice to decision-making. Many NGOs connect indigenous people across national boundaries. The Inuit Circumpolar Conference and the Saami Council are prime examples. The Arctic Council, the inter-governmental process towards sustainable development in the Arctic, has established an Indigenous People Secretariat to support and coordinate the activities of the permanent indigenous participants to the process.

Source: compiled in UNEP 1999, using AMAP 1997.

5. Forests

Deforestation (defined as a net reduction in forest area) is not a major domestic issue in the UNECE region, where the forest has been expanding in nearly all countries for the last half century, through natural extension (notably onto former agricultural land) and through plantation programmes, although concern has been expressed in many quarters about the replacement of undisturbed forests by more managed forest ecosystems.

Forests cover just over 41 per cent of the UNECE region's land area, although this ranges from 1 per cent to 75 per cent in individual countries (UNECE/FAO, 2000). About half the world's forests are in the UNECE region. By far the largest part of the world's boreal forests is in three UNECE countries, the Russian Federation, Canada and USA, with significant areas in Finland, Norway and Sweden. In Canada, the Russian Federation and other NIS, most forests are publicly owned, but elsewhere, over half the forests are in private hands. Nearly half the forest area is considered "undisturbed by humans", but this is essentially in two countries, the Russian Federation, which has over 80 per cent of the region's undisturbed forest, and Canada. Most of the region's forests (including many of the undisturbed areas) are considered "managed" to supply biodiversity, protection against erosion, recreation opportunities, wood or other forest products.

Concerns about forest issues in the UNECE region may be grouped as follows:

- A perceived decline in forest "quality" (though strictly speaking quality is not a measurable term), through replacement of more natural and multi-species forest types with systems which give priority to wood production over biodiversity;
- Threats to forest health through fires, insects, exceptional climatic events and air pollution;
- The need to strengthen and extend the system of forest areas protected for biodiversity;
- Increasing concerns of forest owners and managers, public and private, about the economic viability of forest management, as they are expected to manage for multiple functions, with only one significant revenue stream, wood sales (with hunting or tourism income in a few cases).
- Increasing interest in developing the social side of forest policy, through issues such as participation in decision-making, maintenance of rural economies, etc.

The globalization of the world economy in general, increasing concentration in the forest industries, expanding trade in forest products and the installation of ever larger processing units have made the forest sector, like other sectors, increasingly global and inter-connected: it is no longer realistic to set national forest policies in isolation. There has been increasing awareness of the impact of policies in other sectors, most notably environment, energy, rural development, and trade, on the forest sector and its management. There appears to be an increasing need for a holistic approach to forest sector issues, involving decision makers outside the sector in a complex debate at the national and international levels. In addition, stakeholders, such as NGOs, user groups, consumers of forest products and many others, are increasingly being consulted on forest management issues and consensus solutions are being implemented.

During the United Nations Conference on Environment and Development (Rio de Janeiro, 1992), areas of consensus were limited as expressed in chapter 13 of Agenda 21 and the so-called "Forest Principles". This relative failure, however, sparked a decade of international forest dialogue, at the global and regional levels, which has defined the issues, and laid down proposals for action, by national governments, by international organizations and by civil society.

What have been the main achievements of the decade since the Rio Conference? As with most environmental issues, with the slow rate of change in forests in most of the UNECE region, only marginal changes can be expected on the ground. Changes in policies, institutions and management objectives have been quite significant though. The main changes can be summarized as follows:

- An international consensus, at the global and regional level of what the main components are of sustainable forest management and how it should be measured and monitored through the use of criteria and indicators of sustainable forest management;
- A number of regional processes have defined regional issues, defined criteria and indicators and agreed on programmes for international action; in the UNECE region, there is the Ministerial Conference on the Protection of Forests in Europe (MCPFE), and for other temperate and boreal zones the Montreal Process which includes Canada, the Russian Federation and USA among UNECE members; the 1998 Lisbon Conference had before it data on indicators of sustainable forest management, mostly collected by UNECE/FAO;
- Chapter 9 of the pan-European Biological and Landscape Diversity Strategy, concerning forests is incorporated into the work programme of the MCPFE, achieving a common approach from environmental and forestry processes;
- In the last decade, practically all European countries have completely revised their forest policies and legislation, and in many cases their institutional structure, so as to bring them in line with the international concepts (UNECE/TIM/SP.19, in press), notably the balance between the ecological, economic and social roles of forestry;

An important feature of the new policies is that they are often based on a national forestry programme using a holistic, participatory approach to define objectives and methods; in general, participation plays a much larger role than before in forest management. National forestry programmes of course take a wide range of approaches; there is no single set of guidelines:

- There are now several national and international certification schemes for forest products in operation, often initiated by pressure from NGOs such as the Forest Stewardship Council initiative; all schemes use a voluntary, market-based approach. These initiatives encountered significant problems, from setting standards for well managed forests (who should set the standards, and how?), reconciling the legitimate interests of the public authorities, private forest owners, and NGOs, as well as assuring compatibility with national sovereignty and the international trade regime; nonetheless several million hectares have been certified and certified products are now increasingly available for consumers;
- At the operational level, foresters are increasingly favouring more "close-to-nature" approaches where circumstances allow, and promoting biodiversity also in forests managed for wood production, by careful management of key biotopes.

6. Mountains

Europe has important mountain ranges in many countries. These mountains are highly diverse in almost every characteristic, including climate, ecosystems, demography, and economics. Though a relatively small proportion of Europeans lives in the mountains, they are of vital importance to the continent's population in many ways, and have been described as "the undervalued ecological backbone of Europe" (Marzelli et al. 1999). Mountains have four key values for Europe as a whole:

as ‘water towers’, as centres of both environmental and cultural diversity, as locations for tourism and recreation, and as indicators of environmental change.

The European mountains as water towers

Perhaps the most important key value for Europe’s mountains relates to their function as:

“water towers” Price (1999): mountains intercept water from air masses and store it either as snow or in lakes and reservoirs. In spring and summer, water from mountain rivers supplements the earlier high flows from the lowlands, which typically occur in autumn and winter. For example, even though only 11 per cent of the Rhine river basin is in the Alps, these mountains supply 31 per cent of annual flow and, in summer when water is particularly needed for agriculture, over 50 per cent of flow.

In the drier areas of Mediterranean and Balkan Europe, mountain water is of even greater significance. And in Central Asia, for example, shared water resources, mostly originating in the upper watersheds in Kyrgyzstan and Tajikistan but used for irrigation in the lowlands of Uzbekistan, Kazakhstan and Turkmenistan, are the basis of many inter-governmental discussions and conflicts. Much of Europe’s future freshwater supplies, especially in Central Asia, are critically dependent on better management and restoration of mountain environments. Just as water-user associations are necessary in downstream water use and irrigation management, there is a need for associations of mountain stakeholders.

Mountains provide a range of essential local and downstream environmental products and services, e.g. related to freshwater supplies, irrigation, hydropower, flood control, biodiversity conservation and tourism. The strategic maintenance of mountain ecosystem functions is therefore essential. Overall, there is a trend in the mountain areas of Europe and Central Asia towards environmental degradation. A comparison of satellite imagery from 10-20 years ago with current data reveals significant loss of forests and other vegetative cover, agriculture and livestock developments in fragile areas, excessive tourism and recreational infrastructure, and soil erosion (Beckel 1995). Rare species are endangered, and age-old indigenous traditions and knowledge systems are waning. Inappropriate management of mountain watersheds causes silting of rivers and reservoirs, and allows disastrous floods to take an unprecedented toll as roads, bridges, and, sometimes, entire communities are washed away.

Policy Response (Price & Kim 1999)

Convention on the Protection of the Alps

The Convention on the Protection of the Alps entered into force in 1995. It requires its contracting parties (Austria, France, Germany, Italy, Liechtenstein, Slovenia, Switzerland, and the European Community) to pursue a comprehensive policy for the preservation and protection of the Alps through application of the principles of prevention, payment by the polluter and cooperation. The following areas are covered specifically by the Convention: population and culture, regional planning, prevention of air pollution, soil conservation, water management, conservation of nature and the countryside, mountain farming, mountain forests, tourism and recreation, transport, energy, and waste management.

The Convention stipulates that the contracting parties will cooperate in the carrying out of research activities and scientific assessments, develop joint or complementary systematic monitoring programmes, and harmonize research, monitoring and related data-acquisition activities. It also provides for legal, scientific, economic and technical cooperation in areas relevant to the Convention.

In 1991, the countries of the Alpine region opened for signature a Convention on the Protection of the Alps that takes an integrated, sustainable development management approach towards the Alps under UNEP auspices. There are current discussions, as well, over the feasibility of beginning negotiations on similar conventions or charters for the Caucuses and the Carpathian mountains, and these may be brought to the attention of the Ministers at the Fifth Ministerial Conference “Environment for Europe” (Kiev, 2003).

There is growing interest in the United States and Canada in sustainable mountain communities, especially those with heavy impact from recreation tourism, such as in Colorado and western Canada.

A European Charter of Mountain Regions was prepared in the early 1990s, under the auspices of the Council of Europe's Congress of Local and Regional Authorities of Europe (CLRAE). It has been considered and adopted by many bodies within the Council of Europe, but the Committee of Ministers of the Council has not yet approved it.

The EU does not have a specific strategy or policy for sustainable mountain development, but both Structural Funds under EU's Agenda 2000 and Rural Development funds are available to many mountain areas, including in the Mediterranean region. The funds apply to regions that are still lagging behind and to a number of industrial and rural areas identified as vulnerable and undergoing reconversion. These areas include much of the Alps, Pyrenees, Massif Central, Jura, Vosges, Black Forest, Ardennes and the central Apennines. In addition, the work underway in the area of biodiversity (see section, above), should positively affect mountain ecosystems.

Non-governmental organizations have been active in this area. The European Mountain Forum (EMF), established in 1998, promotes the sustainable development and management of European mountains and their environment and has set up regional nodes for the Caucasus, Central and Western Middle Mountains and the Mediterranean.

However, with few exceptions, the management of mountains in environmental terms is inadequate: they suffer from the classic "commons syndrome" in which all seek to benefit, yet stakeholders lack coordination, incentives, and instruments for joint care. While there is growing recognition throughout the region that economic development and sustainability depend in many respects, directly or indirectly, on appropriate resource management in mountain areas, shared responsibility for mountain commons in the region is still at a very early stage.

It is expected that the Mountain Summit, proposed by the Government of Kyrgyzstan to conclude the International Year of the Mountains (IYM) and prepared under the auspices of FAO and UNEP, will assist in demonstrating and promoting sustainable mountain development initiatives in and between the mountain countries in the region as well as in other mountain regions in Europe.

7. Freshwater

The three main sectors affecting water stress are agriculture, industry and households. Water resources are unevenly distributed in the UNECE region. Some countries rely heavily on transboundary waters. Traditionally most countries in the region have relied more on surface water than on groundwater. Groundwater, however, is increasingly the main source for public water supply, and the health of streams and ecosystems depends on groundwater (EUROSTAT 1997; EEA, 1999c; Statistics Canada 2000; The Groundwater Foundation 1996) In the United States, groundwater resources are also used for irrigation of 43 per cent of irrigated farmland (Sampat 2000).

Quantity

There are problems with water availability around the Mediterranean, including Cyprus, Israel and Turkey; in the United States, where large amounts of water are required for irrigation; and in Central Asian areas, where there has been poor management of the large and complex irrigation systems in the Aral Sea basin (especially through over-consumption for agriculture). In the central part of Western Europe most water supply is for cooling for energy production. This water is returned to the abstracted source more or less unchanged and can be used again. Of water used for irrigation, however, around 80 per cent is lost through evapotranspiration. Agriculture consumes far more water

than the other sectors: in Europe approximately 75 per cent versus 20 per cent for urban and industrial use and 5 per cent for cooling water; in the United States as much as 85 per cent of total freshwater consumption is for agriculture (EEA-ETC/IW 1997).

Over-exploitation of water, especially increasing use of groundwater for public water supply, and, to a lesser extent, over-use of surface water for irrigation, has serious consequences such as drying-up of spring-fed rivers, destruction of natural wetlands in western, southern and eastern Europe and North America and salt-water intrusion in aquifers, for instance along the Mediterranean coast and the Aral Sea (see also the box on the Aral Sea in section IV A 8 on the Marine and Coastal Areas). Furthermore, flooding is becoming the most common and costly “water quantity problem” in the Mediterranean region as well as in parts of Western and Central Europe and North America (see also box on floods in Hungary and Ukraine in section IV B on environmental disasters).

Quality

Water pollution is a serious issue all over the region. Though progress has been made in pollution reduction in Western Europe (for instance the Rhine) and North America (such as the Great Lakes), the situation is less promising in the CEE countries.

Overloading with organic matter, nitrogen and phosphorus still results in eutrophication and other water-quality problems of seas, lakes, rivers and groundwater all over the UNECE region. Nitrogen sources of water pollution include fertilizers and pesticides used in agriculture. Most phosphorus comes from households and industry through great volumes of nutrient-rich wastewater, though intensive agriculture can also contribute seriously (EEA, 2000+2001). Furthermore discharges of toxic chemicals from industrial processes and accidents, and sludge from wastewater treatment plants often contaminated with heavy metals and other hazardous waste, directly impact on water quality of both surface and groundwater.

In Western Europe fertilizer consumption fell from the mid-1980s onwards when the eutrophication problem became clearer. In North America, and particularly in the United States, it fell briefly in the early 1980s but has gradually increased, causing problems related to nitrogen run-off. In CEEC, use of agro-chemicals has declined markedly since the early 1990s when privatization and economic liberalization meant the end of subsidies, which reduced nitrogen-phosphorus fertilizer use to about half.

Phosphorus discharges from urban wastewater treatment plants in Western Europe and North America have fallen significantly (50-80 per cent) since the early 1980s. (EEA-ETC/IW 1997; Environment Canada 1999) By the end of the 1990s, 90 per cent of the western European population was connected to sewers and 70 per cent to waste water treatment plants, although there are differences among countries. The same is true for North America. Industrial wastewater treatment has also improved. In CEEC, however, the situation is less favourable: only 60 per cent of the population in the accession countries is connected to sewers; for 18 per cent of these, wastewater is discharged untreated. The remaining wastewater is treated before being discharged into surface waters, mainly secondary treatment to remove organic matter (EEA, 1999b). From 1990 onwards, most accession countries started to invest heavily in sewage collection and treatment, with some success in the advanced reform countries. For instance, in the Czech Republic discharges of organic pollutants from point sources declined by almost two-third between 1990 – 1996 (OECD, 1999). In the slower reform countries and the NIS, levels decreased 30-50 per cent by 1998 compared to 1990, but this was mainly due to the economic recession (OECD, 1999).

Heavy pollution in major rivers like the Rhine in western Europe has declined significantly since 1980, due mainly to reductions in large point source discharges of organic matter and phosphorus (EEA-ETC/IW 1997, UNEP 1999). Major successes were achieved in North American freshwaters as

well. Improvements have been less significant in Southern and Central Europe. For instance, nitrogen and phosphorus loads in the Danube have decreased only slightly since 1990 (Ministry of Environment Protection of Romania 1996). In Eastern Europe the situation is even worse. Looking at the Russian Federation and Ukraine, the two most industrialized countries of the former USSR, discharge of polluted water into rivers still increased significantly in the second half of the 1980s, despite a major clean-up campaign for the Volga and the Ural, which was started as early as 1972. In the transition period in the 1990s, the situation became even worse (Interstate Statistical Committee of the CIS 1999) (see table).

Nitrate concentrations in Western European and North American rivers and lakes have shown little change since 1980, and the reduced use of nitrogen fertilizers in agriculture does not seem to have resulted in lower levels of nitrate (EEA, 2001, UNEP 1999). Smaller rivers stand out with high concentrations, probably reflecting the impact of agriculture (EEA, 2001). In the accession countries, agricultural activities are generally less intensive, but nevertheless, there are some regions with high nitrate levels (EEA, 1999a).

Pollution of aquifers is a serious problem throughout the region as well, mainly associated with nitrates and pesticides from agriculture (OECD, 1998; The Groundwater Foundation 1996). In the Russian Federation alone, more than 2,700 aquifers were identified in 1999 as polluted, more than 80 per cent located west of the Urals (State Committee of the Russian Federation for Environmental Protection 2000).

Insufficiently purified wastewater discharges into surface waters in the Russian Federation and Ukraine
(in million cubic meters)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Russian Federation												
Discharge	11,981	11,210	16,723	23,323	27,146	27,798	28,017	27,139	27,244	24,642	24,478	22,414
% of total discharge	16	15.2	22.2	32	32	37	38	38	40	41	41	38
Ukraine												
Discharge	1,299	1,216	1,152	2,634	2,900	3,199	4,291	4,008	4,652	4,873	4,652	4,109
% of total discharge	7	7	6	14	15	16.5	23	23.5	29	32	31	31

Source: Interstate Statistical Committee of the CIS (1999)

Lakes that had high phosphorus concentrations in the early 1980s have lower concentrations today. This decrease is mainly due to reduced inputs from large point sources because of better wastewater treatment and use of phosphorus-free detergents (EEA-ETC/IW 1997; Environment Canada 1999). However, only slight changes in phosphorus concentrations have been observed in initially less-affected lakes in Europe (EEA-ETC/IW 1997). This is mainly due to accumulation and (delayed) release of phosphorus from lake bottoms or continued contamination from small, scattered dwellings and from agricultural sources. Overall, water quality in many lakes in large parts of the UNECE region still requires much improvement (EEA-ETC/IW 1997; Environment Canada 1999; IJC 2000).

Policy Response

Water conservation measures often rely on economic principles such as water metering, increased water charges and taxes. More technical measures and changes in consumer attitudes relate to restrictions on garden watering, reducing leakage, user education and use of more efficient appliances such as dual flush toilets and less water consuming washing machines. EPA Guidelines in the United States contain step-by-step approaches and conservation measures that can be used by water system planners to develop and implement plans for water conservation. Canada is establishing a national programme specifically dealing with groundwater, to ensure a coordinated approach to the sustainable management of groundwater resources.

Agricultural reforms concern planting crops in southern Europe with lower water demands and introducing more efficient irrigation systems. Abstraction charges and pricing mechanisms are widely regarded as valuable tools for achieving more sustainable water management in agriculture and deserve much more attention. Agricultural users generally pay very low charges that are related neither to the quantity used, nor to the real environmental impact, while water charges, for instance, have proven to be effective in reducing water use by households and industry. In CEEC all these more non-conventional measures are not yet really applied, nor foreseen in the near future. A major challenge will also be to reduce the vast quantities of water loss through distribution networks, especially in CEEC where losses may be as high as 50 per cent and more (EEA, 1998).

The EU Drinking Water Directive guideline value and the maximum allowable concentration for nitrate in drinking water are exceeded in many Western and some Central European groundwater supplies. This causes serious problems, particularly where water is taken from shallow groundwater sources with significant recovery time lags. Indeed, implementation of the EU's Nitrate Directive has been unsatisfactory in the majority of Member States and the EU has initiated proceedings against those that have not yet complied. EU legislation is planned on drinking water quality, urban wastewater treatment, on the use and protection of groundwater, on issuing permits for wastewater discharge and for determination of individual emission limits in the point sources of pollution.

In the United States, the Clean Water Act of 1992 and the Water Pollution Prevention and Control Act of 1993 serve as the main vehicles for considering changes in the nation's water pollution laws. In an interesting example of implementation, the Clean Water Act led to an agreement between the United States Government and Amtrak, the country's largest passenger rail operator, to carry out environmental audits at its facilities and to undertake other environmental improvements, such as projects to restore wetlands and reduce PCBs in locomotive transformers.

Implementing the EU's Urban Wastewater Treatment Directive has been more satisfactory than that of its Drinking Water Directive. Upgrading treatment plants to EU standards has considerably reduced polluting discharges: two-thirds of organic matter and almost half of the nutrients (EEA-ETC/IW 1997). Though control of point source discharges still varies between countries, improvements are likely as more and more countries invest in new infrastructure to comply with the objectives of the EU Directives. The same will be true for the accession countries. Compliance with EU regulations on permits and standards related to waste water is foreseen for as early as 2000-2003.

There are many multilateral and bilateral agreements for management of transboundary waters. The UNECE Convention of the Protection and Use of Transboundary Watercourses and International Lakes strengthens national measures for the protection and ecologically sound management of transboundary surface waters and groundwater. It obliges Parties to prevent, control and reduce water pollution from point and non-point sources, and it includes provisions for monitoring, research and development, consultations, warning and alarm systems, mutual assistance, institutional arrangements, and the exchange and protection of information, as well as public access to information. A Protocol on Water and Health is awaiting its entry into force (see box below).

Protocol on Water and Health

The Protocol on Water and Health will promote sustainable water supply and management in cities and rural areas, the rehabilitation of defective water-supply and sewage systems, and the minimization of the adverse impact of human activities (e.g. waste-water discharges, water resources development projects) on human health and safety. It should also help reduce health problems and diseases due to poor water quality. The Protocol will explore the possibility of including measures on compliance into the work plan; it will develop soft-law instruments and methodologies; and it will support human resource development and institutional capacity building, for example through workshops, training courses and pilot programmes or projects.

Another transboundary example is the Danube River Protection Convention that was signed by Austria, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Republic of Moldova, Romania,

Slovak Republic, Slovenia and Ukraine in 1994 and entered into force in 1998. The Convention, which grew out of an agreement at the first Ministerial Conference “Environment for Europe” (Dobris Castle, Czech Republic, 1991), pledges the signatories to work together to conserve, improve and use rationally the surface and ground waters in the Danube Catchment basin; to control hazards originating from accidents in the river area; and to contribute to reducing the pollution loads of the Black Sea from sources in the catchment area.

A new Convention for the Protection of the Rhine was adopted at the January 2001 Conference of Rhine Ministers, that, once ratified, will be the new basis for international cooperation of the riparian countries and the EU, replacing the 1973 Bern Convention and the 1976 Chemical Convention. The new Convention fixes targets for international cooperation for sustainable development of the Rhine, further improvement of the ecological state, holistic flood protection and defence. In addition to aspects of water quality and quantity, including flood-related problems, ground-water problems in relation with the Rhine will in future be included in ICPR-work (www.iksr.org/icpr).

Progress along the Rhine

The Ministers of the ICPR contracting states (Germany, France, Luxembourg, Netherlands, Switzerland) responsible for the protection of the Rhine and the European Commission met in Strasbourg on 29 January 2001 in order to draw the most important conclusions from Rhine protection actions taken within the last 50 years and to point out new perspectives of cooperation.

They underlined the considerable improvement of the water quality and the progress made in the field of the ecological restoration of the Rhine ecosystem. These included:

- In general, point source pollutions (of industrial and municipal origin) are under good control.
- Efforts to reduce the inputs of diffuse sources have been less successful and, as a consequence, the share of diffuse nutrient and heavy metal inputs in the total inputs has risen.
- The species diversity in the Rhine has increased noticeably. The construction of fish passages as well as measures aimed at improving the structure of water bodies, e.g. by restoring alluvial areas and lateral water bodies of the Rhine to their natural state were prerequisites paving the way for the return of most of the 45 fish species and 38 species of waterfowl typical for the Rhine which may today again be observed in and along the Rhine, just as at the end of the 19th century.
- The targets fixed for the first phase of the implementation of the Action Plan on Floods have largely been reached. Particular attention must however be paid to the reduction of damage risks in flood plains and flood-prone areas. There is great need for increased public awareness of this problem.

The Ministers and the European Commission adopted the programme on sustainable development of the Rhine for the period up to 2020. A working plan to 2005 has been drafted.

8. Marine and coastal areas

The semi-closed and closed seas in the UNECE region, such as the Aral, Azov, Baltic, Black, Caspian, Mediterranean, and White Seas, which have limited water exchange with the open ocean, are very sensitive to pollution. The first box below describes the extreme situation in the Aral Sea. The second box gives a brief description of the Caspian Sea Region. The open seacoasts of the Arctic, Atlantic and Pacific are not immune either. Some 85 per cent of European coasts are at high or moderate risk from unsustainable development-related pressures (Bryant, 1995).

The Aral Sea Basin

The Aral Sea Basin covers an area of approximately 1.5 million km² and is located in parts of Afghanistan, the Islamic Republic of the Islamic Republic of Iran, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan, and Kazakhstan (the first two countries are not part of the Aral Sea Basin Programme). Through its hydrological functions, the Aral Sea used to moderate the continental climate of the neighbouring deserts, with a climatic influence over a radius of 100-400 km. It also acted as a groundwater head.

Up until the 1960s, the Aral Sea was the world's fourth largest lake with a surface of over 68,000 km² and a volume of over 1,040 km³. Large irrigation schemes were then set up to produce cash crops such as cotton and rice. The irrigated area in the Aral Sea basin increased from 3 million ha to 8 million. In the same period, mineral fertilizers use increased 3.5 to 6 times. The 1,200-km-long Kara Kum canal was constructed to provide Turkmenistan with an annual flow of 10 km³ of freshwater, and in Kyrgyzstan, hydropower dams were built. These measures resulted in a continuing decrease in discharges from the Syr Darya and Amu Darya rivers into the Aral Sea.

The reduced water inflow has resulted in the desiccation and shrinking of the Aral Sea, combined with an accelerated salinization of the water. The desiccation also led in 1989 to the division of the Sea into a southern section and a much smaller northern section in Kazakhstan. If the current low inflow continues, it is expected that the larger sea will separate again in 2004-2005.

Before the major changes in its ecosystem, the Aral Sea contained at least 24 commercial species of fish. The rapid and marked changes in its hydro chemical and hydrological systems led to a critical decrease in the reproduction of fish stocks, resulting in the complete cessation of fishing and the liquidation of the fishing fleet, leaving over 60,000 persons unemployed in the Aral Sea area. The two deserted and abandoned fishing ports, Moynaq in Uzbekistan and Aralsk in Kazakhstan, have become symbols of this environmental disaster. The quality of the water is not only affected by increased salinity, but the extensive use of pesticides and fertilizers on agricultural land and industrial discharges also contributed to the increase of pollution in the Amu Darya and Syr Darya river water.

The Aral Sea used to have a moderating influence on the meso-climate by softening cold Siberian winds in winter, and functioning as a conditioner in lowering heat in summer. Due to the desiccation, summers appear dryer and shorter now, while winters are longer and colder. The growing season has been shortened to 170 days. In coastal areas, precipitation has decreased tenfold, and humidity of air by 10 per cent. Along the former shoreline, salt and dust have accumulated due to evaporation and have formed a thin, white crust. As a result of strong northeastern winds in the area, salt and small dispersed dust, containing remnants of pesticides and fertilizers, are being picked up and transported and deposited over thousands of square kilometres of cultivated land. Scientists estimate the amount of transported toxic salt and dust to be between 15 and 75 million tonnes annually. Some severe dust storms transport particles and aerosols as far as the Antarctic and the Himalayas. Pesticides, used in the Aral Sea region, have been found in the blood of penguins. The deposition of particles is affecting soils, crops and human health and has contributed to the 50 per cent reduction in pasture productivity. Pesticides and fertilizers have also found their way into water and irrigation channels, thereby polluting food and drinking water and affecting the lives of 5 million people in the Aral Sea region. Pesticides have been found in breast milk in Aralsk and Kyzylorda. Over 80 per cent of irrigation pipes and canals are not sealed, and more than half of them are used for municipal purposes such as drinking water. They are often in a critical condition. The ingestion of contaminated (surface) water presents health hazards that are thought to contribute to the increase in various diseases.

Source: UNECE EPR of Kazakhstan, 2000

Fast-growing tourism, increasing transport (both at sea and on land), agricultural and industrial activities, aquaculture, fishing, oil drilling and continuing urbanization are often in competition for the use and control of coastal land resources. Integrated coastal zone management is found rarely. Vast amounts of waste and pollution end up in the seas: from direct dumping, discharges and spills; nearby industrial and urban waste discharges, from rivers containing chemical and organic loads from up-stream catchments, and from the atmosphere. Most of this material is diluted and dispersed in the

deep oceans, but contamination of sediments and biota is common in most marine waters of the UNECE region. Elevated concentrations of hazardous substances such as heavy metals and some organic compounds have been found in marine organisms and sediments, particularly near some river outflows and in seas with little connection to the Open Ocean, and near point sources of pollution (EEA, 2001).

Coastal erosion, from natural causes or due to *infrastructural developments* and other building activities, is a major issue in some parts of the region with 25 per cent of the European coast length subject to erosion, 50 per cent stable, and 15 per cent receiving material (aggradation); for the remaining 10 per cent, the evolution is unknown (Corine 1998).

Though *maritime transport* is considered an environmentally friendly mode of transport, it can have major negative environmental impacts if necessary measures and legislation are not enforced. It is estimated that 30 per cent of the total merchant shipping in the world crosses the Mediterranean every year, and 20 per cent of oil shipping (MAP/REMPEC 1996). With such high 'ship-pressure' the potential for problems is also high (see box on oil spills in the policy section). Shipping accounts as well for large amounts of SO₂ emissions. By 2010, as land-based polluters are curbed, ships will account for 30-40 per cent of the total European SO₂ emissions (Planet Ark 2000).

Although industrial eco-efficiency has clearly improved since the early 1990s, *pollution through industrial waste* is still serious in many areas (EEA, 1999; Environment Canada 2000). Besides, many of the 200 nuclear power plants operating throughout Europe (EEA, 1999) are located in coastal regions or along major rivers, due to the large volume of cooling water needed. And, reprocessing of nuclear waste causes radioactive pollution. For instance, increasing amounts of technetium 99 are found in seaweeds and various forms of shellfish in the coastal waters of Ireland and Scandinavia. Radioactive pollution from the nuclear fleets of the Soviet navy (originating from as far back as the 1960s) remains a problem for the North Sea and the Pacific Ocean.

High population concentrations still result in high levels of wastewater both in European and North American waters. Often wastewater is not yet sufficiently treated, e.g. in the Mediterranean, Black and Caspian Seas. Although numerous agricultural reforms and wastewater improvements have been made, nitrogen and phosphorous loading remains a problem in the entire UNECE region (EEA, 1999; Environment Canada 2000; NOAA 1998a). (See also sections on freshwater and land).

The Caspian Sea Region

The Caspian Sea, surrounded by the five littoral countries of Azerbaijan, Islamic Republic of Iran, Kazakhstan, the Russian Federation, and Turkmenistan, is the largest land-locked body of water on earth. Situated in a natural depression, below mean sea level, it receives water from, the Volga, Ural and the Kura rivers and numerous other freshwater inputs, but has no outlet to the world's oceans.

The isolation of the Caspian basin, its climatic and salinity gradients, have created a unique ecological system. Some 400 species are endemic to the Caspian waters, with about 115 species of fish, some of which, notably the sturgeon, are of major economic importance. The Caspian region is also very important to wild bird life, and to the Caspian seal, one of the only two freshwater seal species that occur worldwide. However, today, many Caspian biota are threatened by over-exploitation, habitat destruction and pollution.

Principal economic activities in the Caspian basin include fisheries, agriculture, oil and gas production, and related downstream industries. The Caspian basin is rich in commercially viable hydrocarbon deposits. Production of oil and gas is significant and new exploration activity is under way. Oil production is expected to increase dramatically during the next few decades. The magnitude of oil and gas extraction and transport activity poses a serious risk to water quality.

The traditional Caspian sturgeon fishery and the Caspian-derived caviar are well known. At its peak, the Caspian supplied more than 80 per cent of the world's sturgeon stock, bringing revenues to the riparian countries of approximately US\$ 6 billion annually. In recent years, however, sturgeon landings have decreased dramatically from 23,000 tons in 1985 to only 2,500 tons in 1998. A quota system, introduced together with a temporary ban on pelagic fishing, does so far not appear to have been effective in reviving the declining fish populations. Poaching, which dramatically increased during recent years, is a main cause of sturgeon decline.

Tourism is important for most coastal areas in the region. The Mediterranean is the world's leading tourist destination, accounting for 30 per cent of international tourist arrivals and for one-third of the receipts from international tourism. Overall, the annual growth rate for tourism in Europe is 3.7 per cent per year (EUCC 1997), but tourism in the Mediterranean is growing by more than 5 per cent per year (UNEP/MAP 2000). This requires more tourism facilities, often at the cost of nature and agricultural land.

Policy Response

Within the region, four new conventions were agreed around 1992, illustrating a legally binding, sub-regional approach to the control of marine pollution and management of marine and coastal resources. These include:

- The Convention on the Protection of the Marine Environment of the north-east Atlantic (OSPAR - 1992);
- The Helsinki Convention on Protection of the Marine Environment of the Baltic Sea Area (HELCOM - 1992);
- The Bucharest Convention on the Protection of the Black Sea against Pollution (1992); and
- The 1995 revision of the Convention of the protection of the Mediterranean Sea against pollution implemented through the Mediterranean Action Plan (Barcelona Convention - 1976)

Furthermore, action programmes have been set up and new conventions are being negotiated or considered. An example is the Caspian Environment Programme (CEP) that was agreed in 1995 and officially launched in 1998. Problems of pollution, resource depletion and sea level rise confront the countries around the Caspian Sea. The potential of the sub-region for oil exploitation and the ongoing negotiations on the legal status of the Caspian Sea are complicating factors in the implementation of CEP. Efforts are underway to negotiate and conclude a Framework Convention that would serve as the overarching legal instrument, under the umbrella of the CEP, assisting the riparian states in developing and using the resources of the Caspian region in a sustainable way.

A first sub-regional, transboundary programme in NIS has recently been established for the Aral Sea Basin. A Central Asian Interstate Sustainable Development Commission (ISDC) was established and a regional Environmental Action Plan was launched. A sub-regional Agenda 21 is currently being developed for the basin and a sub-regional convention on sustainable development of the Aral Sea is being considered. However, progress has been hampered by a number of factors including continued emphasis on irrigation over a more comprehensive and sustainable approach and differences of views among the affected countries.

All the conventions and programmes show the clearly good intentions of the countries involved. However, states face a growing number of commitments flowing from Agenda 21 and related conventions and action programmes. Implementation requires collaboration among governments, organizations and institutions with responsibilities and expertise in all those sectors relevant to marine and coastal areas at all levels - national, regional and global. For the northeast Atlantic, Baltic and Mediterranean seas sectoral approaches in water pollution control already existed before the Rio Conference. Since then, States have accepted the need to widen the focus of activities from these sectoral approaches to the much broader context of integrated coastal zone management and sustainable development. Under the Baltic Sea and the Northeast Atlantic Conventions (OSPAR and HELCOM), strong commissions have been vested with powers to make recommendations for adoption of specific legislative measures to be taken by the State parties. In 1994 the Mediterranean Action Plan (MAP presented an umbrella Agenda MED 21. The Contracting Parties of the Barcelona Convention proceeded to extensively revise it in 1995, officially widening it to include sustainable development. In 1996 the Mediterranean Commission on Sustainable Development (MCSD) was set

up to advise MAP states on sustainable development solutions and to offer them recommendations and proposals for action. The Baltic countries soon followed suit with the Baltic Agenda 21 (1998).

At least partly as a result of the new multilateral policy instruments and related national level policy measures, nitrate concentrations in coastal waters fell in nearly half of the OSPAR and HELCOM coastal waters (25 per cent on average) over the 1985-1998 period. However, there were also some increases, for instance in the North Sea near the Netherlands and Germany and in the Baltic (EEA, 2000). Most coastal waters show little or no change in phosphate concentrations. The exception is a substantial decrease of 35 per cent of the OSPAR and HELCOM coastal waters (EEA, 2000). Direct and riverine inputs of hazardous substances into the Northeast Atlantic decreased between 1990-1998, which shows the effects of emission reduction target setting in OSPAR (EEA, 2001). Atmospheric inputs of heavy metals into the North Sea also decreased between 1987 and 1995 as a result of air pollution abatement policies in the countries surrounding the North Sea (EEA, 2001).

There has been progress in the Mediterranean (see for instance the box on oil spills below). A comprehensive programme to reduce inputs of pollutants into the Mediterranean is being launched as part of the implementation of the Strategic Action Programme (SAP) to Address Pollution from Land-based Activities, adopted in 1997. Both multilateral and bilateral funding is currently being made available to assist the region to establish the administrative and technical basis for implementation of SAP. The programme is expected to improve the situation in the Mediterranean drastically.

Oil spills in the Mediterranean and the policy responses

Due to a very high density of maritime traffic, the Mediterranean Sea is one of the world's seas with the highest risk of accidental pollution by oil and other hazardous substances. It is estimated that some 360 million tonnes of oil are shipped across the Mediterranean every year, representing 20-25 per cent of the oil transported by sea in the world. Ships enter or leave one of the more than 300 Mediterranean ports or are in transit between the Suez Canal, the Straits of Gibraltar and Dardanelles. Operational discharges from ships account for the bigger parts of total oil pollution although accidental oil spills and major tanker incidents generate larger attention by media and the general public.

Most oil spills from tankers originate from routine operations such as loading, and are caused by broken hoses, defective valves or inappropriate working practices. They usually result in small spills, which are dealt with locally and are rarely reported. Typical shipping incidents, involving both tankers and other types of ships, include collisions, groundings and explosions often followed by fire. Causes are adverse weather and sea conditions, and structural failures. Shipping incidents occur less often but are more likely to result in larger and sometimes massive spills of oil (see table below on reported spills between 1991 and 2000, source REMPEC database).

More than 10 000 tonnes	2 incidents
1000 – 10 000 tonnes	5 incidents
100 – 1000 tonnes	28 incidents
10 – 100 tonnes	27 incidents
10 tonnes or less	45 incidents
Unknown size	30 incidents

The total amount of oil spilled in maritime transport related incidents in the Mediterranean is decreasing. Between 1991 and 2000, it was estimated at a little over 21,500 tonnes, compared to 36,500 during the previous decade.

In case of marine pollution incidents, the authorities of the affected or threatened country are expected to undertake response measures, exercising direct control over response operations or coordinating them. The only case that necessitated international action (among French and Italian response units) was the "Haven" spill of 1991, the biggest incident ever recorded in the Mediterranean. The total cargo of 144,000 tonnes of crude oil was lost. However, a major part was burned and it was not possible to estimate the amount that actually entered the sea.

The main principles of international cooperation in the field of preparedness for and response to marine pollution incidents in the Mediterranean are defined by the Emergency Protocol to the Barcelona Convention serviced by UNEP. The existence of a reliable national system is considered to be the single most important factor that determines the effectiveness and the success of pollution response measures. REMPEC was established to assist coastal States in the implementation of the Emergency Protocol.

There has been progress, but some states, particularly countries-in-transition, have had difficulty in meeting their obligations to sub-regional agreements such as the Caspian Environment Plan (CAP), the Aral Sea Programme and the Black Sea Convention. Active programmes of assistance from wealthier states play an important role in improving implementation and compliance, for example, in the Baltic and Mediterranean regions.

The Helsinki Convention on the Baltic Sea is typical of a sub-regional agreement that is characterized by the establishment of a relatively strong secretariat charged with supervising implementation of the agreement and reviewing and deciding upon relevant programmes and institutional matters. OSPAR's and HELCOM's strength leads to good coordination among relevant authorities and institutional structures within the States parties.

The Great Lakes Commission in the United States is dedicated to sustainable development of the eight-state Great Lakes region. Ontario and Quebec are Associate members through a Declaration of Partnership. The goals of the Great Lakes Basin Program are to demonstrate successful erosion control practices through state and local projects, increase community and political awareness and building partnerships that have a positive, long-term effect on Great Lakes water quality. Emerging themes include cleaning up toxic hot spots, controlling invasive species, controlling non-point source pollution, restoring and conserving wetlands and critical coastal habitat, ensuring the sustainable use of water resources, strengthening decision-support capability and enhancing the commercial and recreational value of waterways.

Many once-plentiful stocks of fish in the Atlantic Ocean, such as cod, swordfish and bluefin tuna, have declined as a result of severe over-fishing, degradation of the marine environment and other factors. Regional fisheries management organizations, such as the International Commission for the Conservation of Atlantic Tuna (ICCAT), the North Atlantic Salmon Conservation Organization (NASCO) and the North-East Atlantic Fisheries Commission (NEAFC), have been implementing forward-looking measures in an attempt to reverse the declines in these stocks, so far with only limited success. Countries within the UNECE region have also begun to implement, both individually and through such organizations, new global standards to address overfishing, including the 1993 FAO High Seas Fishing Compliance Agreement, the 1995 UN Fish Stocks Agreement, the 1995 FAO Code of Conduct for Responsible Fishing and related FAO International Plans of Action.

Monitoring

Both OSPAR and HELCOM are also positive examples with respect to monitoring capacities. The Commissions are adequately supported by States parties and can effectively gather information. As a result the Commissions are able to make well-founded recommendations that are to be incorporated into the national legislation of member states. However, though the HELCOM and OSPAR Commissions have sufficient resources to gather basic data independently, it is difficult for HELCOM to monitor the extent to which member states follow its recommendations, as reporting is done by each country on a mandatory basis, but without provisions for enforcement.

The Barcelona Convention has made substantial progress in the Mediterranean region, where a challenging system of monitoring pollution trends and compliance to regulations has been established (the MED POL Phase III Programme). The system, including a data bank, is now being implemented in many countries (EEA, 1999). Under agreements like the Black Sea Convention there are technical limitations and economic disruptions that seriously affect the level of monitoring. For the Caspian Sea a possible convention is under consideration, but would likely face comparable problems. Still enforcement has improved significantly in some CEE countries, and the introduction of economic instruments has had an impact where they would have been inappropriate before. However the general problem of the slow transformation of large, polluting, state-owned enterprises continues to present obstacles. The European Bank for Reconstruction and Development, in cooperation with

HELCOM, has made funding available for infrastructure improvements in the transition countries in the sub-region.

The main challenge in coastal areas is to try and integrate sectoral issues that directly influence the state of the coastal environment, since they are all inter-related and amplify individual impacts. To date, an integrated approach to Coastal Zone Management (ICZM) is still missing at the national level, where a sectoral approach dominates. Key areas of action in this area are environmental impact assessment, coastal land planning, and habitat management and pollution control.

B. Environmental disasters

Environmental hazards

Environmental hazards, whether natural or technological, continue to occur throughout the UNECE region and have led to a multitude of economic, environmental and social losses.

Natural disasters in Kyrgyzstan

Kyrgyzstan is a highly disaster-prone country; the territory is exposed to more than 20 different types of natural hazards. The most dangerous, in terms of prevalence, recurrence and damage, are earthquakes, debris flows, flash floods, landslides, rock falls, avalanches, spring frosts and snowfalls as well as glacial lake outburst floods (GLOFs). Between 1992 and 1999, over 1,210 natural disasters were registered in the country. They took the lives of more than 400 people, and damaged or destroyed more than 50,000 houses, 222 school buildings, 127 healthcare facilities, roads, electricity transmission lines, hydro-technological constructions and other important infrastructure. Direct economic damage caused by natural disasters exceeds US\$ 20 million in a normal year. Indirect damage and secondary effects, such as ecological damage, epidemics, deterioration of living conditions and decrease in soil fertility, have not been assessed, but are certainly important.

This high vulnerability to natural disasters can be attributed on the one hand to the country's complex geo-climatic conditions and, on the other, to its economic difficulties during the transition period. Kyrgyzstan is situated in one of the most seismically active regions of the world. Its geological conditions are dominated by high mountain systems surrounded by desert plains. High altitudes have predetermined a wide development of glaciation. There are 8,208 glaciers with a total area of 8,100 sq. km in Kyrgyzstan. In the mountainous areas, deforestation, ploughing and the impact of cattle grazing on mountain slopes have caused intensive destruction of the soil cover, the formation of mudslides, landslides and avalanches. The absence of appropriate legislation to protect ecosystems has led to the irrational use of limited natural resources. As a result, the environment has deteriorated and become more vulnerable to natural disasters.

The areas prone to natural disasters are unevenly distributed over the country. The most vulnerable areas, in particular in cases of rapid and disastrous events, such as earthquakes, glacial lake outburst floods and debris avalanches, are the valleys where human settlements, transport and other infrastructure are concentrated. In these areas, the potential for loss of life and property is very high, as the settled inter-mountain depressions and valleys are relatively densely populated with 90 persons per sq. km (the average population density is 20 persons per sq. km, and in high mountain areas it is 2-3 persons per sq. km)

Source: UNECE Environmental Performance Review Kyrgyzstan, 2000

Natural hazards are often more devastating than, and have the potential to precipitate technological hazards. Flooding is natural and essential to the health of watersheds. However, storms and floods, the most common environmental hazard events, are also the most costly in terms of insured and other economic losses in the UNECE region, as is true worldwide. Forest fires also continue to cause serious problems in Southern Europe and North America. Forest fires not only cause casualties, but they can also create clouds of smog over surrounding areas and lead to loss of extensive forest areas (see box on forest fires in North America).

Forest fires in North America

Forest fires are a natural part of North America's landscape and play an important role in maintaining and regenerating forests (NIFC 2000). In Canada humans cause most wildfires, but destruction of the largest areas is initiated by lightning. In the United States, most wildfires are sparked by lightning but burn relatively small areas. Wildfires open up space in forests for new seedlings, help to increase diversity in age and type of vegetation, clear debris, and increase the availability of nutrients (Jardine 1994).

Over the past century, human presence and intervention have shaped natural fire regimes in North America. Extensive logging left behind an unnaturally high fuel load from debris. Forest structure and make-up changed as fire-resistant trees were replaced by species that burn hotter and faster than those of the past (The White House 2000). The result was increasingly large and disastrous fires. (H. John Heinz III Centre 2001).

In recent decades populations have moved significantly closer to fire-prone areas, increasing risks to homes, businesses and human life (USDA Forest Service 2001). It is estimated that in the 1990s, wildfires damaged six times the number of homes than during the previous decade (Morrison et al 2000). In 1999, United States fire damage from all types of fire cost over 10 billion dollars, an increase in 16 per cent from the previous year (NFPA 2000). Changes in climate with drier conditions and more severe storms may be playing a role in changing fire patterns in North America. Canada's severe 1995 fire season was in part due to extremely dry conditions (EC, 1999). Severe, long lasting drought related to La Niña, accompanied by thousands of lightning strikes from a series of storms contributed to the severity of the United States 2000 fire season (USDA Forest Service 2001). In the future, North America's annual fire severity rating may well increase due to climate change, which is predicted to bring drier conditions, more lightning strikes and higher intensity and frequency of windstorms (Jardine 1994; IPCC 2001).

Floods are always the result of a complex set of factors. Human activities influencing both the likelihood and magnitude of flooding are, among others, land clearing, building in floodplains, drainage of wetlands and straightening of rivers, thus increasing peak flows and the overall vulnerability of the watershed to flood by decreased ecosystem resilience. Some 85 per cent of the Mississippi River basin's wetlands was lost this way (Searchinger & Tripp 1993). Settlement in floodplains has indeed been made increasingly possible due to dam, dyke and diversion construction. At the German-French border the Rhine's floodwaters rose over seven metres above flood level about once every 20 years between 1900 and 1977. Since 1977, that level has been reached on average once every other year (UWIN 1996). It is not possible, though, to single out the dominant causes of this increase.

In mountainous areas clearing of land for agricultural purposes, infrastructure and heavy tourism development may lead to soil erosion, landslides and down-stream flooding. The 1993 Mississippi flood, for instance, was the result of record-breaking spring rains, a larger than usual snow cover, high soil moisture content, and confinement of the river to its channel by levees and dikes, helping to increase the flood crest when it eventually broke through (Dalgish 1998).

Floods in Hungary and Ukraine

In March 2001, at least 20,000 houses were flooded in at least 200 submerged villages in western Ukraine and northeastern Hungary because of heavy rains and melting snow that overflowed rivers and burst dikes around the Carpathian Mountains. More than 30 miles of highway and about five miles of railway were destroyed in the Ukrainian part of the flooded area, where workers used about 437,600 sand bags sent from neighbouring regions to strengthen dikes. The highest water level of 43.56 feet in the Tisza River was registered close to the town of Chop on the Ukraine-Hungary border - only 3.2 inches less than the record high, the ministry said.

Experts say the water levels, which are the highest in more than a century, are causing less damage than the record floods of 1998 because of dike reinforcement work since then.

Despite uncertainties in data, there are clear indications that costs of natural hazards are growing. In Europe, economic losses due to floods and landslides between 1990 and 1996 were four times the loss in the entire 1980-1989 decade (Munich Re 1997). In England and Wales alone total losses from flooding over the last few years cost more than 1,000 million per year (EA 2000). The 1993 Mississippi flood cost between US\$ 10 and 20 billion (€10,000 to 20,000 million), surpassing all previous United States floods in terms of economic losses and the area, duration and amount of

flooding (USGCRP 2000). In 1996, Canada experienced its most destructive and costly flood in the Saguenay River valley in Quebec. It resulted in over CDN 800 million in damages (Environment Canada 1998). In 1997, the Red River, which flows north from the United States into Canada, experienced its worst flooding in 150 years, incurring costs of almost US\$ 5 billion (IJC 2000).

Although the increase in weather-related natural hazards cannot be directly or solely attributed to climate change, it is consistent with extreme events expected with the intensification of the hydrological cycle (Bruce *et al* 1999). Indeed, El Niño's behaviour has changed over the past 20 years. An uncommonly strong El Niño in 1997-1998 accounted for heavy floods in the United States (Trenberth 1999). The magnitude, frequency and cost of extreme hydrological events in some regions of North America are forecast to increase (USGCRP 2000). Where rainstorms intensify and flooding increases, there is greater potential for damage to low-lying settlements and dock and port facilities as well as for problems with water distribution and sewage systems (Environment Canada 1999). And as the population continues to grow, so does the area of intersection, leading to costlier and deadlier disasters (Barton and Nishenko 1997).

Industrial Accidents

In 1997, a total of 37 major industrial accidents were reported in the EU (MARS database), the highest annual number since records began in 1985. In contrast to accidents in fixed installations, major oil spills from marine transport and offshore installation accidents have shown a clear downward trend (ITOPF 1998).

Quantifying risk from accidental releases of radionuclides is not possible due to lack of sufficiently detailed, comparable information. It is likely that the overall risk from nuclear accidents has declined in the 1990s as older plants are taken out of service and building new ones has slowed. A complicating factor is the deterioration of the older nuclear power plants still in use in Eastern Europe built on a similar design as the Chernobyl reactor. Implementing improved safety plans for these reactors is delayed because of the lack of financial resources, despite significant outside assistance.

Chernobyl

In Chernobyl, many thousands of people died or received additional doses of radiation immediately after the catastrophe or in the years following the accident. More than 200,000 persons were resettled from contaminated territories in Ukraine, Belarus and the Russian Federation between 1990 and 1995. The measures imposed in the area in response to the catastrophe have limited the industrial and agricultural activities in the region. The result was the decrease of local income and the further out-migration of the work force to uncontaminated areas so that the region is now suffering from a shortage of labour and professional staff. The geographically more distant effects are still being felt. In 1999, for instance, 0.4 per cent of Norwegian sheep were still too radioactive to be marketed. The costs this entails are still carried by consumers and taxpayers all over Europe. Accidents like Chernobyl clearly have a very long-term impact on human activity and the environment in a vast area.

Analysis of major industrial accidents indicate that component failure and operator error were the two most common immediate causes, but the dominant underlying causes identified (for 67 per cent of the accidents studied) were poor safety and poor environmental management (Drogaris, 1993; Rasmussen 1996). There have also been significant gaps in regulation and monitoring. The mining accident at Baia Mare in January 2000, served as a rather sobering reminder of the shortcomings of environmental legislation and administration of the countries of Eastern Europe. It is important to note that in this case one cannot blame old and worn-out equipment or obsolete technologies, since the use of cyanide is still the preferred method for processing gold ores around the world, and serious mining accidents also occurred in, for instance, the United States in 1992 and Spain in 1998. (Environment Europe 2000).

Policy Response

As yet, there is no practical targeted policy to reduce natural hazards in Europe, although programmes such as the specific 1975 Flood Damage Reduction Programme (FDRP) (European Programme for Climatology and Natural Hazards) have specifically addressed this source of risk. In North America more concerted efforts have long existed, such as the specific 1975 Flood Damage Reduction Programme (FDRP) in Canada and the 1979 U.S. Federal Emergency Management Agency (FEMA). International work is undertaken thorough the International Strategy for Disaster Reduction (ISDR 2000).

There is an increased likelihood of flooding and droughts (and subsequent fires) in many temperate and humid regions due to climate change (IPCC 1997) (see box on forest fires). However, difficulties in forecasting and prediction, coupled with limited technical or behavioural responses, seem likely to lead to fewer improvements as compared to technological accident risk management (see below). Some countries have procedures in place to ensure that risk of flooding, avalanches, landslides and earthquakes are taken into account in their planning and development processes. In Canada, for instance, settlement in flood prone areas has been discouraged through mapping and the designation of over 320 flood risk areas (Environment Canada 1998). However, in practice it does not appear to result in adequate responses to natural disasters. The lack of integrated land use planning and management in susceptible areas, such as mountainous areas and floodplains, can increase the incidence and severity of hazards. The recent European Biodiversity and Landscape Strategy (PEBLDS), the new EU Water Framework Directive and, for example, efforts towards integrated coastal zone management could improve the situation in future.

For many technological hazards, holistic approaches are becoming more prevalent, with increasing attention to reduction of risk of long-term environmental impacts as well as acute health and property damage from accidents. The Seveso II Directive of the EU, now also incorporated into the legal systems of most CEE countries, is important in this respect. Its accident database MARS (Major Accident Reporting System), recently complemented by SPIRS (Seveso Plants Information Retrieval System), is a practical tool helping countries in their risk management decisions. Indeed, information on the extent and location of technological hazards is generally improving. As such, pre-arrangements can be made in emergency response plans for technological accidents, but many efforts are still necessary to further reduce the risks related to major accidents.

Why did the Baia Mare accident in Romania occur?

In January 2000, an industrial accident occurred in Baia Mare, Romania, with potentially severe transboundary effects. A mining company in northern Romania accidentally spilled over 100,000 cubic metres of cyanide-polluted water into the Lapus River. Within two days, the polluted water reached the Tisza, one of Hungary's largest rivers. Not only Hungary's environment, but also that of the Danube's other downstream countries was affected. The incident showed that accidental water pollution can have far reaching transboundary effects even if it happens at a location far from any international border.

The UNEP/OCHA mission that investigated the accident (EU 2000) reported that faults in the design of the operating plant (inadequate construction of the dams, non-operation of the hydrocyclones, use of a closed circuit tailings management facility) indeed contributed to the accident. Another key problem identified in this accident was that the permitting process was over-complex – the plant received twenty-two individual environmental and health permits before operations started (Environment Europe 2000). The Baia Mare Task Force concluded that the original EIA was flawed and that there was no clear responsibility for the final decision in the permitting process (op. cit.). Furthermore, there were no measures established in case of an emergency, while also monitoring of the water level in the pond was inadequate. This accident again made clear that operations involving hazardous substances still pose a serious threat to our common environment and that there is a need to police investments that might take advantage of lax enforcement in connection with hazardous activities.

Since industrial pollution does not stop at the political boundaries, an important multilateral agreement in this respect is the 1992 Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE 1992). This convention includes requirements to conduct Environmental Impact Assessments (EIA), to notify downstream states of

accidents and enforces the "polluter pays" principle. The 1991 Espoo Convention on EIA in the Transboundary Context requires states to notify and consult each other on all major potentially dangerous ongoing projects (UNECE 1991). The above Baia Mare example illustrates that compliance and enforcement remain major issues. It is anticipated that the Convention on the Transboundary Effects of Industrial Accidents, which entered into force in April 2000, will also improve the situation when fully implemented.

Public perception of hazards and risks is often far removed from reality. For instance, many people only associate the chemical industry with technological hazards, but transport of hazardous products, travel and agricultural activities also cause technological accidents (EEA, 1999). The number of fatalities from natural hazards far outweighs those from major industrial hazards (95 per cent of the total in the period 1985-1996). This is another reason to ensure that reliable information on current natural and technological hazards is readily available. Important remaining questions to be answered include: Which hazards are connected with chronic changes to the environment, such as global warming and sea level rise? Are human activities increasing the risk from various hazards? More knowledge is required about the possible differences between short- and medium-term impacts and long-term impacts of environmental disasters. The problem of low frequency, high consequence events also remains a key issue in risk management for both natural and technological hazards.

C. Conclusions

To tackle climate change, the EU has announced it is on track to achieve the 1997 Kyoto targets to reduce CO₂ emissions, assuming additional policy and measures. Over half the required reductions in Europe could be achieved at low cost and "non-technical" pollution control. Measures such as road pricing and tax incentives will become more important. Opinions still differ, though, as to whether the "additional policy and measures" referred to by the EU will be feasible and sufficient to reach the set target. Current emission levels of most CEE countries and NIS are far below their "Kyoto base year levels". Emissions trading schemes present interesting possibilities for CEE countries and NIS. In North America curbing emissions will be difficult to achieve with current policy developments. Many feel that the current energy policy debate in the United State is worrisome with respect to future CO₂ emissions. Structural changes will be required in the entire UNECE region in the transport and energy sectors.

Policy measures taken to reduce air pollution have shown a clear positive impact on the environment and human health situation. Overall it is clear that SO₂ and NO₂ emissions are decreasing, but particulate matter and ozone precursors still cause serious problems. The average figures mask a large variation among member countries in the UNECE region. Despite this clear progress in curbing air pollution, it is forecast that additional measures will still be needed to protect the environment and human health. Integrated abatement strategies are required to address the interactions between environmental sectors and problems such as climate change, ozone depletion, air, soil and water pollution. To do so, the scientific understanding of pollutant effects needs to improve and in general there is a clear scope for improvements in the quality of reported data.

Damage to the region's landscapes and soils is increasing. Policy is primarily aimed at combating pollution in other areas (air, water), affecting soils only indirectly. Better integrated land use planning and management is required to tackle the problems associated with land cover and land use change and soil degradation.

Biodiversity is affected by a complicated combination of driving forces. Integrated approaches towards biodiversity and landscape protection are advocated in a pioneer way by the PEBLDS and the CBD. Efforts are still recent. Many of the policy instruments in place still have the enforcing "command and control" character rather than providing incentives.

As with most environmental issues, with the slow rate of change in forests, only marginal changes can be expected on the ground in 10 years, but changes since the 1992 Rio Conference in policies, institutions and management objectives have been significant.

Overall, the environmental management of mountains is inadequate: they suffer from the classic “commons syndrome” in which all seek to benefit, yet stakeholders lack coordination, incentives, and instruments for joint care.

Though there has been progress in reducing freshwater pollution in Western Europe and North America, the situation is less promising in CEE countries. Water pollution (quality) of surface and groundwater still is a serious issue in the whole region. There are water availability (quantity) problems in various parts of the region as well. Much national legislation and various bi- or multilateral agreements exist for the management of freshwater. Success in implementation varies though. There is need for more sustainable watershed management and freshwater protection, integrating water quantity and quality aspects, including sustainable flood protection and groundwater protection.

More and more legally binding, sub-regional conventions for the management of marine and coastal resources have come into force. Much attention is given to integration through commissions on sustainable development and sub-regional Agenda’s 21, trying to tackle all three pillars of sustainable development together. Though there is progress, difficulties by some states in meeting their obligations contribute to problems in overall implementation. To date, implementation of truly integrated coastal zone management is still missing.

In the UNECE region storms and floods are both the most common natural hazards, and the most costly in terms of economic and insured losses. There are clear indications that costs of natural hazards are increasing. A lack of integrated land use planning and management in susceptible areas, such as mountainous areas and floodplains, increase the incidence and severity of hazards. Difficulties in forecasting and prediction, coupled with limited technical or behavioural responses, seem likely to lead to few improvements in hazard risk management.

For many industrial hazards, holistic approaches are becoming more prevalent, with increasing attention to reduction of risk of long-term environmental impacts as well as acute health and property damage. There are still shortcomings in environmental legislation and administration. Significantly more effort is needed to further reduce the risks related to major accidents.

V. SUSTAINABLE DEVELOPMENT AT NATIONAL LEVEL

A. Decision-making Structures and Institutional Arrangements

Almost all countries in the ECE region have established sustainable development councils or committees post-Rio, but none of these have the right to take legally binding decisions. They primarily serve as advisory boards, opinion makers or coordinating bodies. Decision-making belongs to Governments, Parliaments (legislative initiatives), and Heads of States and, at the local level to elected self-governments. However, in some ECE member countries, decision-makers are obliged to accept the opinion of relevant sustainable development bodies. This feature is rather common to the region and not specific to a particular sub-region or group of countries. Only in Canada a legal act contains rules of enforcement and compliance (see box below).

Canada's exemplary approach towards sustainable development

Canada's approach to achieving sustainable development is unique. By amendment to the Auditors General Act, the office of the Commissioner of the Environment and Sustainable Development was created in 1995. The Commissioner monitors and reports on progress in implementing sustainable development strategies at the federal level. Appointed by the Auditor General, the Commissioner is given a large degree of autonomy.

In all ECE countries the Ministries of Environment or equivalent Governmental agencies have remained the major initiators and promoters of actions towards sustainable development. The box below describes the three main approaches towards sectoral integration and sustainable development.

National approaches toward sectoral integration

Countries have adopted specific approaches to better coordinate and integrate sectoral policies and relevant Governmental decisions with the principles of sustainability.

- A coordination approach, based on the creation of broad inter-ministerial committees, commissions, working groups, and Task Forces. For example, the United Kingdom has established a Cabinet Committee of "green" Ministers, supported by civil servants in each Department; Poland set up the National Commission for Sustainable Development in late 1994 to coordinate and facilitate Governmental activities towards integration of economic, environmental and social aspects. France created an inter-ministerial steering group to coordinate "greening of government" activities;
- A strategic approach, based on the development of a shared agenda with the Government through sustainable development strategies, policies and executive programmes. This approach is very common in the region, particularly after the Lucerne Ministerial Conference "Environment for Europe", and very often connected to "coordination" and "structural" approaches; and
- A structural approach, based on integration of sectoral policies into one "mega-ministry". Examples of this approach include, in the United Kingdom, the Department of the Environment, Transport and Regions; in Denmark, the Ministry of the Environment and Energy; in Poland, the Ministry of Environmental Protection, Natural Resources and Forestry; in Belgium, with the Ministry of Social Affairs, Public Health and the Environment; and, in the Netherlands, with the Ministry of Housing, Physical Planning and the Environment.

Neither geographic nor economic characteristics can explain the variation among countries. For example, among Western European and North American countries, Austria, Finland, Italy, Norway, Switzerland and the United States have established sustainable development coordination structures, but Denmark, Germany, Spain and Sweden have not. Among EU candidate accession countries, the Czech Republic, Estonia, Hungary, Poland and Slovakia have, but Latvia, Lithuania, Romania and Slovenia have not. In NIS, such bodies have been established in Belarus and Uzbekistan but not in Armenia or Tajikistan. In a very few countries, an implementing agency has been established, such as the National Environmental Centre for Sustainable Development in Kazakhstan. Other initiatives have the character of a Round-Table or of advisory commissions, in which representatives of government, outstanding scientists and representatives of other major stakeholders comment on government actions, and initiate and discuss new developments. The most promising results were achieved in this area by the Czech Republic and Hungary and, most recently, in Germany, where a Council on Sustainable Development was established in June 2000, and in the United Kingdom where the Prime Minister established a Sustainable Development Commission (July 2000).

Western European countries, most of the EU candidate countries, and many NIS have established sustainable development strategies and environmental policies, the latter two groups of countries often through the Capacity 21 programme (UNDP 1999, 2000). In general, CEE countries followed the guidelines for the National Environmental Action Programmes, as adopted by the Pan-European Conference of Environmental Ministers in Lucerne, Switzerland, in 1993. Some other CEE countries, including the Czech Republic and Poland, developed their own environmental policies much earlier, i.e. Poland's National Environmental Policy of 1990 (adopted by the Parliamentary Bill of May 10, 1991), which utilized the sustainable development principles contained in the Bruntland Report. However, none of these policies and strategies is binding. All are an important contribution to the initiation of principles of sustainability into development planning, but their practical impact on sectoral strategies and policies remains to be seen.

In many countries or groups of countries in the region, national and local governments have promoted local environmental action programmes and Local Agendas. The best results have been achieved in countries where national (federal) law required them and where elements of those plans were identified by "bottom-up" initiatives or, at the minimum, with public participation. The relationships between national and local sustainable development strategies and action plans have varied from country to country. A successful approach is often a partnership in which local strategies or plans are formulated and implemented under the guidance of a national strategy. The national strategy provides the overall framework, while local strategies inform and give feedback to the national strategy. Among the more successful examples are those in Austria, Bulgaria, the Czech Republic, Denmark, Estonia, Finland, Hungary, Republic of Moldova, the Netherlands, Poland, Romania, Slovakia, Turkey and the United Kingdom, and, at sub-regional scale, around the Baltic Sea and the Mediterranean. Comparable efforts are underway for the Aral, Black and Caspian Seas (see section on Marine and Coastal Areas) (UNDP/Capacity21, 1999).

B. Regulatory Instruments

Throughout section IV on Environmental Challenges and Responses, examples have been given of more recently established regulatory instruments that have had various degrees of success in moving towards more sustainable development patterns.

During the 1990s emission standards have been tightened, particularly among Western countries in the ECE region, but also in some economies in transition. This has helped to alleviate some of the pressure on the environment, particularly with regard to emissions of certain pollutants to the atmosphere and to water.

The most important and most sustainable results in the region have been due to technological progress that has facilitated reductions in energy, water and minerals consumption, and the introduction of recycling, material substitution and broader use of renewable resources. However, technology transfer still remains very weak in the ECE region and should be improved. The European integration process should assist candidate accession countries in this regard. The NIS require separate action.

The EU recently introduced an integrated permit system through the Integrated Pollution Prevention and Control Directive, based on product life cycle and best available technology (BAT) approaches. This system has consequently been introduced into environmental legislation in candidate accession countries. However, some argue that the BAT approach could distort market conditions and introduce unfair commercial practices as well as create problems for small and medium sized enterprises (SMEs). Integrated permit systems, with or without BAT, have become quite common in the European region, with the exception of NIS, where an old separate permit system remains in use.

Environmental Impact Assessment (EIA) has been introduced in law in almost all the ECE member States. However the scope of EIA differs among countries or group of countries, i.e. the EU countries have a very uniform EIA system that includes public participation and monitoring at each stage of the process. Non-EU Western European countries have adopted EIA legislation similar to the EU's. The candidate accession countries are in the process of harmonizing their legislation to the EU legal structure as well. In the NIS, the situation is different. There the old system of "environmental expertise" is still in use, and this does not include strong provisions for monitoring or public participation.

There is the perception that command and control regulation (polluters have to pay and authorities have to monitor enforcement and impact) is economically ineffective and results in a significant constraint on industrial growth. Unfortunately, such perceptions have intensified in recent times, leading to a phenomenon called the "regulatory chill", that is, a reluctance on the part of environmental regulators to act (Nordström and Vaughan 1999). Empirical evidence, however, shows that the costs of compliance are negligible and would have only a minor impact on the competitive position of domestic industry in relation to foreign competition. In the industrial sector, for instance, compliance only involves 2 to 4 per cent of the production costs (Luken 2000). In the United States, the average is even lower at 1.6 per cent (OECD, 1996). One setback that does exist is that some of the smaller enterprises may have find it difficult to cope.

C. Economic instruments and Voluntary Action

The countries of the ECE region countries are leading globally in the introduction of economic, market-oriented instruments. The most common instruments in the region are:

- environmental fees and fines;
- environment related taxes;
- product charges;
- product deposits;
- environment related subsidies; and
- voluntary instruments.

Various examples of several of these instruments have been given throughout the sections on Driving Forces and on Environmental Challenges and Responses. Some more discussion is given below.

Direct *environmental fees* for using natural resources, for emissions into the atmosphere, waste water discharge and solid waste dumping, have been used by most countries of the ECE region for decades. Only a few countries, such as Finland, Greece, Portugal and Turkey, do not use them, but they do apply a system of payment for environmental services.

Environmental fines for violations are not in common use. In most countries, environmental fees are collected by the state and sometimes returned to the environment in the form of specific subsidies, aimed at achieving well-defined environmental goals. These subsidies, in the form of grants or "soft" loans, are provided directly to a company, municipality, or other legal entity by the state, or, in the case of most CEE countries, through a specially established environmental fund. In a few CEE countries, including Poland, Czech Republic, and Hungary, the environmental fees and fines are collected by environmental funds directly for distribution to environmental investments and activities, so operating outside the state budget.

In Bulgaria, privatization of industry began following the adoption of the Privatization Law in 1992. The privatization of small and medium-sized enterprises is now virtually complete, while a Privatization Agency was created for the privatization of larger enterprises. Privatization proceeds were paid directly into the State budget.

Environmental policy objectives are included in the industrial privatization process at a prominent level. In fact, no other sectoral policy concerns are singled out in the privatization process. There was no major objection to the scheme from the business sector, as enterprises see environmental improvements of production as a necessary precondition for their commercial integration into Western Europe. The Ministry of Environment is mandated to implement the provisions within the privatization procedure with a view to encouraging redemption of environmental damage caused by the enterprise prior to privatization, and concluding a phased programme with new owners for full compliance by the enterprise with current environmental norms and standards.

Different instruments are applied to the management of each of these objectives: an environmental impact assessment is undertaken together with an analysis of past damage, and an environmental audit.

The new environmental legislation in Bulgaria holds the State liable for past environmental damage from enterprise activities. The extent of the damage is determined by a special analysis for each enterprise undergoing privatization. Each special analysis gives rise to a remedial plan and the determination of a ceiling for the funds deemed necessary to repair the damage. The remedial plan, including the time frame within which repair is to be carried out and the limit on funding is built into the privatization agreement. Remedial measures are then undertaken by the enterprise, but funded from the State budget up to the set financial limit. Depending on the situation, the amount may be paid from the environmental fund, but credit arrangements have also been negotiated with the World Bank, totalling US\$ 50 million.

Source: Second Environmental Performance Review, Bulgaria

Most Western countries and the EU candidate accession countries have introduced special *taxation* on fuels, energy consumption and motor vehicles (see also sections III A on energy and IV A 1 on climate change). The revenue from environment-related taxes averages roughly 2 per cent of GDP in these countries, but there are significant differences among countries (see the table below).

Region, sub-region or country	Revenue from environment-related taxes (in percentages of GDP)
ECE region	2
Denmark	5
Greece	4.2
Portugal	3.8
Norway	3.6
Netherlands	3.6
Hungary	3.2
Czech Republic	3
United States	1
most other CEE countries	> 1

As mentioned in the climate change section, Denmark, Finland, Italy, the Netherlands, Norway and Sweden have introduced so called carbon taxes, according to the carbon content in fossil fuels. However, the levies are not pure carbon taxes, since numerous exemptions and rebates are applied for sectoral competitiveness and income distribution. Fuels used in electricity generation and distribution, aviation fuels, and fuel used in commercial fishing, for instance, are often exempt from taxation. There is no real evidence of the environmental effectiveness of these taxes, such as reductions of CO₂ emissions. There are financial gains though, which are often used for environmental protection purposes.

Other instruments of a very similar character are *product charges and product deposits*. They support waste minimization policies and producer responsibility. *Product charges* are very common in both Western countries and in the CEE countries. The most popular environmental product charges are applied to hazardous substances, such as specific chemicals, PETs, batteries, and packaging that cannot be recycled.

Environmentally sound *product deposits* play a much “cleaner” role in the whole range of economic instruments supporting sustainable development. This system introduces special charges for products and packages that could be easily recycled. A product deposits system, when combined with adequate legal instruments introducing extended producer responsibility, can shape consumption and production patterns within the whole life cycle of product. The product deposits system is very common among the Western countries of the region and the EU candidate accession countries. Products usually included are car batteries, car tires, car bodies, bottles, glass and metal containers, wooden packages, waste paper, used oil, hazardous chemicals packages, and, in some specific conditions, even nuclear wastes. This system plays a clear motivational role but requires well-organized and costly waste selection and collection structures. The system should be further developed to be self-financing, but the initial start-up generally requires support from the Government and possibly external assistance, particularly in the NIS.

Another economic tool for supporting environmental protection and sustainable development is the system of *environmental subsidies* (see also the box in the sub-section on energy). Subsidies can be provided through tax cuts, particularly import taxes; custom’s duties for environmentally sound technologies and equipment; lowering VAT for environmentally sound production and services; soft loans, guaranties and grants from state budgets; and from environmental funds.

Voluntary agreements aiming at reduction of economic and social costs, such as emission trading at national and international scale, and voluntary agreements between environmental authorities and polluters, are well developed in North America and more and more applied in Western Europe as well.

The system of emissions trading (tradable permits, so far mainly in SO₂ emissions) is well developed in the United States, where at least ten projects have been established in the areas of air protection, water management and water protection aimed at reducing sulphur dioxide, hydrocarbons, substances depleting the ozone layer and lead emissions, stabilization of water consumption, reduction of eutrophication and nutrient discharge. One project has been developed in Switzerland for reduction of VOC emission; one in Germany for stabilization of ground water consumption; and one in Poland (demonstration project) for speeding up the local low emission abatement programme. Potential developments in CO₂ emission trading in Europe are discussed in a box in the sub-section on climate change. Western countries of the region, and especially North America, use voluntary agreements between environmental authorities and polluters (entrepreneurs). This mechanism is intended to stimulate producers’ behaviour towards sustainable development. However there is some level of uncertainty on the environmental effectiveness, particularly in comparison to other economic instruments. This mechanism is used on a very limited scale in CEE countries, probably due to the collapse of old producer’s associations and chambers of commerce and a still weak private sector.

Other kinds of voluntary activities, such as cleaner production programmes, Environmental Management Systems aimed at obtaining ISO 14000 certificates (for future EMAS certificates), public-private partnerships (PPPs – see box below), as well as other “responsible care” programmes are becoming popular, also in CEE countries, and particularly in the EU candidate accession countries, bringing significant environmental results at moderate costs. National and local authorities, bilateral agreements and international assistance support these programmes.

Public-private partnerships (PPPs)

Sustainable Development can be advanced through Public-Private Partnerships (PPPs). PPPs involve a range of structures through which risks and responsibilities are shared between the public and private sectors. PPP tools are concessions, joint ventures, leasing, BOT arrangements (build, operate and transfer) and others, designed to improve infrastructure in energy, transport, telecommunications and municipal services. PPPs are typically applied in areas like water supply systems, waste-water management, solid and hazardous waste management, district heating, energy efficiency, renewable energy and urban transport. These schemes are particularly relevant for the transition economies where the public sector alone does not have the resources, both qualitatively and quantitatively, to provide adequate services for its population.

PPPs help in moving a society towards sustainability in many different ways:

- **Institutional:** they allow Governments to attract private sector funding and involvement without incurring the adverse effects of full-scale privatization. Governments can for instance retain a significant role so that they can maintain the essential 'public' character of infrastructure;
- **Economically:** they promote efficiency and indirectly economic growth through decentralization of services, corporatization of municipal utilities, cost recovery through user charges, economic efficiency in resource use and allocation;
- **Socially:** they meet people's needs by offering better transportation, cleaner water, new communications systems, more reliable supplies of power and so on. This helps in raising living standards and, particularly in CEEC and NIS, in alleviating poverty;
- **Environmentally:** they can be used for the transfer of environmentally innovative technology and can help in raising environmental controls to EU standards.

PPPs are, however, not easy to implement. They involve complex financial instruments and management of risk. The schemes require a strong relationship between the partners and real effort and commitment both by the public and the private sector. PPPs need strong governments, which will actively promote the schemes among the potential partners, ensure that the necessary tools are in place and that companies comply with their obligations.

Indeed, as in the example on PPPs above, local Governments play a key role in managing resources and societies. They are the primary party in the dialogue with the people and the local corporate community who are affected by Government decisions. And local Governments have important task in monitoring compliance of national legislation. Unfortunately local authorities do not always have sufficient resources to implement these tasks, certainly not in CEEC and NIS.

D. Information, Monitoring and Evaluation

Monitoring Progress

As indicated earlier, implementation of sustainable development principles at the national level is in practice still limited to integration of environmental concerns into economic and sectoral policies such as those for transport, energy, mining, forestry, agriculture and fisheries, and to physical planning. However, detailed monitoring and reporting on such early attempts towards integration is difficult and uncertain. National reports to the CSD as well as to Convention Secretariats, for example, are generally descriptive, and, with few exceptions, not based on objective reporting frameworks with indicators. The same is true for this report. The main reason is that the difficult question remains on how to integrate environmental, economic and social dimensions into a core set of indicators or even an index for sustainable development.

Directly related to the indicator development problem is the issue of data. There are still serious data gaps and the quality and comparability of the data remain an important concern. The complexity of the data issue due to both technical and institutional constraints is summarized in, among others, a separate introductory section in the Global Environment Outlook 2 (UNEP 1999). Though clearly more problematic in many CEE countries and most NIS, data quality, availability, compatibility and management are a problem in the Western countries of the region as well.

Work on sustainable development indicators and indexes has been carried out for almost 10 years by CSD, UNEP, the World Bank, the European Commission, OECD, SCOPE, WWF, CIESIN, the World Economic Forum, and numerous other research entities. The results of all this work to date are still not fully satisfactory. Global, regional and national monitoring and statistical reporting systems continue to operate with separate environmental, economic and social indicators. The most common approach across the ECE region is to just use environmental indicators, relate them to per capita or economic (per GDP) parameters, hoping to give a possible indication of progress in sustainable development. Again, this report does the same.

The conclusions of a recent OECD conference on measuring progress in sustainable development (OECD, 2000) gives a useful summary of why indicators are required and what needs to be done in relation to sustainable development indicators:

- indicators are essential tools for *communicating sustainable development issues* to policy makers and civil society, and for *promoting dialogue* (see also information needs below)
- indicators are required to *measure progress* and to *raise awareness* about inter-linkages and trade-offs, as well as about longer term implications of current decisions and behaviour (see also below);
- since the three dimensions (economic-environmental-social) involve complex synergies and trade-offs, *emphasis should be on the interactions* among the three dimensions in order to minimize possible conflicts;
- most national initiatives are still driven by environmental actors, so that the major part of sustainable development indicator sets and indexes is formed by environmental indicators;
- there is a need to further refine and link indicators, in particular more work needs to be done on incorporating indicators related to issues of social sustainability.

Other Information Needs

Information needs on sustainable development at the national level can be divided into three major functions: information for decision-makers, information for the public to support public participation in decision-making, and information to promote dialogue on sustainable development.

Environmental Protection Information System in Croatia

Croatia has established an Environmental Protection Information System that contains emission inventory data, selected administrative data on the state of the environment, expert and scientific data from local and foreign institutions and international organizations, metadata and other vital environmental information. The Government prescribes the monitoring contents and methodologies, the reporting obligations and the procedures for both data transmission and management, including processing and disclosure.

If a company plans a project that requires an EIA, it must measure its emissions and immissions, keep records and take part in the monitoring of environmental and other impacts caused by its environmental pollution.

As a part of the Information System, an Environmental Emission Cadastre has been established. This is an integrated pollution register, comprising data on air emissions, solid waste and waste-water as well as general information about pollution sources, and it is intended to be used as a decision-making instrument.

EPR of Croatia, 1999.

Among Western countries in the region, information is routinely used while reaching major decisions (information about potential impacts of future decisions; information about progress in implementation of earlier decisions). In CEE countries, and particularly in NIS countries, the role of information for decision-making is not yet clear. The EU candidate countries have to generate information for different EU integration purposes. They are receiving significant assistance in capacity-building to do so. One of the ways in which NIS are being assisted is through ECE's

Environmental Performance Review programme, which also requires that reviewed countries collect and make available significant amounts of data (see box below).

Furthermore information is required to increase awareness of the public and to support public dialogue and participation in decision-making (see section II C on public participation and democracy). Following the requirements to implement environmental impact assessments (EIAs) for major projects and programmes, the public needs to be informed and heard before final decisions are taken. The same set up is being developed for broader strategies and development plans (strategic environmental assessments - SEAs). Information should therefore be available to the public on the state of environment, foreseen economic, environmental and social consequences of possible decisions, and on government plans, programmes and strategies (see also the box below). The Espoo Convention, the Aarhus Convention, the relevant EU directive and the OECD recommendation on public access to information provide for the above tools.

Public access to environmental information in Poland

One of the most advanced legal and institutional structures has been developed in Poland, where the Constitution gives the public the right to free access to environmental information and to justice. The Act on Public Access to Information, Decision-making and Justice and Environmental Impact Assessment extends the constitutional provisions relevant to national implementation of the Espoo and Aarhus Conventions and Principle 10 of the Rio Declaration. Following these provisions, the Minister of the Environment of Poland has recently established a Centre for Environmental Information.

In NIS countries, public participation in environmental decision-making is becoming more active as both the number and the role of non-governmental organizations has grown significantly during the past decade. These NGOs have been major actors in providing information and seeking to influence decision-making in sustainable development (see section II C on public participation and democracy).

In summary:

- In western ECE countries there is a high demand for raw data and processed information on sustainable development both for decision makers and the public; demand is growing in the CEEC; and in NIS demand and access to data and information are still very low;
- The level of demand for information depends on capacity, awareness and education, of both authorities and the public. The NIS countries, in particular, need assistance in mobilizing public demand for information on sustainable development;
- The media (television, radio, and the printed press) need to become more fully involved in providing information to the public on sustainable development to promote public awareness and active participation.

E. Conclusions

Actual implementation of all the good intentions about integration and sustainable development is still in its early stages. Many ECE countries in all subregions consider improvements in *environmental* performance the same as progress in sustainable development. Links to economic growth are tenuous. The social dimension and consumption pattern issues are generally ignored due to their politically sensitive character and lack of objective indicators (see below).

Nonetheless, economic instruments and adequate institutional structures have brought significant improvements to national environmental performance, particularly in Western countries and in the EU candidate accession countries. A combination of economic instruments and regulations should be the principal means for making output in market economies more environmentally sustainable. As for the policy instruments, a wider use of economic instruments – taxes, charges and tradable permits, for example – to correct market and policy failures, and to internalize environmental and social costs

should be further developed. Carefully designed and implemented economic instruments can make an important contribution to achieving sustainable development, and can also be used to strengthen the application of multilateral environmental agreements and to develop mutually supportive environmental and trade policies. Direct regulation, for instance through the setting of environmental standards, including outright prohibition, continues to be necessary in a number of areas.

Local Governments play a key role in managing the various instruments and in monitoring compliance of national legislation. They are the primary interlocutors with the people and the local corporate community who are affected by Government decisions. Unfortunately local authorities do not always have sufficient resources to implement these tasks, particularly in CEE countries and certainly not in NIS.

In NIS, regulatory and enforcement structures and instruments are still weak and results inadequate due to the very slow progress in the transition process, the much longer history of a centrally planned economy and consequent environmental degradation, and a chronic lack of financial resources and lack of ability to mobilize them. The necessity of external assistance for capacity building and the establishment of efficient legal and enforcement institutional infrastructure as well as financing institutions seem to be indispensable here.

Comprehensive but rationalized, harmonized data collection and reporting programmes with sufficient detail and quality are still weak, both in terms of statistical data and of geo-referenced mapping. Indicators to assess success or failure in efforts to achieve sustainability need further development, focusing on the interactions among the three pillars of sustainability. Due to these weaknesses, progress in achieving sustainability can currently not be quantified and comparability at ECE region level remains weak.

VI. INTEGRATION AND HARMONIZATION OF SUSTAINABLE DEVELOPMENT POLICIES AT REGIONAL AND SUB-REGIONAL LEVELS

Finding the path towards sustainable development has been among the most significant of the sets of issues that Europe has had to deal with in a collective manner. The last decade has given rise to a marked increase in the coordinated activities of states in the European region to harmonize their policy responses on the way towards achieving sustainable development.

Such harmonization can work in several ways. States can work individually on solutions to particular problems, and these can be “harmonized” through periodic exchanges, associations and conferences. This may be sufficient in the case of issues that are faced uniformly and locally throughout the region, such as municipal waste disposal. Even in such cases, however, international processes may facilitate the exchange of information and develop the state of the art. Coordination is also a necessary element when states have to take joint action to address, for example, a transboundary problem. In these circumstances international negotiation may often be required. Within Europe several frameworks for addressing transboundary issues have been established through multilateral environmental agreements (MEAs). Finally, the more complex the problem the more a comprehensive regional solution is required to address it. Several long-term international processes have been initiated to address major challenges, an illustrative example being the work on transport, environment and health undertaken under the auspices of the UNECE and WHO Europe.

Within the region there are several factors that have played an important role in the coordination and harmonization of policy responses for sustainable development. Most notable of these is the transition process, discussed in Part II of this report, which brought the region’s serious environmental problems to the attention of the international community. The reform process offered a unique opportunity to integrate environmental concerns into the re-development of democratic, market-based societies (Stec 1998). It also renewed and re-invigorated the structure for pan-European cooperation and gave rise to several significant developments relating to harmonization of sustainable development policy responses. Perhaps the most significant of these was the establishment of the main vehicle for pan-European dialogue in this field – the “Environment for Europe” process. The extension of Environmental Performance Reviews to countries-in-transition under the auspices of UNECE was a second new opportunity for furthering policy harmonization.

A. Key Agreements: MEAs as Tools for Harmonization and Integration

The time and effort it takes to negotiate and implement a Multilateral Environmental Agreement (MEA) ensures that only those issues that are of sufficient importance to require concerted international action will result in the development of an MEA. The complexity of factors involved in coordinating policies among states to achieve environmentally sound and sustainable development contributes to the difficulty. Nevertheless, MEAs are major tools for harmonization of sustainable development policies.

Within Europe, the UNEP Regional Office for Europe provides important services to support many of the global MEAs for countries in the region, and promotes coordination between and among bodies.

Regional Participation in Global Agreements

Ratification of significant global agreements is high in the region, and fairly balanced among the sub-regions (UNEP/REC 2000). This suggests a general acceptance of international trends and leadership from within the region. However, ratification and implementation are affected by both environmental and economic problems within States. The low number of ratifications of the Vienna Convention for

the Protection of the Ozone Layer and its Montreal Protocol among certain key countries-in-transition, for example, indicates an inability within these countries to guarantee compliance with reduction targets. At the same time, there are some global MEAs with a high recent acceptance among countries-in-transition. Support from Central and Eastern Europe States has grown for the Convention on Migratory Species. The Convention to Combat Desertification has received eleven new ratifications or accessions from UNECE member States, and the Basel Convention, eight. In general, implementation of MEAs through adoption of legislation is good throughout the region. In recent years there has been increased pressure on countries-in-transition to focus more on bringing environmental laws in line with EU legislation, with the result that drafting of environmental law has gained prominence, building momentum for laws meeting all international obligations, not just those related to accession.

In Europe, a great deal of harmonization has gotten its start through consideration of transboundary environmental issues, such as industrial accidents and air pollution. Significantly, there has been a shift in the region during the last few years towards improving compliance with MEAs, especially with respect to UN ECE conventions.

Regional Conventions

There are many Europe specific regional conventions (UNEP/REC 2000). From its pioneering days in developing the 1979 Convention on Long-range Transboundary Air Pollution (LRTAP), the first internationally legally binding instrument to deal with problems of air pollution on a broad regional basis, the United Nations Economic Commission for Europe (UNECE) has assumed a place at the centre of harmonizing and developing environmental law and policy developments on the pan-European level, through the Environment for Europe Process as well as through the UNECE Committee on Environmental Policy.

To date, five environment and sustainable development conventions have been adopted under the auspices of the UNECE: the 1979 Convention on Long-range Transboundary Air Pollution (CLRTAP), the 1991 Convention on Environmental Impact Assessment in a Transboundary Context (Espoo), the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, the 1992 Convention on the Transboundary Effects of Industrial Accidents and the 1998 Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus).

Harmonization of control measures for all major air pollutants throughout the UNECE region has been the objective of the Convention on Long-range Transboundary Air Pollution. A total of eight Protocols to the Convention have been adopted, reflecting both shifting priorities toward pollutants that are increasing or are difficult to control and continued scientific research. These Protocols address: atmospheric monitoring and modelling, targets for emission reductions for sulphur, nitrogen oxides and volatile organic compounds; abatement of acidification, eutrophication and ground-level ozone; heavy metals; and, most recently, persistent organic pollutants. The UNECE Protocol on POPs played a major role in aiding the development of a global instrument for the control of POPs that was negotiated under the auspices of UNEP and adopted in May 2001. For more information, see the discussion on policy responses to the problem of air pollution (Section IV A 2).

The importance of environmental impact assessment (EIA) as a tool both for harmonization of policies and integration of environmental considerations into economic and sectoral decisions began to emerge in the 1980s. As a decision-making process, it combines the precautionary principle with the principles of public participation and of preventing environmental damage. By the beginning of the 1990s, there were national EIA procedures in a number of countries of the region, and other countries were examining the benefits of EIA for their own national assessment and planning processes. However, these national EIA procedures were not universal; nor were they consistent; and,

perhaps most importantly, they could not incorporate measures to manage environmental impacts of a transboundary character. The elaboration, signing in 1991 and entry into force in 1997 of the Convention on Environmental Impact Assessment in a Transboundary Context (EIA Convention or Espoo Convention) brought EIA to the international level in particular in a transboundary context.

Over the ten years since its adoption, the Convention has contributed significantly to harmonizing and improving EIA at national and international levels. However, the number of actual cases of transboundary EIAs has so far been comparatively low. The Convention needs to be strengthened, and further guidance on good practice, elaborated.

An important recent development was the decision of the Parties to the Convention at their second meeting (Sofia, Bulgaria, 26-27 February 2001) to undertake further work in areas such as bilateral and multilateral cooperation, public participation in a transboundary context, and sub-regional cooperation and to begin negotiations on a new, legally-binding Protocol on Strategic Environmental Assessment.

Protocol on strategic environmental assessment

The Convention invites Parties to apply the principles of EIA not only at the project level but also to policies, plans and programmes. Some countries have experience with the application of strategic environmental assessment (SEA), but recently it has become more important at the international level. Consequently, the Parties to the EIA Convention have decided to start negotiations on a new legally binding Protocol on Strategic Environmental Assessment. The Protocol is expected to be ready for adoption and signing at the fifth Ministerial Conference "Environment for Europe", which will be held in Kiev, Ukraine, in May 2003. These negotiations are one of the major new developments under the EIA Convention. Such a protocol will further underline the cross-sectoral approach of the Convention by integrating environmental and health considerations into strategic decision-making.

Another area for which policy harmonization has been essential is that of the transboundary effects of industrial accidents. Industrial operations may involve substances that do not usually represent a great threat to health or the environment but are nevertheless potentially hazardous. Even the safest plant is never totally risk-free. In 1992, three months prior to UNCED, the Convention on Transboundary Effects of Industrial Accidents was adopted in Helsinki; it entered into force on 19 April 2000.

In Europe, the well-publicized industrial accidents at Seveso in Italy in 1976 and Basel in Switzerland ten years later emphasized the need for international agreement in this area. Most recently, in January 2000, the industrial accident in Baia Mare, Romania, demonstrated that accidental water pollution could have far-reaching transboundary effects even if it happens at a location far from any international border (see also section IV B).

One of the important issues connected with transboundary pollution is liability. The Parties to the Industrial Accidents Convention and the Convention on the Protection and Use of Transboundary Watercourses and International Lakes are now jointly addressing this. A joint special session of the governing bodies of the two Conventions will be held on 2-3 July 2001 with a view to considering entering into an intergovernmental negotiation process for a new protocol on this issue.

Harmonization of policies through the Convention on the Protection and Use of Transboundary Water Courses is discussed in the sections on Freshwater (IV A 7) and Environmental Disasters (IV B). The Aarhus Convention is discussed in the section on public participation and democracy (II C).

B. Key International Processes for Harmonization of Environmentally Sound and Sustainable Development Policies

Regional responses to the challenge of environmentally sound and sustainable development have taken advantage of the confluence of two major streams of events. The first is the series of processes relating to the integration of environmental and social concerns throughout decision-making at all levels. At various levels, this is reflected through the implementation of EIA and SEA, the growing experience with effective public participation in decision-making, the use of economic instruments and other tools to influence choice, national, regional and local environmental action plans and programmes and policies, and the use of international fora for determination of priorities and goals. The second involves the necessity to harmonize policies across the region, particularly as efforts are made to reconstruct societies in a large part of Europe (UNEP/REC 2000). These two streams have come together in the “Environment for Europe” (EfE) process, and to a lesser extent in other similar regional fora such as the “Environment and Health” process. Several processes linked to the EfE process have resulted in pan-European plans, programmes and strategies. The Pan-European Biodiversity and Landscape Diversity Strategy is one example. In addition, plans and programmes on the level of the European Union play an important role in harmonization due to the trend towards European integration.

1. The “Environment for Europe” (EfE) process

In the midst of various bilateral and multilateral initiatives, the largest role in setting the policy framework for environment-related assistance to Eastern Europe has gradually been assumed by the “Environment for Europe” process. This process, inspired by the dream of the first Environment Minister of Czechoslovakia, Josef Vavrousek to establish a permanent European environmental council, began with the first pan-European meeting of environment ministers of Europe at Dobris, Czechoslovakia, in 1991, and has continued up to the present. Among the major organizations supporting the process are UNECE, UNEP, the World Bank, the Organization for Economic Cooperation and Development (OECD), the European Commission, the Council of Europe, EcoForum and the Regional Environmental Centre for Central and Eastern Europe (REC).

Summary of some of the major accomplishments of the EfE Ministerial meetings related to harmonization

- Adopted the Environmental Programme for Europe to set long-term environmental priorities at the pan-European level and to make Agenda 21 more operational in the European context, particularly through its provisions relating to the integration of environmental policy with other policies;
- Requested the preparation of “Europe’s Environment: The Dobris Assessment,” prepared by the European Environment Agency;
- Decided to begin negotiation on a convention on access to environmental information and public participation in environmental decision-making under the auspices of the UNECE “with appropriate involvement of NGOs”;
- Adopted significant MEAs, including the Aarhus Convention and Protocols to the Convention on Long-range Transboundary Air Pollution on Heavy Metals and on Persistent Organic Pollutants;
- Established certain pan-European priorities, including environment and health, environment and transport and sustainable management of forests;
- Endorsed the Pan-European Biodiversity and Landscape Strategy and established the Biodiversity Task Force;
- Endorsed the Environmental Action Programme for Central and Eastern Europe (EAP) and set up a Task Force to implement it;
- Established a Project Preparation Committee (PPC);
- Endorsed the Policy Statement on Energy Efficiency and the Guidelines on Energy conservation in Europe;
- Established the Environmental Performance Review Programme of the UNECE for countries in transition.

Source: OECD, 1999

There have been four "Environment For Europe" Ministerial Conferences. The first took place in Dobris, Czechoslovakia, in 1991; the second, in Lucerne, Switzerland, in 1993; the third, in Sofia, Bulgaria, in 1995; and the fourth, in Aarhus, Denmark, in 1998. The fifth Conference is scheduled for May 2003, in Kiev, Ukraine.

The EfE process has provided the framework for the development of many significant strategies and cooperative arrangements leading towards harmonization in the region. Over its ten-year history, the EfE Process has gradually shifted from a focus on East-West cooperation to a framework for pan-European cooperation. Another important development throughout the process has involved the role of the public, including the organization at the Aarhus Conference of a joint NGO-Ministerial session. Together with the generally positive experience of government-NGO cooperation in the development of the Aarhus Convention, this trend should lead to greater public involvement in the "Environment for Europe" process in the future. Examples of EfE related programmes, agreements and activities are detailed below:

- Environmental Programme for Europe
- Public Participation
- Pan-European Biological and Landscape Diversity Strategy
- Environmental Performance Reviews
- EAP Task Force

Environmental Programme for Europe

The 1991 Dobris Ministerial Conference "Environment for Europe" called for a comprehensive assessment of Europe's environment and envisaged the development of an Environmental Programme for Europe. At the 1993 Lucerne Conference, Ministers endorsed "Elements for a Long-Term Environmental Programme for Europe" elaborated under the UNECE framework and decided on the further development of this programme on the basis of a comprehensive assessment of Europe's environment. "Europe's Environment: The Dobris Assessment", prepared by the European Environment Agency for the 1995 Sofia Conference, provided a foundation for the Environmental Programme for Europe.

Assessment of Europe's environment

The European Environment Agency (EEA) presented the first pan-European State of the Environment Report *Europe's Environment, the Dobris Assessment* at the Sofia Conference. The report, which identified and reviewed twelve environmental problems of particular European concern, was extremely valuable as a baseline study for the development of the Environment for Europe Programme. Subsequently, the ministers at the Sofia Conference requested EEA to prepare a second report. *Europe's Environment: The Second Assessment*, which was presented to the Aarhus Conference in 1998. A third assessment report is being prepared for the Kiev Conference in 2003.

Much of the information included in Part IV of this report is based on EEA publications.

The Third Ministerial Conference "Environment for Europe" (1995, Sofia) endorsed the Programme. The Programme is the first attempt to set long-term environmental priorities at the pan-European level and to make Agenda 21 more operational in the European context, particularly its provision relating to the integration of environmental policy with other policies. It serves as a framework for the better coordination of national and international efforts to improve environmental conditions throughout Europe and to promote convergence of environmental quality and policies. The Programme was reviewed and updated at subsequent EfE conferences (Sofia and Aarhus).

Priorities identified in the Environment for Europe Programme

Priorities identified in 1995 (Sofia Conference) included:

- Economic instruments;
- Local initiatives towards sustainable consumption patterns;
- Policy statement and Guidelines on energy conservation in Europe;
- Pan-European strategy to phase out leaded petrol;
- Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters; and
- ECE Guidelines on Access to Environmental Information and Public Participation in Environmental Decision-making.

As a result of reviews in 1998 and 2000, attention was given to the following elements:

- energy and the environment;
- local initiatives towards sustainable consumption patterns;
- follow-up on the Strategy to phase out leaded petrol;
- integrating environmental considerations into sectoral policies; and
- environmental monitoring

Public Participation

Public participation and the Aarhus Convention are discussed in an earlier section of this paper. However, it is important to emphasize the broader role that the Environment for Europe process has had in fostering public participation and supporting the involvement of non-governmental organizations. Most notable outcomes of this support have been the establishment of a Pan-European ECO-Forum and the establishment of Regional Environmental Centres (RECs).

EcoForum is a network of more than 200 “environmental citizens’ organizations” operating in the UNECE region and focusing mostly on the "Environment for Europe" (EfE) process. It coordinates NGO participation and involvement in the EfE process. In preparation for the 5th Ministerial Conference (Kiev, Ukraine, 2003) the ECO-Forum organized a Strategy Meeting (September 2000, Kiev) at which it brought together 104 organizations from thirty-three countries.

The 1995 Sofia Ministerial Conference “Environment for Europe” recommended the establishment of a Regional Environmental Centre for the New Independent States. The first REC, the Regional Environmental Centre for Central and Eastern Europe, was established in Szendendre, Hungary. Subsequently, additional RECs have been set up for the Russian Federation, Ukraine, Republic of Moldova, the Caucasus and Central Asia. Regional environmental centres are not themselves non-governmental organizations, but they contribute to public participation by encouraging cooperation among non-governmental organizations, governments, businesses and other environmental stakeholders; supporting the free exchange of information; and promoting public participation in environmental decision-making.

Pan-European Biological and Landscape Diversity Strategy

The Pan-European Biological and Landscape Diversity Strategy (PEBLDS) can be seen as an innovative non-binding regional programme that implements a global MEA and harmonizes domestic policies and programmes. PEBLDS was adopted at the Sofia Ministerial Conference “Environment for Europe” in 1995. UNEP and the Council of Europe together provide the secretariat for PEBLDS. The Strategy provides a framework to promote a consistent approach and common objectives for national and regional action to implement the Convention on Biological Diversity (UNEP/ECNC 2000).

Ministers of Environment at the Aarhus Ministerial Conference recognized that land use had a strong impact on biological and landscape diversity and they agreed to take initiatives to integrate

biodiversity considerations into the agricultural sector within the EU enlargement and transition processes. In that regard the Ministers welcomed the proposal by the Biodiversity Strategy Council to organize a ministerial conference on agriculture and environment.

As a follow-up, a Pan-European Conference on Agriculture and Biodiversity: Europe and their impacts on biological diversity and landscape towards integrating biological and landscape diversity for sustainable agriculture in Europe, is planned to be held in France in 2002. The Conference is expected to develop recommendations to governments on integrating biodiversity considerations into agricultural and land-use policies and to come up with proposals on a possible ministerial conference on agriculture and environment in 2004.

Environmental Performance Reviews

Originated in the context of the OECD in 1991, Environmental Performance Reviews (EPRs) assess a country's efforts: to reduce its overall pollution burden and manage its natural resources; to integrate environmental and socio-economic policies; to strengthen cooperation with the international community; to harmonize environmental conditions and policies throughout Europe and North America; and to contribute to sustainable development (OECD, 1996 +1997; UNECE web-site). At the Lucerne Ministerial Conference "Environment for Europe," the Ministers requested UNECE to extend Environmental Performance Reviews to the countries in transition. OECD has completed its first round of EPRs for all of its member States and, in cooperation with UNECE, for Poland (1994), Bulgaria (1995), Belarus (1997) and the Russian Federation (1999). UNECE has concluded EPRs for Estonia (1995), Slovenia (1997), Latvia, Lithuania and Republic of Moldova (1998), Ukraine and Croatia (1999), Armenia, Bulgaria (Second Review), Kazakhstan and Kyrgyzstan (2000). The expert reviews for Estonia (Second Review), Romania and Uzbekistan have been finalized, and these countries will undergo their Peer Reviews in September 2001.

Assessment missions are undertaken by a team of international experts upon the request of the reviewed country. Harmonization of policies in the region is one of the main objectives of the programme. The primary vehicle for this is the Peer Review process that takes place at the intergovernmental level. In the case of both ECE and OECD, all Member States of the two respective bodies carry out the intergovernmental Peer Review.

EAP Task Force

Among the main outputs of the EfE Process was the Environmental Action Programme for Central and Eastern Europe (EAP), guided by the EAP Task Force. Primarily developed under the auspices of the World Bank, the EAP was formally adopted at the Lucerne EfE meeting in 1993. The EAP Task Force cooperates closely with the Project Preparation Committee (PPC) (see also section VII B 3). Among its key recommendations, the EAP established the three-pillar approach to targeted expenditures, including the development of environmental policies, institutional framework, and economic incentives.

The EAP serves as a framework for supporting countries-in-transition in their efforts to solve their most urgent environmental problems and to create the basis for sustainable development. The Work Programme of the Task Force consists of four core activities: helping Central and Eastern European countries (later extended to the NIS) to develop national environmental action plans (NEAPs); running training programmes; involving the private sector; and improving the management of priority conservation areas. The EAP Task Force brings together environmental representatives from all CEE countries, the NIS and Organization for Economic Development and Cooperation (OECD) countries, as well as international organizations, financial institutions, parliamentarians and social partners — the enterprise sector, trade unions and environmental citizens organizations.

Other Issues

Other issues related to the Environment for Europe process, such as the Environment and Health process (Integration of Environmental Policies with sectoral policies), the Aarhus Convention (public participation) and the Project Preparation Committee (financing) are discussed in following sections.

2. Sustainable Development Programmes of the European Union

In June 2001, the Gothenburg European Council took up the issue of adopting a long-term strategy for “economically, socially and ecologically sustainable development”, in response to a request from the Helsinki European Council in December 1999. The Council conclusions for Gothenburg, as agreed by the Permanent Representatives Committee on 29 May 2001, are included in the box below.

Key themes and desired outcomes of the Gothenburg European Council

The Summit could, inter alia,

- Reaffirm the International Development Targets and Millennium Declaration goals and take steps to ensure their integrated and coherent implementation, including the effective use of all sources of funding.
- Commit developed countries to change their unsustainable production and consumption patterns.
- Ensure that the agenda of the Summit deals with all aspects of sustainable development in a balanced way.
- Consider poverty eradication and promotion of sustainable consumption and production patterns as overriding objectives for the Summit.
- Ensure that a gender perspective permeate all its preparations.
- Focus on operationalizing implementation of Agenda 21 and other outcomes of UNCED through concrete and practical measures. The idea of a “new global deal or pact” between North and south, involving all relevant stakeholders, could be further explored.

Four areas are of particular concern to the EU. The following elements have been identified based on the Commission communication and should be seen as a firm preliminary contribution to the forthcoming dialogue with partners on possible main themes:

- Protecting the natural resources base of economic and social development
- Integrating environment and poverty eradication
- Making globalization work for sustainable development
- Enhancing good governance and participation

The Council recalls the commitments made in Rio by all countries to implement Agenda 21, including through the provision of new and additional resources to support developing countries, and it calls on all developed countries to reach, as soon as possible, the agreed United Nations target for ODA of 0.7 per cent of GNP, to which the EU and its Member States are committed.

Source: EU Council Conclusions on the Preparation of the World Summit on Sustainable development, Brussels, 30 May 2001.

The EU Environmental Action Programmes, used by the EU since 1973, also provide an important means to harmonize environmental policies for EU member States and applicant countries. Shortly after UNCED, in 1993, the EU adopted its Fifth Environmental Action Programme, covering the period to the end of 2000.

The recently adopted Sixth EAP, entitled “Environment 2010: Our Future, Our Choice,” identifies four priority areas: climate change, nature and biodiversity, environment and health, and natural resources and waste. The integration of environmental concerns in sectoral policies has high priority in the EU. It is one of the five “key approaches” for environmental protection in the 6th EAP of the EU.

The EU prepares other integrative policies in a number of areas under its concern. Two examples are the EU Common Agricultural Policy and the European Spatial Development Perspective. Other

recent EU initiatives are linked to the economic and social pillars of sustainable development, e.g. Luxembourg on employment, Lisbon on the strengthening of employment, economic reform and social cohesion, and, more recently the development of a Social Policy Agenda for the EU. There are also integrative policy developments in the fields of transport and energy.

3. The North American Free Trade Agreement (NAFTA)

The North American Free Trade Agreement (NAFTA) entered into force in Canada, the United States and Mexico on January 1, 1994. Designed to foster increased trade and investment among the partners, NAFTA contains an ambitious schedule for tariff elimination and reduction of non-tariff barriers, as well as comprehensive provisions on the conduct of business in the free trade area. At the same time the parties adopted The North American Agreement on Environmental Cooperation (the so-called "Environmental Side Agreement" or "NAAEC") As the integration of trade and environment policies is an increasingly significant focus of global strategies, the NAAEC stands as one of the more influential factors for harmonization in this field. It also represents one of the highest achievements of a subregional (North American) approach within the UNECE region.

The Commission for Environmental Cooperation (CEC) is an international organization created by Canada, Mexico and the United States under the NAAEC. Among its core objectives is to advance the understanding of the relationship between the environment, the economy and trade, to encourage cooperation among the three Parties in promoting an integrated approach to environmental protection, and to help avoid environment and trade conflicts.

The Environment, Economy and Trade Programme

The *Environment, Economy and Trade Programme* area supports the goals of NAAEC to:

- Promote sustainable development based on cooperation and mutually supportive environmental and economic policies;
- Support the environmental goals and objectives of NAFTA;
- Avoid creating trade distortions or new trade barriers;
- Promote economically efficient and effective environmental measures;
- Promote "win-win" opportunities for achieving environmental and economic development objectives.

The principal goal of the "Financing and the Environment Project" is to encourage mutually beneficial, cooperative partnership between the private financial services sector in North America and community, environmental and other groups that support environmental protection and sustainable development. Among the priorities of the project is to arrange a dialogue between selective representatives of the North American commercial and investment banking sector (and related insurance, pension funds and other activities) and those representing the environmental agenda, to attempt to identify trends in environment-related financing, including the development and use of innovative financing products, opportunities and partnerships in specific areas, such as the mechanisms of the Kyoto Protocol, biodiversity, and environmentally sound merchandise and services.

4. Pan-European Economic and Security Cooperation through OSCE

The Organization for Security and Cooperation in Europe (OSCE) plays an important role in contributing to harmonization of environmentally sound and sustainable development policies. Economic and environmental matters have always been a part of the OSCE agenda, operating on the premise that promoting economic prosperity and cooperation on environmental problems can contribute to peace, prosperity and stability.

Interdependence of peace, security, environment and economy

In the Helsinki Final Act, the States expressed their conviction that "efforts to develop cooperation in the fields of trade, industry, science and technology, the environment and other areas of economic activity contribute to the reinforcement of peace and security in Europe, and in the world as a whole". These issues constituted basket II of the Helsinki Final Act, in which the participating States agreed, inter alia, to take the necessary measures to bring together environmental policies.

OSCE facilitates the formulation of economic and environmental policies and initiatives to promote security in the OSCE area, particularly in countries-in-transition by (a) organizing conferences and seminars on economic and environmental matters; (b) promoting the articulation of and adherence to shared standards and norms for economic and environmental behaviour; and (c) developing and intensifying contacts with relevant international organizations.

As one of the key fora for discussion of issues related to human rights and democratization, the OSCE (and its precursor organization the CSCE) has been the sponsor of several critical pan-European meetings with environmental themes. At the Lisbon Summit in December 1996, the Heads of State called on the OSCE to "focus on ways of identifying the risks to security arising from economic, social and environmental problems, discussing their causes and potential consequences, and draw the attention of relevant international institutions to the need to take appropriate measures to alleviate the difficulties stemming from those risks." In 1997, the Permanent Council established the post of coordinator of OSCE Economic and Environmental Activities to strengthen the OSCE's ability to address economic, social and environmental aspects of security.

C. Key International Processes for Integration of Environmental Policies with Sectoral Policies

Integration of the environment and social policies to sectoral policies and strategies is the most important pre-condition of effective implementation of environmentally sound and sustainable development principles. However difficult this is at a national level, it is even more difficult at the international level. Nonetheless, a number of integration processes are underway within the region, through negotiation and implementation of legal instruments, intergovernmental and interagency initiatives and mechanisms of cross-sectoral integration in a transboundary context. Among these are regional initiatives for:

- Environment and health;
- Transport and environment;
- Transport, environment and health;
- Transport, environment and land use;
- Environment and forestry;
- Environment and agriculture; and
- European spatial development;

as well as such sub-regional initiatives as:

- Mediterranean 21
- Baltic 21
- the Stability Pact for South Eastern Europe.

1. Key Regional Initiatives

Environment and Health

The Pan-European process on health and environment creates an international framework to improve environmental and health protection in the whole region. Aside from Governments, the process also involves major inter-governmental organizations and financing institutions. Within the "Health and Environment" process three Pan-European Ministerial Conferences have been held in Frankfurt a/Mein (1989); in Helsinki (1994); and in London (1999).

The most recent, London, Conference, adopted three important agreements:

- a Protocol on Water and Health to the Convention on Protection and Use of Transboundary Watercourses and International Lakes;
- the London Charter on Transport, Environment and Health and
- the London Declaration.

The obvious link between NEHAPs and the National Environmental Action Plans (NEAPs) under the EfE process was strengthened at the London Conference in 1999. This Ministerial Conference was the biggest political event on environment and health ever held in Europe; more than 70 ministers of health, environment and transport attended it from 54 countries.

The London Conference called also for invitation of the NIS countries to actively participate in the Environmental Health Action Plan.

The fifth Ministerial Conference will be held in Budapest, Hungary in 2004 under the overriding issue of "sustainability in environment and health in Europe."

Transport and Environment - Vienna Programme of Joint Action on Transport and the Environment

Agenda 21 identifies transport as a key priority of action both at the national and international levels. In response, UNECE launched a preparatory process that integrated environment and transport that led to the Regional Conference on Transport and the Environment in Vienna, in November 1997. This was the first international forum that brought together Ministers and high-level officials of both the transport and environment sectors.

The Vienna process set a basis for an integrated approach to dealing with the challenges related to transport and the environment throughout the region. The Conference adopted the Vienna Declaration by which governments in the region committed themselves to achieving commonly agreed objectives for making transport sustainable for environment and health.

Objectives have been divided into seven main fields of activities which include: policy action towards sustainable development; promoting energy efficient and less polluting vehicles and fuels; promoting efficient and sustainable transport systems, protection of sensitive areas; promoting sustainable urban transport; promoting safe transport of dangerous goods and promoting the prevention of water pollution. The specific activities to be carried out to meet these objectives both at the national and international levels have been outlined in the Programme of Joint Action (POJA) (UNECE/RCTE/CONF./2/FINAL).

Progress is assessed annually. The Vienna process was strengthened in June 2000 through the creation of an ad hoc expert group on transport and the environment, which held its first session at the end of February 2001.

Transport, Environment and Health

Responding to the results of a questionnaire, the World Health Organization proposed that the Third Ministerial Conference on Environment and Health (London, June 1999) take up the question of transport and examine the possibility of developing a Charter on Transport, Environment and Health, which was subsequently negotiated and adopted.

The London Charter requests a number of specific transport, environment and health related “products”, which should be delivered by the fourth environment and health conference (Budapest, 2004). UNECE and WHO were requested to provide an overview of relevant existing agreements and legal instruments as well as to recommend further steps needed to make transport sustainable for health and the environment.

The Ministers in London felt the need to improve and harmonize the implementation of existing agreements and legal instruments and to further develop them as needed. They judged it appropriate to consider the possibility and feasibility of a new agreement. On 4 May 2001, a High-level Meeting on Transport, Environment and Health met in Geneva to consider further action.

See also section III B for transport as a driving force in development.

Possible framework convention on transport, environment and health

The High-level Meeting on Transport, Environment and Health, on 4 May 2001, inter alia,

welcomed the assessment of priorities for further work identified in the Synthesis Report, especially (a) the integration of the transport, environment and health sectors, in particular in relation to decision-making processes, monitoring and impact assessment, (b) transport-related environment and health problems in urban areas, applicable to a great extent to sensitive areas, as well as to transport corridors with heavy traffic and major transport infrastructure, and (c) the needs and role of pedestrians and cyclists participating in transport; and

decided that further preparatory work to be able to decide whether to start negotiations of a Framework Convention, including the specific task of identifying the possible elements of such an instrument, shall be carried out at the international level by a tripartite task-force to be established within the framework of the London and Vienna follow-up processes, as soon as possible. NGOs and other stakeholders will be invited as observers to the meetings of this task force. A progress report on this tripartite process should be submitted to regional ministerial meetings (such as the regional preparatory meeting for the Johannesburg summit in September 2001). Further decision should be taken at the second High Level Meeting on Transport, Environment and Health to be convened in 2002, prior to the Johannesburg summit.

Transport, Environment and Land Use

As a follow-up to the joint Workshop on Encouraging Local Initiatives Towards Sustainable Consumption Patterns, held in Vienna in 1998, the two UNECE Committees on Environmental Policy and on Human Settlements, in their respective sessions in September 1999, decided to develop jointly a project on urban transport patterns and land-use planning, integrating land-use and local transport policies, strategies and plans across all policy areas and all levels of decision-making. Land-use and local transport policies are linked to policies on health, environment, economy, education and social welfare, as well as to national and regional policies.

It is anticipated that this work will result in the preparation of guidelines for governments on a strategic approach to integrating urban transport management with land-use planning and environmental policies. The Guidelines could be presented to the Fifth Ministerial “Environment for Europe” Conference, in Kiev in 2003.

Environment and Forestry - Ministerial Conferences on the Protection of Forests in Europe (MCPFE)

The first Ministerial Conference on Protection of Forests in Europe (Strasbourg, 1990) began the new approach to sustainable development and forestry management. This Conference undertook certain important decisions related to monitoring of forest ecosystems, protection of forest genetic resources, and establishment of adequate databases and a European research network. The Conference also adopted a "General Declaration" urging Governments to promote close cooperation in the area of forests protection. The Conference established a General Coordinating Committee, consisting of representatives of four countries.

Subsequent to the 1990 Strasbourg Conference, two additional Conferences took place: Helsinki, 1993 and Lisbon, 1998. The next, fourth, Pan-European Ministerial Conference on Forests in Europe will be held in Vienna in 2002.

This process also provides a good example of the linkages between various integration processes, in this case with the PEBLDS. At its first meeting, in May 1996, the Council for PEBLDS decided to contact the PFE ministerial process in order to evaluate the possibilities for collaboration on "Forest Ecosystems." This initiative resulted in 1998 in a joint "Work Programme on the Conservation and Enhancement of Biological and Landscape Diversity in Forest Ecosystems," endorsed at the PFE ministerial meeting in Lisbon and the EfE ministerial meeting in Aarhus (for forest policy issues see also sections IV A 4 and 5)

The Montreal Process for Sustainable Forest Management in Temperate and Boreal Forest Countries has adopted seven criteria for measuring progress in the area of environment and forestry. These criteria include: conservation of biological diversity, maintenance of productive capacity of forest ecosystems, maintenance of forest ecosystem health and vitality, conservation and maintenance of soil and water resources, maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies, and a legal, institutional and economic framework for forest conservation and sustainable management.

Environment and Agriculture

The interrelationship of agriculture and the environment is at the top of the agendas of both economic and environmental organizations. Agricultural issues were discussed at the third (Sophia) and fourth (Aarhus) Ministerial Conferences "Environment for Europe". A strong interest in agriculture is also shown by IUCN, which issued a "Background Study for the development of an IUCN Policy on Agriculture and Biodiversity" (see also section III D on agriculture as a driving force in development).

The European Commission has been notably active in shaping and harmonizing the agriculture and environment process in the region, particularly with respect to its planned reform of the EU Common Agricultural Policy (CAP) of 1992. In the Agenda 2000 reform, agri-environmental programmes and other measures in favour of environment in rural areas, became part of a comprehensive rural development regulation (1257/99), which became the second pillar of the CAP. The CAP reform is also connected with the coming enlargement of the EU. The European Commission has issued two important documents on sustainable agriculture: "Directions Towards Sustainable Agriculture", and "Indicators for the Integration of Environmental Concerns into the Common Agricultural Policy".

In the area of integration of environmental concerns to agricultural policies, strategies and programmes, the OECD has done significant work. Two OECD Committees, namely Environmental Policy Committee (EPOC) and the Committee on Agriculture (CA) have established a Joint Working

Party to analyse, discuss and design a new instrument, guidelines and measures to monitor progress in sectoral integration. One of the most important activities of JWP is its work on agri-environmental indicators.

2. Examples of Sub-regional Approaches – from the Baltics to the Balkans

A number of harmonization initiatives exist on the subregional level. These include sub-regional MEAs to create protection regimes based on shared natural resources, for example, agreements concerning the Baltic Sea, the Mediterranean Sea, the Danube River Basin, the Rhine River Basin, and others. Furthermore, neighbouring countries often pool efforts into sub-regional implementation plans and programmes. Institutional arrangements and bodies for coordination of financial assistance are also found on the subregional level in the UNECE region. Two illustrative examples are presented here. The first – Baltic 21 and HELCOM -- demonstrates cooperation among subregional states for meeting specific policy targets. The second – REReP – demonstrates a coordinated international effort to address comprehensively a sub-region in a critical situation.

Baltic 21 and HELCOM

An “Agenda 21 for the Baltic Sea Region - Baltic 21” was adopted at the 7th Ministerial Session of the Council of the Baltic Sea States, Nyborg, June 22-23, 1998 on the basis of a mandate from the Heads of Government of the region and the meeting of Ministers for Foreign Affairs of the Baltic Sea Region, within the framework of the Council of the Baltic Sea States (CBSS), including the European Union. For the Russian Federation only the northwestern part is included. The Ministers of Environment officially launched Baltic 21 in October 1996 by the Saltsjöbaden Declaration. Ministers responsible for spatial planning in the BSR also decided to concentrate work on sustainable development, and in particular to integrate relevant activities with the Baltic 21 process.

The emphasis of Baltic 21 is on regional harmonization of sustainable development policies, focussing on the integration of seven sectors of crucial economic and environmental importance in the region: Agriculture (HELCOM and Sweden), Energy (Denmark and Estonia), Fisheries (IBSFC), Forests (Finland and Lithuania), Industry (Russian Federation and Sweden), Tourism (Estonia, Finland, Baltic Sea Tourism Commission) and Transport (Germany and Latvia).

The Helsinki Convention on the Baltic Sea provides a positive example of a relatively effective sub-regional agreement. Under the Baltic Sea Convention, a strong commission, HELCOM, has been vested with power to make recommendations for adoption of specific legislative measures to be taken by the states parties. HELCOM’s strength leads to excellent coordination among the relevant authorities and institutional structures within the states parties.

While the Baltic Sea Convention provides a good example for the design of institutions and mechanisms, its very success emphasizes the difficulty of achieving real improvement in environmental conditions. Problems in the Baltic Sea region are still significant, and the first steps towards improvement of the environment arising out of this agreement have only recently been achieved. While construction of wastewater treatment plants contributed to an overall reduction of biological oxygen demand (BOD) between 1991 and 1994, phosphorus and nitrogen emissions actually increased. But in some countries in transition in the Baltic region improvements in compliance have been significant, due not only to economic changes, but also to greater transparency, better attitudes towards international cooperation and a renewed sense of willingness. After the ratification of the 1992 Convention by the Russian Federation and its entry into force in January 2000, the revisions to the previous 1974 Agreement can be put into practice, opening new doors for the effective protection of the Baltic. For details on the Baltic Sea, see also section IV A 8.

Nordic Strategy on Sustainable Development

In November 1998, the Nordic Prime Ministers and the political heads of the self-governing areas of the Faeroe Islands, Greenland and the Åland Islands adopted a Declaration on a Sustainable Nordic Region. The declaration called upon the Nordic Council of Ministers to prepare a cross-sectoral strategy for the Nordic region and the adjacent areas.

The strategy "Sustainable Development – New Bearings for the Nordic Countries" was adopted by the Nordic Prime Ministers and the Nordic Council and came into force January 1 2001. The strategy contains the long-term goals of the Nordic countries for sustainable development up to 2020, together with an action plan for the period 2001-2004.

The strategy focuses on efforts to integrate environmental considerations and sustainable development in six sectors: energy, transport, agriculture, business and industry, fisheries, and forestry. The principle of integrating environmental considerations and sustainable development into all sectors will be developed further.

Initially, five essential cross-sectoral issues have been included in the strategy: climate change, biological diversity, the sea, chemicals, and food safety. Additionally, the strategy entails initiatives to strengthen public participation in activities promoting sustainable development, local Agenda 21 activities and initiatives to promote the knowledge base, cooperation on instruments, and resource efficiency. The strategy also points to special initiatives related to the areas adjacent to the Nordic countries.

The Nordic countries will assess implementation of the Strategy and propose by 2004.

The contribution of UNEP ROE to harmonization: a focus on countries in transition

UNEP's Regional Office for Europe promotes environmentally sound and sustainable development in Europe through policy integration and regional and sub-regional initiatives mainly targeted at countries with economies in transition. Through the provision of assistance for the implementation of global commitments, in particular the MEAs in the region, UNEP contributes to institutional strengthening and capacity building in the region. It has in the past developed regional Seas conventions for the Mediterranean and the Black Sea, and is presently facilitating the negotiation of a Framework Convention for the Protection of the Marine Environment of the Caspian Sea within the context of the comprehensive Caspian Environment Programme funded by the Global Environment Facility. These programmes have resulted in a stronger focus on the countries with economies in transition. Technical assistance is provided in particular for the implementation of the Basel Convention, the Ozone Convention and Montreal Protocol, for training in integrated management of chemicals and in information systems development through the Global Resource Information Data Base (GRID) and the Environment and Natural Resource Information Networks (ENRIN), now established in most countries in transition.

UNEP has taken on tasks in particularly complicated areas, including the Balkans (through UNEP Balkans). Working in collaboration with other organizations including UNECE, IUCN, the REC, OSCE and NRECs, UNEP ROE has promoted the extension of harmonization initiatives into remoter parts of the UNECE region, for example, the Russian Far East, the Caucasus and Central Asia. A significant part of these harmonization initiatives has been focused on support to the implementation of biodiversity-related conventions and the Aarhus Convention. By linking global and regional perspectives in a single partnership with unique capacities, these initiatives assist CITs in moving towards environmentally sound and sustainable development, for example in helping them to develop plans, programmes, policies and legislation to meet international obligations and reach policy goals.

The Stability Pact for South Eastern Europe

On 10 June 1999, at the EU's initiative, the Stability Pact for South Eastern Europe was adopted in Cologne. In the founding document, more than 40 partner countries and organizations undertook to strengthen the countries of south Eastern Europe "in their efforts to foster peace, democracy, respect for human rights and economic prosperity in order to achieve stability in the whole region." The Stability Pact is the first serious attempt by the international community to replace the previous,

reactive crisis intervention policy in South Eastern Europe with a comprehensive, long-term conflict prevention strategy. Reorienting the region towards sustainable development is an important element of the programme.

Among the important environmental issues that play a role in the return of stability to the South East European region are the protection of shared natural resources such as the Danube River and the Adriatic Sea as well as the rich biodiversity of the region, impacts of mass movements of refugees, threats to natural resource, coastal zone and protected area management due to breakdowns in previous structures, and economic disruption leading to uncontrolled exploitation of forest resources. In an effort to stabilize these elements and to harmonize the subregion's redevelopment with pan-European trends, a Regional Environmental Reconstruction Programme has been developed.

Regional Environmental Reconstruction Programme (REReP)

In January 2000, the Ministers of Environment of the South Eastern European countries in Skopje, the former Yugoslav Republic of Macedonia stated that "the comprehensive reconstruction process within the framework of the Stability Pact offers a unique opportunity to integrate environmental and human health concerns into the economic sectors and forthcoming infrastructure projects, thus implementing the concept of Sustainable Development," and they endorsed a Regional Environmental Reconstruction Programme for South East Europe (REReP). By targeting institutional and civil society reforms, the programme aims to create the conditions for sustainable environmental improvements in this region. The programme consists of the following priority components:

- institutional strengthening and policy development;
- environmental civil society building
- emergency assistance for combating war damage
- support to priority national and local environmental projects
- reinforcement of existing cooperative mechanisms and structures and development of regional cross-border projects.

D. Conclusions

The period around the Earth Summit was characterized in the UNECE region by a series of actions aimed at establishing frameworks for transboundary cooperation in a number of areas. These included integration of environmental and development concerns, preventing and responding to industrial accidents, and protecting and regulating transboundary waters, and were carried out largely through the mechanism of regional MEAs. Since then, MEA efforts have gradually moved away from the transboundary context towards establishing Europe-wide domestic norms for addressing certain problems. These have included an instrument on water and health and a convention on access to information, public participation and access to justice in environmental matters, and are continuing in other areas such as strategic environmental assessment and pollutant release and transfer registers. Public participation-related initiatives increased substantially beginning around 1994, partly due to increasing understanding of the links among environmental civil society, democratization and market reforms in the countries-in-transition. Progress on addressing air-related issues has been substantial, due to the effective and long-standing framework of the Convention on Long-Range Transboundary Air Pollution. Other specific agreements, such as NAAEC, introduce new perspectives in integrating sustainable development in various fields. In addition the region made significant contributions to the development and promotion of global MEAs, particularly in fields such as biodiversity and nature protection and hazardous waste transport.

The "Environment for Europe" process represents an innovative and highly productive forum for coordination of efforts to harmonize environmentally sound and sustainable development policies on a pan-European level. By taking advantage of an historical opportunity to establish a pan-European dialogue, it has fulfilled several functions, including the establishment of institutional arrangements for coordination of assistance, adoption of new MEAs and pan-European strategies, evaluation of environmental performance, and outreach to related interministerial processes for integration of

environmental and sectoral policies. With respect to the latter, the region is home to a number of significant integration processes relating to transport, health, forestry, agriculture, land use and spatial planning. EU integration and EU enlargement are strong forces for harmonization of policies. The overall process of harmonization has been served by several institutional arrangements and international organizations, some of which have been established in flexible forms specifically to address the special characteristics of environmentally sound and sustainable development in the context of transition. Relevant bodies include UNECE, UNEP, and other specialized agencies of the United Nations, OECD, the EAP Task Force, the Council of Europe, OSCE and the regional environment centres. Regional efforts are mirrored at the subregional level.

A number of complex problems currently dominate harmonization efforts. Some of these involve multi-track processes well under way, such as the development of environmental civil society boosted by the adoption of the Aarhus Convention in 1998. Some quite significant problem areas, however, are still in early stages of development on the regional stage.

VII. FINANCING SUSTAINABLE DEVELOPMENT IN THE ECE REGION

A. Financing Sustainable Development from National Sources

It is generally agreed that development, based on economic growth, should be self-financing, driven by market forces and competitiveness. The situation may be different in the case of sustainable development where environmental and social problems are not clearly related to market forces. While in the Western countries of the region, the “polluter and user pay” principle can be implemented (though not always so easily) without government financing and where the labour market is well developed, in the transition countries interventions seem still to be indispensable.

Even in highly industrialized countries of the region, direct subsidies or indirect assistance in the form of tax and custom exemptions or rebates are still in use to support weak sectors or environmentally friendly activities within specific programmes. These are also needed in the much economically weaker CEE countries and NIS, which are trying simultaneously to combat the political, economic and social problems related to their transition and heavy environmental degradation.

An instrument that was introduced in almost all transition countries from the beginning of their transition period is the system of environmental funds. This system has been developed in different ways across the UNECE region. Actually almost all transition countries have well-established environmental funds that support environmental investments. Environmental funds in the EU candidate countries usually have the status of independent legal entities, while, in the NIS countries, they tend to be located within the structure of Ministries of the Environment. Most of the environmental funds in the EU candidate countries are replenished directly by environmental fees and fines, while the funds in NIS are supplied from state budgets. The disadvantage of the latter is that they are dependent upon changing government policy and budgetary needs and the unpredictability of available resources and therefore cannot perform as long-term investments.

Environmental Protection Fund in Bulgaria

In 1992, a National Environmental Protection Fund (NEPF) was established in Bulgaria. Initially, a tax on imported used cars was the Fund's main source of income. From 1996, taxes on imported fuel progressively became the Fund's main source of income. In 2000, a new product tax was introduced on all kinds of tires, except for airplanes, and revenues from privatization were received until the end of 1998. The Fund also receives pollution charges, fines and fees.

Bulgaria also created a National Trust Ecofund in 1996 to manage funds under debt-for-nature and debt-for-environment swaps, as well as funds provided under other types of agreements with international or national sources.

Source: EPR of Bulgaria, Second Review, 2000

In the EU candidate countries the share of environmental funds in financing environmental investments do not exceed 50 per cent (in Poland 30 per cent) of total investment costs; the balance of costs is covered by other sources such as commercial loans and private investor resources. The share of external assistance in Poland has never exceeded 5 per cent of total costs of environmental protection investments. In the majority of the transition countries, external funds are provided in the form of “soft” loans rather than grants.

In the NIS countries, particularly those least developed in Central Asia and the Caucasian region, foreign assistance, largely provided by the World Bank, TACIS, UNDP, the Know-How Fund and bilateral agreements, is very often the only or major source of financing for environmental investments. These countries are still not able to mobilize their own resources from state and local budgets or from FDI.

While financing of environmental investments in Western countries is well balanced and based on market forces, the CEE countries still need assistance not only from their own environmental funds but also from abroad, as "seed" money used to mobilize other funds; the NIS countries depend on foreign assistance almost 100 per cent.

B. International Financing for CEE Countries and NIS

1. Foreign Direct Investment

The inflow of capital into transition countries began immediately in 1989-1990, but it has never been evenly or widely distributed among the CEE countries and NIS. Until 1995, almost half of the US\$ 23.2 billion of direct foreign investment in the subregion was channelled to Hungary, which alone received more than all of the NIS together. The situation changed somewhat during the second decade, but FDI has played an important role only in the Czech Republic, Hungary and Poland, which together received nearly three quarters of all FDI in central and eastern Europe, in the Baltic States and Slovenia. (Berand in Economic Survey of Europe, 2000, No. 2/3) For the other countries in the subregion, FDI has not played a significant role in their development.

Foreign direct investment in CEE countries

During the last years of the decade, annual foreign investment reached 3-4 per cent of the GDP of the favoured countries, while in the Russian Federation it remained at only a fraction of 1 per cent. Hungary and Estonia were in the lead, with 39 and 35 per cent, respectively. The Czech Republic and Latvia surpassed the world average of 15 per cent. Slovenia and Lithuania are on the world average, while the Balkan countries' stock of foreign direct investment reached only 5-6 per cent of their GDP.

Source: Berand, Economic Survey of Europe

As can be seen from the Table, below, the vast majority of FDI flows between OECD countries. In 1990, CEEC and NIS countries were only 0.2 per cent of total world share of FDI; by 1998, this had increased to 1.1 per cent.

OECD foreign direct investment outflows by region

	In US\$ million			Percentage of Total		
	1990	1995	1998	1990	1995	1998
WORLD	235,845	324,744	571,707	100	100	100
<i>Of which</i>						
OECD countries	189,121	267,262	453,765	80.2	82.3	79.4
NON-OECD countries	46,724	68,698	117 943	19.9	21.2	20.6
<i>Of which</i>						
Africa	823	2,972	8,304	0.3	0.9	1.5
Asia*	12,651	25,371	26,225	5.4	7.8	4.6
Europe*	410	2,221	6,062	0.2	0.7	1.1
Latin Am. & Caribbean*	18,948	22,622	53,045	8.0	7.0	9.3
Near & Middle East	1,056	1,365	4,107	0.4	0.4	0.7
Unallocated	12,821	14,154	20,200	5.4	4.4	3.5

**excluding OECD countries*

Source: Compiled from OECD (1999)

Total Net Resource Receipts

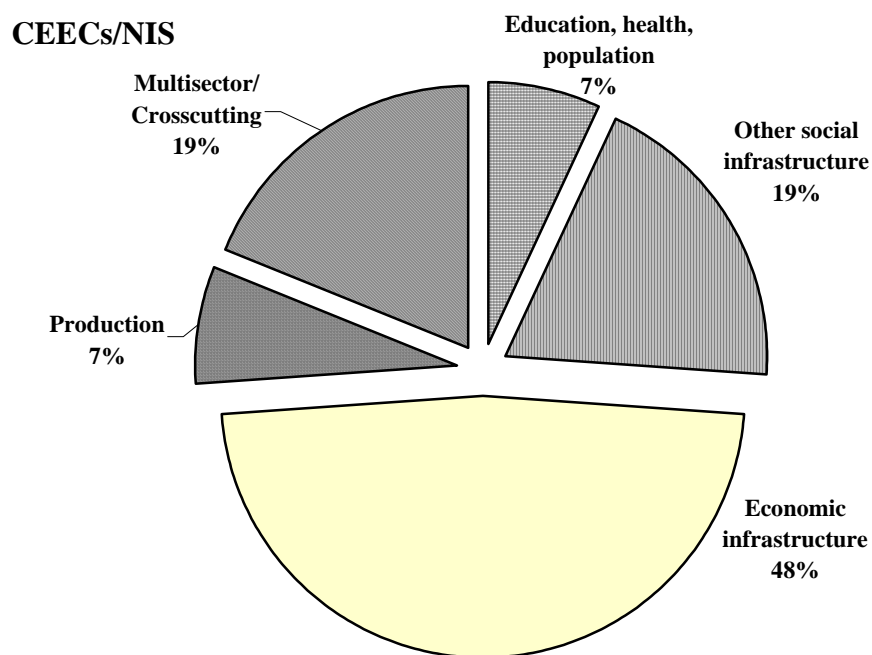
Total net receipts of external resources by the ten countries of Central and Eastern Europe and the twelve New Independent States in 1996 amounted to US\$ 24.9 billion, which, in constant prices and exchange rates, was seven per cent lower than in 1995. Almost three-quarters of the net receipts were on non-concessional terms compared to less than two-thirds in 1995. In 1996, private flows trebled compared to 1995, reaching US\$ 9.8 billion and 57 per cent of total net receipts by CEE countries

and NIS, while official flows at market terms declined sharply to US\$ 1.2 billion. Non-concessional resources from multilateral institutions fell almost ten per cent to US\$ 7.2 billion in 1996. As in previous years, the more advanced countries obtained most of the resources. The Russian Federation alone obtained over one-third of total net receipts. Poland and the Czech Republic came next with fifteen per cent and twelve per cent respectively. (OECD, Aid and Other Resource Flows to CEEC and NIS, 1990-1996)

2. Bilateral Official Development Aid and Official Assistance to CEEC and NIS

As a ratio of GNP of the donor countries, aid disbursements to CEE countries and NIS declined in 1996 to 0.03 per cent. This average was the result of large differences among the OECD Member countries, ranging from 0.10 per cent to zero. The largest aid effort in relation to GNP was made by Austria, Sweden, Denmark and Germany. Over the period 1990 to 1996, Germany was the most important bilateral aid donor (37 per cent of the OECD total), and the United States was second largest (22 per cent of OECD total). Other relatively large donor countries were, in order of magnitude, France (7 per cent), Italy and the United Kingdom (5 per cent). (OECD, 1990-1996)

Aid by sector (as percentage of bilateral sector allocable ODA)



Source: OECD, Creditor Reporting System.

In 1996, the Russian Federation received almost one-quarter of OECD aid. In 1998 it was still receiving the largest amount, but its overall share had dropped to approximately fourteen per cent. Referring to the Table, below, the top ten recipients of ODA and OA were, in order: Russian Federation, Poland, Czech Republic, Ukraine, Romania, Bulgaria, Albania, Hungary, Kyrgyzstan and Kazakhstan.

3. Multilateral disbursements

Project Preparation Committee

The Project Preparatory Committee (PPC) was established by the Lucerne Ministerial "Environment for Europe" Conference to seek funding and other support for specific initiatives and to facilitate cooperation between international financing institutions and donors to accelerate environmental investment in the region. The purpose of the Committee is to increase the impetus of Western environmental assistance in Eastern Europe. The PPC is made up of representatives of the major donors and international financing institutions involved in environmental assistance in Eastern Europe. One of the PPC's key achievements has been in the area of matching grants programmes from donor countries with loans from multilateral development banks (see below). The PPC was credited with facilitating 26 environmental infrastructure projects worth a total of 1.2 billion ECU between the Lucerne and Sofia meetings. In total, the PPC has implemented and matched environmental investment funds in the countries of Central and Eastern Europe and the NIS of over 4 billion ECU. The PPC secretariat is located at the European Bank for Reconstruction and Development in London.

The European Bank for Reconstruction and Development

The transition process in Eastern Europe gave birth in 1991 to the European Bank for Reconstruction and Development, a special lending institution established "to foster the transition towards open market-oriented economies and to promote private and entrepreneurial initiative in the central and eastern European countries." The EBRD has emerged as an important factor in the determination of law and policy in many Eastern European countries. Environmental protection and sustainable development is one field in which the EBRD has had an impact. The founding document for the EBRD requires it "to promote in the full range of its activities environmentally sound and sustainable development." The inclusion of such a provision for the first time in the founding documents of any international financial institution not only represents a kind of natural evolution of such institutions, but also has occurred in recognition of the special conditions entailing in Europe. The role of the EBRD in assisting in redevelopment, as opposed to development, reflects the necessity to reorient a highly developed industrial economy.

The EBRD has also attached its environmental policy to promoting the objectives of emerging international environmental legal norms and legal instruments. For example, the Bank requires certain loan recipients to undertake an elaborated form of environmental impact assessment, based upon the principles of the UNECE 1991 Convention on Environmental Impact Assessment in a Transboundary Context.

The various ways in which the EBRD promotes environmentally sound and sustainable development are described in the Bank's Environmental Policy. One specific step taken by the Bank is to ensure that all of its investment and technical cooperation activities undergo environmental appraisal as part of the overall financial, economic, legal and technical due diligence which is carried out.

Each year, the EBRD invests about US\$ 3 billion in over 100 projects. Including the investments made by sponsors of these projects and other financial investors, the total investment in Bank-supported projects amounts to about US\$ 10 billion per year. This figure corresponds to roughly 5 per cent of total fixed investment in the Bank's countries of operations.

The World Bank

Almost ten per cent of the World Bank's investment portfolio was devoted to projects with primarily environmental objectives, representing approximately US\$ 6.5 billion. Of this, ten per cent, about US\$ 100 million was committed in the Russian Federation alone. At the global level, the Global Environment Facility also provides funding.

Within the ECE region, the World Bank's portfolio of projects targeted at environmental protection currently consists of 22 lending operations in 15 countries, financing US\$ 652 million out of total project costs of nearly US\$ 1 billion. In addition, the World Bank manages 22 Global Environmental Facility (GEF) or Montreal Protocol Trust Fund grants, for a total of US\$ 217 million - about 66 per cent of the total cost of the respective projects.

World Bank funding for environment in the UNECE Region

In late fiscal year 1999 and fiscal year 2000, the World Bank's Board approved three self-standing environmental investments, three environmental projects co-financed by the GEF (one in *Georgia* and two in *Poland*), and five stand-alone GEF grants for projects in *Croatia*, *the former Yugoslav Republic of Macedonia*, *Slovak Republic*, *Turkey*, and *Central Asia*. Combined IBRD, IDA and GEF funds committed to these projects amount to US\$ 181 million, or about 63 per cent of total project costs of US\$ 290 million. The three self-standing environmental investments include:

- US\$ 60 million for a Sustainable Forestry Pilot Project in the Russian Federation;
- US\$ 50 million for an Environment and Privatization Adjustment Support Project in Bulgaria;
- US\$ 470,000 IDA credit for a Lake Sarez Risk Mitigation Project in Tajikistan.

In addition to investments, the World Bank has also helped countries develop capacity for environmental management in South East Europe and Central Asia.

The World Bank has undertaken a broad series of activities to help six of the ten EU accession countries prepare to meet the EU environmental requirements, which will cost between two and 15 per cent of GDP, depending on the country.

Similarly, the World Bank supports regional environmental cooperation and is actively involved in a series of interrelated programmes in the Aral, Baltic, Black, Caspian, and Mediterranean seas. These programmes bring together governments, multilateral and bilateral donors, the EU, NGOs, and other stakeholders, to jointly address pollution of international waters, management of coastal ecosystems, and sustainable development.

The World Bank also has distinct portfolios in the region in other sustainable-development-related areas, such as rural development; infrastructure and energy; urban sector, water and sewage; institutional development, governance and anticorruption; and promoting decentralization and community development (see for details the box below).

World Bank portfolios in non-environment sustainable-development-related areas

Rural Development: The existing loan portfolio in the region consists of 55 rural and natural resource projects, with a total of US\$ 2.2 billion in IBRD/IDA commitments.

Separately, the World Bank has been providing assistance to the ten candidate accession countries, helping them to introduce policies that will permit accession without compromising efficiency and competitiveness in their agricultural sectors.

Infrastructure and Energy: In fiscal year 2000, the World Bank approved loans for eight transport projects, totalling US\$ 113.8 million in IBRD loans and US\$ 93.6 million in IDA credits. The total ECA transport sector portfolio consists of 29 projects, aggregating US\$ 2.3 billion. In June 2000, the World Bank's active portfolio within the energy sectors of the region totalled approximately US\$ 4.2 billion. Of this, US\$ 246.4 million represents new investments approved for 4 projects in fiscal year 2000.

Urban Sector, Water and Sewerage. As of end-fiscal year 2000, the World Bank's assistance to the urban sector in the region consisted of 17 projects amounting to about US\$ 1.5 billion. Of this amount, 64 per cent was for emergency recovery, 27 per cent was for housing, five per cent was for municipal development, two per cent was for land market development, and two per cent was for urban rehabilitation. Separately, as of June 2000, Bank investments in the region water and wastewater sector totalled approximately US\$ 800 million.

Institutional Development, Governance and Anticorruption: The World Bank is developing strategies for identifying and addressing problems of governance, and integrating these strategies into its non-lending and lending assistance.

Decentralization and Community Development: The World Bank has developed a wide range of community-based programmes in the region. Social Investment Fund (SIF) projects that directly help stimulate employment and community participation are under implementation or preparation in a number of countries.

At a recent meeting on International Aid and Trade (20-21 June 2001), the World Bank announced that it is developing new guidelines to make green procurement a formal goal of all its projects and that it could announce the regulations within a year. The bank's guidelines could mandate that all bank initiatives require green procurement and the inclusion of environmental terms in their technical specifications. The bank is also strongly considering a ban on the purchase of substances that pose significant environmental concern. The President of the Bank also called for the institution to submit itself to independent verification of its environmental standards and bolster corporate social and environmental responsibility.

The Global Environment Facility

Following a three-year pilot phase, the Global Environment Facility was formally launched in 1994 to forge cooperation and finance actions addressing four critical threats to the global environment: biodiversity loss, climate change, degradation of international waters, and ozone depletion. Activities concerning land degradation, primarily desertification and deforestation, as they relate to the four GEF focal areas, are also eligible for GEF financing.

GEF today counts 168 countries as members. During its first decade, GEF has allocated US\$3.2 billion in grant financing, supplemented by more than US\$8 billion in additional financing, for 800 projects in 160 developing countries and countries with economies in transition.

GEF is the designated financial mechanism for the Convention on Biological Diversity and the United Nations Framework Convention on Climate Change, and has recently been designated as the interim financial mechanism for the Stockholm Convention on Persistent Organic Pollutants. GEF also supports the work of global agreements to combat desertification and protect international waters and the ozone layer.

GEF projects are managed by the United Nations Development Programme, the United Nations Environment Programme and the World Bank, and are executed by a broad range of executing agencies. Recently, a number of other international bodies have been accorded expanded opportunities to work directly with the GEF on project identification and preparation. These include the African Development Bank, the Asian Development Bank, the European Bank for Reconstruction and Development, the Inter-American Development Bank, the Food and Agriculture Organization of the United Nations, the International Fund for Agriculture Development, and the UN Industrial Development Organization.

GEF funding to date for countries within the UNECE region totals US\$620 million. These funds have been supplemented by US\$1,290 million leading to a total project cost in the region of US\$1,910 million. A complete list of GEF finance projects in Eastern and Central European countries is available in the GEF report to be submitted at the Regional meeting for the World Summit on Sustainable Development (Geneva, September 24-25, 2001) as well as on the GEF Website, www.gefweb.org.

United Nations Development Programme: Capacity 21

As UNDP's main instrument to build the capacity of the countries to implement Agenda 21, Capacity 21 works in close partnership with governments, civil society and the private sector to develop country-owned, country-driven processes that influence and support national and local policy and decision-making for sustainable development. Capacity 21 plays a critical role in helping to lay the foundation for more integrated approaches to poverty reduction by building long-lasting human and institutional capacities for sustainable development at all levels of society. Worldwide, the programme has successfully supported more than seventy-five countries since 1993. Among countries of the UNECE region, as of January 2001, Capacity 21 has supported sixteen sustainable development related programmes in total value of US\$ 3.5 million, in Albania, Bulgaria, Estonia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Romania, Russian Federation, Slovakia, Turkmenistan and Uzbekistan.

4. Funding under the European Union

The role of international assistance in the harmonization of environment and sustainable development policies in the pan-European region is an important one. Four of these forms of assistance, including the Phare Programme, ISPA, TACIS and SAPARD, are discussed below.

The PHARE Programme

The PHARE Programme is the main channel for the European Union's financial and technical cooperation with the countries of Central and Eastern Europe. Established originally in 1989 to support transition in Poland and Hungary, PHARE became the European Union's financial instrument to assist the CEE countries' efforts to reform and rebuild their economies. By 1997, thirteen CEE countries had become eligible for PHARE support: Poland, Bulgaria, Hungary, Lithuania, Latvia, Estonia, Czech Republic, Romania, Slovakia and Slovenia, Albania, Bosnia and Herzegovina, and the former Yugoslav Republic of Macedonia. These countries are divided into the ten accession countries with applications to join the EU, and three non-accession countries. PHARE provides both technical assistance and investment support to help the accession countries implement their "National Programme for Adoption of the Acquis Communautaire" (the set of EU legislation and regulations) and provides assistance to non-accession countries as well.

Originally allocated €4.2 billion for the 1990-1994 period, the PHARE budget was increased to €6.693 billion for the period 1995-1999. A large proportion of European multilateral assistance is administered by the PHARE and TACIS (see below) programmes of the European Commission. Budgets for environmental assistance programmes have fluctuated greatly. For the period 1990-94 a total of 337 million ECU, representing approximately 9 per cent of total PHARE funding, was committed to environment and nuclear safety, although the proportion of funding committed to environment dropped steadily over this period.

From 1989 to 1998, cumulative commitments amounted to €8.918 billion, all in the form of non-reimbursable grants, financed from the EU budget. The Energy and Environment (E&E) programmes financed by PHARE over the period 1989-1998 in the ten candidate member states to the EU (Estonia, Latvia, Lithuania, Poland, the Czech and Slovakia, Hungary, Slovenia, Romania and Bulgaria) represent a total financial commitment of some €570 million (7.3 per cent of the total PHARE programme over that period), of which €350 million (61 per cent) was in Environment and €220 million (39 per cent) in energy.

Environment	Committed (million EURO)
Bulgaria	28.2
Czech Republic	20.7
Estonia	10.8
Hungary	69.7
Latvia	12.8
Lithuania	19.7
Poland	88.8
Romania	15.5
Slovakia	16.2
Slovenia	0.0
Multi-country	64.6
Total	346.9

Overall environmental objectives expressed by candidate countries include achieving EU water quality standards, air quality improvement in industrial areas, cleaner production, and creation and maintenance of protected areas to ensure biodiversity. For the future, the Commission has agreed with the candidate countries to develop PEPA (Priority Environment Programme for Accession), a region-wide strategy and investment programme and SAPARD (the Special Accession Programme for Agriculture and Rural Development) to promote the Common Agricultural Policy (CAP) in the period 2000-2006.

Cross-border cooperation programmes were introduced in 1994 in recognition of the specific problems faced by the border regions. Cross-border programmes promote cooperation between countries and regions along borders of the EU and the CEE countries. Complementary financing in the EU's border areas is provided under the INTERREG programme.

Priorities for cross-border cooperation have primarily been investment in infrastructure and the environment, but support has also focused on the exchange of information and experience across the border regions, as well as joint measures in fields such as transport, energy, telecommunications, health, business, technology and tourism.

ECU 150 million was made available up to 1998 for the cross-border cooperation programme. A new cross-border cooperation regulation, adopted in 1998, updates, consolidates and extends cooperation to border regions between the Central and Eastern European Countries, as well as to border regions between Central and Eastern European Countries and European Union Member States. (See also TACIS)

The Instrument for Structural Policies for Pre-Accession (ISPA)

The Instrument for Structural Policies for Pre-Accession (ISPA) is one of the three financial instruments (with PHARE and SAPARD) to assist the CEE countries in the preparation for accession during the period 2000-2006.

The ISPA Regulation is consistent with the Commission's strategy on enlargement in the environment sector as presented in its Agenda 2000. Measures eligible for financing include "environment measures enabling the beneficiary countries to comply with the requirements of community environmental law and with the objectives of the Accession Partnership". As a general rule, ISPA will support only projects that implement "investment heavy" Directives, e.g., investments in relation to drinking water supply, urban wastewater treatment, air quality and urban waste management.

Over the period from 2000 to 2006, a total of €1.040 million a year (at 1999 prices) has been made available for infrastructure projects in the field of environment and transport. These funds will be distributed among the ten candidate countries, divided equally between the transport and the environment sectors.

Special Accession Programme for Agriculture and Rural Development (SAPARD)

SAPARD aims at supporting the efforts being made by the CEE countries in the pre-accession period as they prepare for their participation in the Common Agricultural Policy (CAP) and the single market in the period 2000-2006. The overall budget in each year of programme's seven-year run (2000-2006) amounts to €520 million (at 1999 prices).

Technical Assistance to the Commonwealth of Independent States (TACIS)

TACIS, established in 1991, is the European Commission's technical assistance programme for economic reforms in the Commonwealth of Independent States (also called Newly Independent States, or NIS) and Mongolia. From 1991 to 1998, it committed some €3.8 billion in grants to finance more than 2500 projects. TACIS financing is used primarily for technical assistance.

Environmental assistance comprises a lower proportion of assistance under the TACIS programme than the PHARE programme. Specific large-scale initiatives include those relating to the protection of the Black Sea and the Aral Sea. Total funding under TACIS for 1993-94 was just over 500 million ECU annually, with 36 per cent of this total being committed to the Russian Federation. Since 1996, the TACIS programme has also initiated a small, dedicated environmental assistance component. The total value of the assistance provided through the TACIS Interstate Programme in Environment (TIPE) over the period 1992-1997 was €160 million. The project components covered include the individual programmes for the Black, Caspian and Aral Sea, as well as projects for developing common environmental policies, raising public environmental awareness, and for establishing New Regional Environment Centres (NRECs).

The TACIS Cross-Border Cooperation (CBC) programme was launched in 1996 to provide targeted support for key EU-NIS and NIS-CEEC border regions. The environment is one of the main priorities of the programme. In its first year, four environment projects worth ECU 4 million were approved concerning water supply, wastewater treatment and management, and the management of hazardous waste. More recent CBC projects concern cooperation on transboundary water quality assessment, management and improvement applying a river basin approach, environmental review and development of protection options for river tributaries, habitat restoration and ecological safety improvements, and small and medium-sized business support in sensitive areas.

Recently the TACIS programme has been integrated into a newly formed Europe Aid Cooperation Office, established by the EU on 1 January 2001 to implement the external aid instruments of the European Commission, which are funded by the European Community budget and the European Development Fund.

C. Regional Financial Support to Other Countries

The Member States of UNECE comprise most of the world's donor countries. Of OECD DAC members (Development Assistance Committee), only Australia, Japan, and New Zealand are not included.

The DAC has formulated seven goals, all related to sustainable development, against which to measure progress. These include:

- A reduction by one-half in the proportion of people living in extreme poverty by 2015;
- Universal primary education in all countries by 2015;
- Demonstrated progress toward gender equality and the empowerment of women by eliminating gender disparity in primary and secondary education by 2005;
- A reduction by two-thirds in the mortality rates for infants and children under age 5;
- A reduction by three-fourths in maternal mortality by 2015;
- Access through the primary health-care system to reproductive health services for all individuals of appropriate ages as soon as possible and no later than the year 2015;
- The current implementation of national strategies for sustainable development in all countries by 2005, so as to ensure that current trends in the loss of environmental resources are effectively reversed at both global and national levels by 2015. (Draft Chapter 5 of the OECD Analytical Report on Sustainable Development)

ODA net (in US\$ million – updated on 23 January, 2001)

	1992(a)	1993	1994	1995	1996	1997	1998	1999
AUSTRALIA	1,015	953	1,091	1,194	1,074	1,061	960	982
AUSTRIA	556	544	655	767	557	527	456	527
BELGIUM	870	810	727	1,034	913	764	883	760
CANADA	2,515	2,400	2,250	2,067	1,795	2,045	1,707	1,699
DENMARK	1 392	1,340	1,446	1,623	1,772	1,637	1,704	1,733
FINLAND	644	355	290	388	408	379	396	416
FRANCE	8,270	7,915	8,466	8,443	7,451	6,307	5,742	5,637
GERMANY	7,583	6,954	6,818	7,524	7,601	5,857	5,581	5,515
GREECE	-	-	-	-	184	173	179	194
IRELAND	70	81	109	153	179	187	199	245
ITALY	4,122	3,043	2,705	1,623	2,416	1,266	2,278	1,806
JAPAN	11,151	11,259	13,239	14,489	9,439	9,358	10,640	15,323
LUXEMBOURG	38	50	59	65	82	95	112	119
NETHERLANDS	2,753	2,525	2,517	3,226	3,246	2,947	3,042	3,134
NEW ZEALAND	97	98	110	123	122	154	130	134
NORWAY	1,273	1,014	1,137	1,244	1,311	1,306	1,321	1,370
PORTUGAL	293	235	303	258	218	250	259	276
SPAIN	1,518	1,304	1,305	1,348	1,251	1,234	1,376	1,363
SWEDEN	2,460	1,769	1,819	1,704	1,999	1,731	1,573	1,630
SWITZERLAND	1,139	793	982	1,084	1,026	911	898	969
UNITED KINGDOM	3,243	2,920	3,197	3,202	3,199	3,433	3,864	3,401
UNITED STATES	11,709	10,123	9,927	7,367	9,377	6,878	8,786	9,145
TOTAL DAC	60,850	56,486	59,152	58,926	55,622	48,497	52,084	56,378
TOTAL UNECE DAC Members	48,587	44,176	44,712	43,120	44,987	37,924	40,354	39,939

(a) Including debt forgiveness of non-ODA claims, except for total DAC.

Together, the ECE members of DAC (that is, excluding Australia, Japan and New Zealand) accounted in 1999 for almost US\$ 40,000 million in development assistance. While this is a significant contribution, it is noted that the amount in 1999 from UNECE/DAC Members is US\$ 8,648 million less than in 1992, a decrease of almost 18 per cent. With the exception of the period from 1997 to 1998, there has been a steady decline overall since the year of the Rio Conference. Individual states that are exceptionally providing more ODA in 1999 than they did in 1992 are Denmark, Ireland, Luxembourg, the Netherlands, Norway and the United Kingdom.

In 1999, the top ten recipients of ODA worldwide were, in order, Indonesia, China, India, Egypt, Russian Federation, Israel, Thailand, the Philippines, Viet Nam and Bangladesh.

In 1999, only four countries provided 0.7 per cent or more of GNP for ODA and OA, as follows: Denmark (1.01 per cent); Norway (0.91 per cent); the Netherlands (0.79 per cent); and Sweden (0.70 per cent). The average for all DAC countries was 0.24 per cent.

D. Conclusions

While there are funds and other mechanisms for financing investments and activities for protection of the environment, there is no single efficient system or structure for financing sustainable development. Pure market instruments are not sufficient to cover all needs, particularly in the areas of environmental protection and social welfare. Thus state budget interventions seem to be indispensable in all countries of the region.

Financing of environmental investments in Western countries is generally based on market forces (e.g., via the "polluter and user pay" principle), NIS, in particular, and CEE countries still need both to mobilize additional domestic resources and to receive bilateral and multilateral assistance in order to undertake all of the activities required to move toward sustainable development.

There are many actors involved in financing sustainable development in the ECE region. Funding for related activities may be obtained (1) from national environmental funds and national or local private investments, (2) from bilateral and official assistance (OA), (3) through EU assistance like the Phare Programme, ISPA, and TACIS and (4) through multilateral disbursements via international development banks such as the EBRD, the World Bank and programmes like the Global Environment Facility.

Multilateral institutions should pay more attention to financing sustainable development. The flow of assistance from donor communities to countries in transition in the ECE region is important also in terms of harmonization of policies, which occupies an important place in the overall scheme of assistance.

The IFIs and governments of Western countries should also carefully analyse each project to be financed for its economic and environmental effectiveness, not distorting market conditions but improving social conditions. Each project financed should be subject to an EIA process and comparable test in the more social aspects to ensure its sustainable character.

The level of financing has been decreasing overall, and direct foreign investment to countries in transition is too low. The CEE countries, and particularly the NIS, should create an environment enabling development of institutions and conditions to mobilize their own financial resources, to attract foreign investments and to improve effectiveness of foreign assistance.

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