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**INTEGRATING ENVIRONMENT INTO AGRICULTURE  
AND FORESTRY: PROGRESS AND PROSPECTS IN  
EASTERN EUROPE AND CENTRAL ASIA**

submitted by

the World Bank

through the Ad Hoc Working Group of Senior Officials

BACKGROUND DOCUMENT



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THE WORLD BANK

EUROPE AND CENTRAL ASIA REGION  
SUSTAINABLE DEVELOPMENT DEPARTMENT

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# Integrating Environment into Agriculture and Forestry:

## Progress and Prospects in Eastern Europe and Central Asia

### Volume I

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# Acronyms

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<b>ARET</b>	Agriculture Research, Extension and Training Project (Georgia)
<b>BNPP</b>	Bank-Netherlands Partnership Program
<b>CAP</b>	European Union Common Agricultural Policy
<b>CDM</b>	Clean Development Mechanism
<b>EEA</b>	European Environmental Agency
<b>ECA</b>	Europe and Central Asia Region
<b>EECCA</b>	Eastern Europe, Caucasus, and Central Asia
<b>EfE</b>	Environment for Europe process
<b>EFMA</b>	European Fertilizer Manufacturers Association
<b>EU</b>	European Union
<b>EurepGAP</b>	European Equal Partnership (to support) Good Agricultural Practices
<b>FAO</b>	Food and Agriculture Organization (UN)
<b>FLEG</b>	Forest Law Enforcement and Governance
<b>GAP</b>	Good Agricultural Practice(s)
<b>GEF</b>	Global Environmental Facility
<b>GDP</b>	Gross Domestic Product
<b>HCH</b>	Hexachlorocyclohexane
<b>HELCOM</b>	Helsinki Commission
<b>HNV</b>	High Nature Value (farmland)
<b>IFAS</b>	International Fund for the Aral Sea
<b>IFI</b>	International Financial Institution
<b>IMF</b>	International Monetary Fund
<b>IPM</b>	Integrated Pest Management
<b>METAP</b>	Mediterranean Environmental Technical Assistance Program
<b>NEAP</b>	National Environmental Action Plan
<b>NEFCO</b>	Nordic Environment Finance Corporation
<b>NGO</b>	Non-Government Organization
<b>OECD</b>	Organization for Economic Cooperation and Development
<b>POP</b>	Persistent Organic Pollutant
<b>SEE</b>	Southeastern Europe
<b>UNECE</b>	United Nations Economic Commission for Europe
<b>USDA</b>	United States Department of Agriculture
<b>WB</b>	World Bank

## List of Abbreviations

<b>ALB</b>	Albania
<b>ARM</b>	Armenia
<b>AZE</b>	Azerbaijan
<b>BEL</b>	Belarus
<b>BiH</b>	Bosnia and Herzegovina
<b>BUL</b>	Bulgaria
<b>CRO</b>	Croatia
<b>GEO</b>	Georgia
<b>KAZ</b>	Kazakhstan
<b>KOS</b>	Kosovo
<b>KYR</b>	Kyrgyz Republic
<b>MAC</b>	FYR Macedonia
<b>MOL</b>	Moldova
<b>ROM</b>	Romania
<b>RUS</b>	Russian Federation
<b>SER</b>	Serbia
<b>TAJ</b>	Tajikistan
<b>TRK</b>	Turkmenistan
<b>TUR</b>	Turkey
<b>UKR</b>	Ukraine
<b>UZB</b>	Uzbekistan



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# Foreword

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**T**his study reviews how the integration of environmental concerns into agriculture and forestry is progressing in the countries of Southeastern Europe (SEE) and of Eastern Europe, Caucasus, and Central Asia (EECCA)<sup>1</sup> since 2000 and assesses prospects for the future.

The present report is a contribution to the Environment for Europe process. At the Fifth Ministerial Conference in Kiev in 2003, participants decided to pay greater attention to the needs of the EECCA and adopted an Environmental Strategy for the sub-region. The commitments made under that strategy are taken as benchmarks against which progress is assessed, recommendations made,

and emerging environmental priorities reviewed. This report also includes an assessment of SEE countries and territories. The analysis provided here is intended primarily to inform discussions during and after the Sixth Environment for Europe Ministerial Conference, to be held in Belgrade in October 2007.<sup>2</sup>

This report represents Volume I of the study and provides a synthesis of major regional issues and trends, with broad recommendations for future directions and priorities. A forthcoming Volume II will contain detailed Country Reviews for the 22 countries and territories studied.

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<sup>1</sup> The EECCA countries are Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. The SEE countries and territories reviewed are Albania; Bosnia and Herzegovina; Bulgaria; Croatia; Kosovo (which is a province of Serbia under autonomous administration of the United Nations consistent with UNSC 1244 and is treated as a separate entity for the purposes of the study); FYR Macedonia; Romania; Serbia; Montenegro; and Turkey. Because of the recent emergence of Montenegro as an independent country, it was not feasible to do a separate Country Review; however, its data are included in regional statistics. In addition, special studies were conducted of EU member countries Hungary and Poland, mostly to identify good practice examples for the rest of the region.

<sup>2</sup> Officially, this report was submitted by the World Bank as a Category II Document (ECE/BELGRADE. CONF/2007/INF/32) through the Ad Hoc Working Group of Senior Officials for the Sixth Ministerial Conference on "Environment for Europe".

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# Executive Summary

**A**s part of its contribution to the Environment for Europe meeting in Belgrade in October 2007, the World Bank has undertaken a review of the Europe and Central Asia Region<sup>3</sup> with **the objective of raising awareness among policy makers of the need to accelerate and enhance implementation of environmentally sustainable practices in the agricultural and forestry sectors in SEE and EECCA, and to provide recommendations for doing so.** The process of incorporating considerations of environmental sustainability and resource conservation into sector policies, strategies, programs, and investments will be referred to as *integration or mainstreaming*. This report represents Volume I of the study and provides a synthesis of major regional issues and trends, with broad recommendations for future directions and priorities. It is based on an original set of 21 in-depth Country Reviews prepared by the team with the support of local specialists in each country. The detailed Country Reviews will be published separately in Volume II.

**Agriculture and forestry continue to be very important for economic growth and poverty reduction in transition countries.** The sectors contribute about 15 percent of GDP and support the 35 percent of the population that is rural in these countries. This segment of the population faces a higher risk of poverty than that in urban areas, and accounts for about 65 percent of the poor. This situation creates demands on agriculture and forestry to generate higher growth and income for rural residents. The gap in agricultural productivity

between transition countries and OECD nations remains large. Yet, because agriculture and forestry are particularly dependent on the resource base, closing the productivity gap has important implications for the environment.

**To ensure the sustainability of the resource base, agriculture and forest management has to improve significantly in these countries.** Issues of primary concern include soils management, nutrient conservation, water management, pest management, sustainable forestry, forest health, and illegal logging. Other issues include rangeland and watershed management, food safety, organic farming, carbon sequestration, and climate change adaptation.

**Agriculture and forestry policies, laws, and strategies that promote integration have improved, but more needs to be done on implementation.** The importance of environmental protection is usually recognized in statements of environmental, agricultural, and forestry policy, as well as in the resulting strategies, action plans, and legislation. Nevertheless, a lack of capacity,

<sup>3</sup> The region includes nine countries of Southeastern Europe (SEE): Albania; Bosnia and Herzegovina; Bulgaria; Croatia; FYR Macedonia; Montenegro; Romania; Serbia; Turkey; plus Kosovo (which is a province of Serbia under autonomous administration of the UN consistent with UNSC 1244) as well as twelve countries of Eastern Europe, Caucasus and Central Asia (EECCA): Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

limited funding access, and insufficient incentives are impeding progress on implementing these strategies.

**Failure to integrate environment into agriculture and forestry will have major economic and human health implications.** For example, salinity in Uzbekistan is estimated to cost that country \$1 billion per year, and soil erosion is estimated to cost Moldova at least \$40 million per year. Furthermore, it is now known that drinking water contaminated by agricultural nutrients and pesticides has adverse effects on human health, although the extent of the long-term impacts are just beginning to be understood. The irony is that the solutions to most of these problems are known, and the technology to address them is available from other countries, yet the necessary measures are often not taken.

**Agriculture and forestry can also be important providers of environmental services.** Agriculture and forestry have unique potential for making positive contributions to the environment. Environmental services provided can include sequestering carbon, managing watersheds and rural landscapes, and preserving biodiversity. But currently, many of these services are undervalued and unremunerated. The right incentives should be put in place to encourage the development of more sustainable production systems and the provision of environmental services.

**The interactions between the agriculture and forestry sectors and climate change are highly complex and deserve special attention.** Together, agricultural production and deforestation account for up to 30 percent of greenhouse gas emissions (World Bank 2007d). But the sectors also offer important opportunities for carbon sequestration through afforestation and improved agricultural techniques, and incentives for these should be increased. Agriculture and forestry are also highly sensitive to climate

change, and it is critical for EECCA and SEE countries to build awareness and capacity for the proactive integration of climate change adaptation into agricultural and forestry sector policies, programs and investments.

**Accelerating implementation of environmental integration will require increased efforts by EECCA countries.** This study confirms the conclusion on agriculture and forestry reached by the 2003 EfE Conference in Kiev, that greater effort was needed to ensure environmental sustainability in the EECCA sub-region. Major issues such as water and rangeland management, radioactive contamination of forests and farmland, and illegal logging are much more prevalent in EECCA countries (with important exceptions). Membership and accession into the EU are major incentives for integrating environment into agriculture and forestry. However, in non-accession countries such as those of EECCA, the drive towards integration is much weaker, and generous external support and incentives will be required.

**More effort is needed to address the impact of agriculture on the environment.** Agricultural impacts on the environment are much more significant than those of forestry, but they are being less adequately addressed in both sub-regions. In the forestry sector, regional countries generally harvest less than the annual growth increment (though overharvesting does occur at the local level), and certification of forest products is gaining ground. Progress on the widespread problem of illegal logging is less certain; although major efforts have begun, it is too early to tell how successful they will be. In agriculture, soil erosion is worsening in nearly all countries. Initiatives to improve nutrient management and introduce integrated pest management have been mostly at the pilot project level. While irrigation rehabilitation projects have had some success in improving water use efficiency and reducing salinity, these are not yet major objectives.

**Increasing awareness among decision makers and the general public is an important first step towards accelerating integration of environment into agriculture and forestry.**

Change is unlikely unless the main stakeholders are well informed of the issues and press for change. To this end, environmental monitoring systems need to be enhanced to provide more quantitative data over time, and indicators should be standardized across countries. Implementing the Aarhus Convention in all countries will improve public access to this information. Ministries of the environment need to step up their efforts to inform other public agencies—including those responsible for agriculture, forestry, finance, and the economy—of the long-term consequences of allowing the resource base to be eroded. This will require more evidence of the negative impacts not only on the environment, but also on the economy and human health.

**One of the most important tools for increasing awareness is an effective agricultural advisory and extension service.**

Agricultural extension systems in the region vary greatly in their mode of organization and their effectiveness in informing farmers on sustainability issues. In SEE, basic government systems are in place but need to be modernized and supplemented by the private sector. In EECCA, there are few services available to small, private farmers, and a number of innovations aimed at filling the gap cost-effectively need to be strengthened. In SEE, services to private forest owners need to be improved as well.

**The region needs to build up the financial, human, and institutional capacities for implementation.**

Although just as important as increased investment, institutional change is often more challenging. Agriculture ministries need to strengthen their capacity by training staff on environmental issues and, if necessary, establishing environmental units. Environmental and agriculture ministries need to enhance their

capacity for economic analysis to better prioritize investments and more effectively demonstrate the negative impacts of unsustainable practices. Developing a Code of Good Agricultural Practices is a step in the right direction, but farmers need training to adopt these practices, and technologies must first be adapted to local conditions. This requires investing in improved agricultural research, education, and extension systems. Curtailing negative practices such as illegal logging requires good governance, which, according to published indices, is still lacking in many countries of the region. Collaboration among agencies responsible for agriculture, forestry, and the environment needs to improve.

**Incentives for implementation need to be enhanced, and disincentives to good practices removed.**

Governments should use policy instruments and public expenditures to encourage the spread of good agricultural and forestry practices. The first priority should be to eliminate perverse incentives, such as subsidies for chemical fertilizers and pesticides, or policies that hinder or undermine private ownership of agricultural land. Governments need to implement the “polluter pays” and “user pays” principles in agriculture and forestry, so that meaningful fees are assessed on polluters and on users of scarce resources such as irrigation water.

**The question of incentives is particularly important for non-accession countries.**

New EU member states and accession countries receive powerful incentives for integration in the form of membership and generous grants. However, non-accession countries, particularly those in EECCA, do not benefit from the same incentives and have much more limited resources. Therefore, western countries and international financing institutions (IFIs) must do more to encourage integration efforts in these countries through grants and loans. These will be more effective if they are integrated into the countries’ own strategies.

**A tool that has been little explored but has significant potential is the use of trade incentives, combined with rigorous certification of sustainable production.** This would require western nations to open their markets to more agricultural imports from EECCA, support the establishment of certification systems in those countries, and educate consumers and importers in their own countries. However, even new EU member states, when given the option, have demonstrated a tendency to employ European Union Common Agricultural Policy (CAP) funds for income support rather than for environmental investments. More should be done to encourage countries to use CAP Pillar 2 funds for their intended purpose.

**Countries should accelerate integration by scaling up successful pilot initiatives and disseminating good practices.** There have been a number of successful pilot initiatives in the east, including for nutrient management, integrated pest management, erosion control, and drylands management. However, these initiatives have often been sponsored by external development agencies, and more needs to be done to scale them up and integrate them into national forestry and agricultural development strategies. In addition,

regional knowledge-sharing should be increased so that representatives of countries within a sub-region can establish networks that meet and communicate regularly to share experiences and ideas. Several related issues—from water nutrient pollution and avian flu to illegal logging—are trans-border in nature, providing additional impetus for regional cooperation.

Countries of the region have already shown their commitment to integrating environmental concerns into agriculture and forestry through their policy statements and action plans, including the EECCA Environment Strategy adopted in Kiev. Many, however, are finding it difficult to turn those commitments into action on the ground. Significant needs for investment remain, and these should be supported by a combination of the countries' own resources, funding from donors and IFIs, and private sector partnerships.

**This report makes a number of suggestions for addressing constraints and giving momentum to such implementation. These are summarized into ten overarching recommendations in Table 1** for consideration by all relevant ministries of the governments in the region, as well as NGOs, regional organizations, and the IFI and donor community.

**Table 1: Recommendations**

Recommendation	Responsibility	Duration
1. Having expressed their commitment to sustainable agriculture and forestry through policy declarations, strategy documents, and initial programs, regional countries now need to advance to full-scale implementation.	Governments, led by ministries of agriculture and forestry.	Short term
2. Further analyses of the economic impact of unsustainable agriculture and forestry management should be used to persuade policy makers in economic and sectoral ministries of the priority for action. Economic cost-benefit analysis should be increasingly integrated into decision making.	Ministries of environment, agriculture, and forestry, supported by universities and NGOs.	Short term
3. Given that non-EU accession countries face particular difficulties in reaching the goals of the EECCA Environment Strategy, they will need to mobilize all possible domestic and international support.	Governments, led by ministries of environment, agriculture, and forestry.	Medium term
4. The EU should enhance its role as the main driver of progress on mainstreaming by expanding support to the EECCA countries, especially in foundation issues of governance, awareness, capacity building, and incentives.	EU, EECCA governments.	Medium term
5. The World Bank and other IFIs and donors should build on the foundation with well-targeted projects in all regional countries, scaling up successful pilots where available.	World Bank, other donors, regional governments.	Medium and long term
6. Governments should re-examine their policy instruments, including taxes, subsidies, and support services (research, extension, food safety, etc.) to ensure that their support to integration is consistent and cost-effective.	Governments, with donor support.	Medium term
7. Certification systems for food and forest products should be encouraged and supported as an important driver of sustainable management, including the powerful incentive of market access.	Governments (including trade ministries), certification bodies.	Medium term
8. Pilot projects in mainstreaming should be evaluated and their results disseminated; where warranted, their success should be scaled up to achieve national impact.	Ministries of agriculture, forestry, and environment, and donors.	Medium and long term
9. Regional mechanisms for the exchange of experience among countries should be strengthened.	Regional organizations (EU, UNECE, OECD), new EU members, and governments	Medium and long term
10. While continuing efforts to mitigate climate change, including examining the potential of abandoned farmland for reforestation and carbon sequestration, governments should begin development and implementation of climate change risk management adaptation plans..	International organizations (UN, World Bank, EU, OECD), carbon funds, governments, donors.	Medium and long term

# Integrating Environment into Agriculture and Forestry



**A**s part of its contribution to the Environment for Europe meeting in Belgrade in October 2007, the World Bank has undertaken a review of the Europe and Central Asia Region<sup>4</sup> with **the objective of raising awareness among policy makers of the need to accelerate and enhance implementation of environmentally sustainable practices in the agricultural and forestry sectors in SEE and EECCA, and of providing recommendations for doing so.** The process of incorporating considerations of environmental sustainability and resource conservation into sector policies, strategies, programs, and investments will be referred to as *integration* or *mainstreaming*.

Unless other references are cited, the review is based on an original set of 21 in-depth Country Reviews prepared by the study team with the support of local specialists in each country. This report represents Volume I of the study and provides a synthesis of major regional issues and trends, with broad recommendations for future directions and priorities. The Country Reviews are presented in full in Volume II. In addition to the local specialist inputs, the study benefited from World Bank country, sector, and project documents, other IFI documents, country publications, UNECE Country Environmental Profiles, and other accessible documents, as well as the advice of numerous World Bank staff working in the region. Field visits were made to selected countries to confirm information and fill knowledge gaps. Draft Country Reviews were reviewed by World Bank country teams. Advance copies of this volume plus executive summaries of the respective Country Reviews

were distributed to ministries responsible for environment, agriculture, and forestry in each subject country; comments received have been reflected in the text.

Agriculture and forestry continue to be very important for economic growth and poverty reduction in transition countries. The share of these sectors in national income is much higher in transition countries than in the West, representing on average 14 percent of GDP (compared to the OECD average of 2.2 percent), and an even higher 18 percent in EECCA (Csaki 2006). Agriculture and forestry are also the main sources of income in rural areas, where 35 percent of the population of transition countries still resides. In the least developed SEE and EECCA countries, the majority of the population—over 70 percent—still lives in rural areas and is employed in agriculture and forestry. Nearly all the transition countries have experienced healthy, sustained levels of growth since 2000, which has contributed to poverty reduction overall; nevertheless, rural residents face a significantly higher risk of poverty than urban residents and continue to make up the bulk of the

<sup>4</sup> The region includes nine countries of Southeastern Europe (SEE): Albania; Bosnia and Herzegovina; Bulgaria; Croatia; FYR Macedonia; Montenegro; Romania; Serbia; Turkey; plus Kosovo (which is a province of Serbia under autonomous administration of the UN consistent with UNSC 1244 and is treated as a separate entity for the purposes of the study); and the following twelve countries of Eastern Europe, Caucasus and Central Asia (EECCA): Armenia; Azerbaijan; Belarus; Georgia; Kazakhstan; Kyrgyz Republic; Moldova; Russian Federation; Tajikistan; Turkmenistan; Ukraine; and Uzbekistan.

poor—70 percent in EECCA and 62 percent in SEE (Alam et al. 2005).

Significant improvements in agriculture and forestry still have to take place in transition countries. Although production levels in these sectors have generally stabilized, the productivity gap between transition countries and OECD countries remains large. For example, cereal yields are less than half of the OECD average (Csaki et al. 2006). This productivity gap means there is significant potential for growth in the sectors through improvements in efficiency. But for agriculture and forestry, the sustainability of growth over time is particularly dependent on the sustainability of the resource base. Therefore, ensuring that these economic sectors achieve their potentials for growth and poverty reduction requires integrating environmental considerations into their management.

Agriculture and forestry policies, laws, and strategies that promote integration have improved, but more needs to be done on implementation. Regional countries have generally recognized that past agricultural and forestry practices have had adverse impacts on the environment and that action is needed to move towards longer-term

sustainability of production and conservation of natural resources. The importance of environmental protection is usually recognized in statements of environmental, agricultural, and forestry policy (and even in some state constitutions), and in the resulting strategies, action plans, and legislation. In most cases, National Environmental Action Plans (NEAPs) were adopted early in the transition period, through processes involving a range of stakeholders. In some countries, NEAPs have been updated or followed by detailed sectoral action plans and pilot projects (often with support from the Global Environmental Facility—GEF). In others, that remains to be done. Most countries have ratified the key international conventions on global and trans-border environmental issues. These actions indicate there is a high level of commitment to environmental sustainability in all regional countries.

Regional countries with greater capacity, more funding access, and adequate incentives are following through on their policy commitments with programs and projects that promote more sustainable production. Kazakhstan (see Box 1) has undertaken a broad range of initiatives in both agriculture and forestry. Serbia is

### Box 1: Kazakhstan Shows the Way

Kazakhstan has a broad policy of economic diversification and is emerging as a regional leader based on its efforts to incorporate environmental concerns and sustainable resource management into a diverse array of agricultural and forestry programs. For example, the *Syr Darya and Northern Aral Sea Project* (World Bank/Government, 2001–2008) aims to increase irrigated agriculture and fish production, restore the Northern Aral Sea, and improve environmental conditions in the Syr Darya delta. The sea is already showing improvement: water flow into the delta has increased, several freshwater fish species have returned, and fish harvests are increasing. A second project is being prepared that will be funded mainly by the government. The *Drylands Management Project* (World Bank/GEF/Government, 2003–2009) addresses dryland degradation due to unsustainable cultivation practices. The project has replaced cereal production on marginal drylands with traditional livestock grazing, restored grasslands, and improved the capacity of local institutes. The *Forest Protection and Reforestation Project* (World Bank/GEF/Government, 2006–2012) aims to ensure cost-effective and sustainable environmental rehabilitation and management of drylands and rangelands, with a focus on pine forests, the dry bed of the Aral Sea, and semi-arid rangelands. The *Agricultural Competitiveness Project* (World Bank/Government, 2005–2010) seeks to promote agricultural productivity by improving the quality and safety of farm products, enhancing access to information, and harmonizing standards. The food safety and quality certification component will have a direct positive impact on the environment. The *Zhasyl Yel (Green Country) Program* (2005–2007), initiated and financed by the government, aims to fulfill Kazakhstan's obligations under the Convention on Biological Diversity and the Aarhus Convention through forest conservation and reforestation, and by increasing public awareness and participation. The program has improved media coverage of conservation measures; it is also promoting active youth participation in tree planting nationwide.

harmonizing its legislation with that of the EU and beginning to use strategic environmental assessment. It is also undertaking research and extension programs in nutrient management, pest management, organic farming, and other areas. Countries with lower institutional and financial capacity are also making progress, albeit at a slower pace and on a narrower range of issues. Moldova has been a pioneer in the use of carbon finance for reforestation (see Box 2), as well as in nutrient management, organic farming, and legislation harmonization. Albania has made great strides in the improvement of irrigation systems, introducing user organizations more extensively than elsewhere in the region. It has adopted a similar approach in forestry.

Nevertheless, decision makers and the general public are not yet fully aware of the importance of integrating environment into agriculture and forestry. At the government level, ministries of the environment have an essential role to play in analyzing and providing information on environmental issues (including their potential impact on human health, economic productivity, the natural environment, and the global commons) and in reaching out to sectoral ministries to ensure sustainability concerns are given proper recognition in their programs. But ministries of economy and finance also need to be made aware of the longer-term economic consequences of

neglecting environmental concerns. Moreover, experience in many countries shows that little will be done on environmental protection unless the public is well informed on the issues and presses the government to action.

Environmental integration is better in SEE countries than in EECCA and more advanced in forestry than in agriculture. The EU is clearly a powerful driver for change in its new member states, in countries on the path to accession, and in some that are not. However, some transition countries that became EU members have shown that increasing production and supporting farm incomes are higher priorities for them than environmental sustainability. When given the choice, they often prefer to shift funds from environmental activities under Pillar 2 of the Common Agricultural Policy (CAP) to income supports under Pillar 1. In the forestry sub-sector, there is a tradition of resource conservation that is being reinstated following the dislocations of transition. Agriculture, however, is faced with a more complex and less tractable set of issues.

There is a lack of capacity in virtually all transition countries. While limited funding is the most obvious example, all countries face shortages of skilled staff. Moreover, they need to continue the slow process of institutional change to support new policies on integrating environment into agriculture and forestry. There is also a lack of ca-

## Box 2: Carbon Finance in Moldova

Moldova is successfully taking the lead in mainstreaming environmental considerations into afforestation to contribute to carbon sequestration and reduction of greenhouse gas emissions. The *Soil Conservation Project* (World Bank Prototype Carbon Fund/Government/Japan, 2004–2007) addresses the link between afforestation efforts and protection of forest ecosystem diversity, as well as agricultural land degradation, while contributing to carbon sequestration. The project has restored nearly 20,000 ha of degraded agricultural lands to productive uses for rural communities and has established community-based management. A follow-up project includes the planting of new forests on 33,000 ha, of which approximately 6,000 ha were granted carbon finance eligibility. Further stages of development are planned. The *Agricultural Pollution Control Project* (World Bank/GEF/Government, 2004–2009) includes afforestation efforts and the creation of buffer zones along the Dniestr River. Grants are provided to entrepreneurs and businesses for investing in environmentally sustainable agricultural practices, including agro-forestry, planting of buffer strips, wetland restoration, monitoring of soil and water quality, and assessing environmental impacts.

capacity to evaluate the economic costs and benefits of environmental issues in these sectors. Because of such constraints, even new EU member states find it difficult to spend EU funds for sustainable agriculture in a timely manner, and to demonstrate the impact of those expenditures.

Positive incentives for environmentally friendly behavior need to be enhanced, while negative incentives should be curtailed. Tax and subsidy programs must work together to promote sustainability. Trade opportunities with the West combined with rigorous environmental standards

have tremendous potential for creating positive incentives, particularly for non-EU countries. Creating the right incentives also requires integrating sound economic analysis into agricultural and forestry policy-making.

Successful pilot projects need to be scaled up and experience exchanged among countries of the region. By now, there are numerous examples of good practices—many of which are cited below—but mechanisms for implementing these pilots on a national level and transferring this knowledge between countries need strengthening.

# Agriculture and Forestry have Major Impacts on the Environment

2

Agricultural production and forest management can have major impacts on the environment. For example, soil erosion affects all regional countries; in Turkey it generates 1 billion tons of sediment per year. The agricultural and forestry sectors are responsible for almost 60 percent of waterborne nitrogen input and 50 percent of waterborne phosphorus input into the Baltic Sea, which includes a number of transition countries in the catchment area.<sup>5</sup> These two pollutants are the major causes of the eutrophication problems that afflict the sea (HELCOM and NEFCO 2007). A similar situation exists in the Black Sea. Indiscriminate use of pesticides in the past in Central Asia has had major impact on human health. Forest fires can cause enormous economic damage and release huge amounts of greenhouse gases. At the same time, the future of agriculture and forestry depends on the sustainable management of the resource base, including land, water and climate. Table 2 lists the main issues of concern, their geographical scope, the nature of the threat, the availability of mitigation measures, and priorities for future action.<sup>6</sup>

Agriculture and forestry can also be important providers of environmental services. While the potential negative side effects of poor agricultural and forestry practices have become increasingly recognized over the past decades, largely unrecognized is the unique potential these sectors also have for making positive contributions to the environment. Environmental services provided can include sequestering carbon, managing watersheds and rural landscapes, and preserving biodiversity. But currently, many of these services are underval-

ued and unremunerated. The challenge, therefore, is not to constrain the development of agriculture and forestry, but to provide the right incentives to encourage the development of more sustainable production systems and the provision of environmental services.

The interactions between the agriculture and forestry sectors and climate change are perhaps more complex than with any other sectors, and deserve special attention. Together, agricultural production and deforestation account for up to 30 percent of greenhouse gas emissions, second only to the energy sector (World Bank 2007d). But the sectors also offer important opportunities for carbon sequestration, such as through afforestation or improved agricultural techniques like minimum tillage. However, much of this potential has not been realized due to a lack of incentives. The production of biofuels has also been put forth as an opportunity for reducing greenhouse gas emissions (although more work is needed to reduce the environmental footprint of biofuel production and increase its economic viability). At the same time, due to their dependence on weather and the resource base, agriculture and forestry are also highly sensitive to climate change. The increased frequency of heat stress, droughts and flooding events caused by

<sup>5</sup> Estonia, Latvia, Lithuania, Poland, and Russia are Baltic littoral countries, while Belarus, Czech Republic, and Ukraine are also located within the catchment.

<sup>6</sup> The information in Table 2 is intended to provide a broad, generalized picture of the whole region. There are many country exceptions, which will be described in Volume II of this study.

global warming will reduce crop yields and livestock productivity, while increased risks of fires and pest outbreaks will have negative consequences for forestry (Easterling et al. 2007). While aggressive mitigation of greenhouse gas emissions should continue to be a priority, most experts agree that climate change is already happening (IPCC 2007), and that countries should now be making serious efforts to reduce their vulnerability. The best way to do this is not to treat climate change in isolation, but to integrate climate change risk management into agricultural and forestry policies, programs and investments (World Bank 2006a). This is particularly important for poor farmers who are the most vulnerable.

The transition brought about major changes in agricultural production. Since the year 2000, countries of the region<sup>7</sup> have largely completed the wrenching transition from a socialist to a free-market economic model and, as a result, most have experienced relatively high levels of economic growth. The transition drastically changed production relationships in all sectors, none more so than agriculture. The most basic change has been the privatization of farmland, a process that is almost complete in SEE and some EECCA countries but continues in others. Evidence from elsewhere in the world<sup>8</sup> suggests that full private land ownership provides a powerful incentive for farmers to conserve their land and apply sustainable farming practices. In most countries, grazing land still belongs to the state and/or local communities, which presents a challenge for sustainable management.

Disruptions in the forestry sector have been perhaps more temporary in nature. Increased poverty and higher energy prices, together with a breakdown of law and order, led many rural people to exploit local forests for fuelwood and encouraged industrial-scale illegal logging in some countries. However, these problems are now being seriously addressed in many countries. Some forest land in SEE has been restored to the previous private owners,<sup>9</sup> while state ownership remains

the norm in EECCA. Given the public-good nature of many forest benefits, state ownership of forest resources is compatible with sustainable management; the bigger challenge is to get the public-private balance right. Forest management in Europe has a long tradition of resource conservation that is now being reasserted, for example, in Croatia and Bulgaria. The forest health situation is more mixed, but most countries are taking action to control fires, pests, and diseases, including a major program in Russia that recently experienced serious difficulties as a result of a fast-track transition to decentralized fire management, as mandated by the new Forest Code (2007).

The transition to a market economy presents both a challenge and the opportunity to put in place policies and incentives that would minimize the environmental impact of increased output. The introduction of market prices for inputs, energy, and farm products has greatly altered production operations and has led to shifts in the crop mix and, often, to less input-intensive production—which has generally benefited the environment. For the same reasons, together with reduced consumer demand, livestock numbers and production have declined, putting less pressure on natural resources. For example, manure production in Russia has declined by two-thirds, or almost 400 million tons. However, there are indications that, as regional economies improve, input use and the demand for meat and dairy products will grow, eventually approaching levels now observed in Western Europe. For example, in the Baltic Sea

<sup>7</sup> Turkey is the exception, not being a transition country.

<sup>8</sup> See for example, World Bank. (2000). While it is generally rather early to observe private ownership leading to greater use of sustainable practices in EECCA, a study in Tajikistan did show that private cotton farmers were more likely to practice crop rotation (and obtain higher yields) than collective farms (World Bank. 2006b.)

<sup>9</sup> HELCOM and NEFCO. (2007). Projections from FAO, OECD and EFMA (2004).

**Table 2: Summary of Issues**

Issue	Occurrence		Nature of impact				Availability of mitigation measures	Response	Priority
	Human health	Economic productivity	Natural environment	Global commons					
<i>Agriculture</i>									
<b>Soils management</b>									
<b>Soil erosion</b>		Throughout the region					Technologies well understood but need to be adapted to local conditions.	Limited action, except in Turkey. Conservation tillage not widely practiced.	II
Poor structure and fertility; acidification		Throughout the region; fertility esp. in EECCA, acidification esp. in northern SEE					Technologies well understood.	Limited because of cost of amendments for poorer farmers.	III
<b>Nutrient Conservation</b>									
Eutrophication		Especially in the Baltic and Black Seas					Plot projects in Russia, Turkey, Bulgaria, Romania, Serbia, Georgia, Moldova.	National program in Poland and beginning in Romania. Limited elsewhere.	I
Nitrates in drinking water		Throughout the region but esp. in Russia, Bulgaria, Croatia, Serbia, Romania					Mitigation expensive. Prevention better.	Accession countries implementing Nitrates Directive. Limited elsewhere.	I
<b>Water Management</b>									
Water use inefficiency		All countries with irrigated agriculture					Technologies well understood.	Projects with modest impact underway in all irrigation countries except Russia and Ukraine.	I
Waterlogging and salinity		Central Asia, Russia, Ukraine, Turkey					Basic technologies understood but more comprehensive approaches needed.	Projects with modest impact underway in all irrigation countries except Russia and Ukraine.	I
<b>Pest Management</b>									
Lack of pesticide regulation		Throughout the region					Technologies well understood.	Well addressed on paper; enforcement variable.	III
Non disposal of obsolete products		Throughout the region					Testing of lower cost approaches needed.	Inventories underway in most countries. Disposal projects underway in several countries, complete in three.	III
Lack of IPM		Opportunities throughout the region					Concept well accepted but much adaptive research needed.	Great success in cotton in Central Asia but limited elsewhere to high value and organic crops.	I
<b>Rangeland deterioration</b>		Throughout the region but esp. in Central Asia					Techniques well known but need adaptation to local conditions.	Pilot projects in Kazakhstan and Kyrgyz Republic.	III

(continued on next page)

**Table 2: Summary of Issues (continued)**

Issue	Occurrence	Nature of impact	Availability of mitigation measures	Response	Priority
<b>Lack of watershed management</b>	Upland areas		Good pilot projects that balance environmental, economic, and social factors.	Progress in Turkey and Tajikistan.	II
<b>Threats to food safety</b>	Throughout the region but esp. in food exporting countries		Technologies well known but systematic (and expensive) approach needed.	Good progress in most SEE and Caucasus countries.	I
<b>Lack of organic farming</b>	SEE, Ukraine, Georgia, Moldova		Technologies well known but economic and marketing factors may determine success.	Promising starts in most SEE countries plus Ukraine, Georgia, and Moldova.	II
<b>Abandoned farmland</b>	SEE and Kazakhstan		Afforestation alternative well understood.	Opportunities for economic use and/or carbon sequestration not yet widely taken. Conversion of cropland to rangeland in Kazakhstan.	II
<b>Radioactive contamination</b>	Belarus, Ukraine, Russia and Kazakhstan		Pioneering approaches in Belarus and Ukraine.	Chemobyl situation under control, with some land being returned to cultivation and strict standards for crops and timber. Scant action in Kazakhstan.	I
<b>Forestry</b>					
<b>Unsustainable management</b>	Throughout the region		Technologies well understood.	Annual cut less than incremental growth in all countries.	II
<b>Threats to forest health</b>	Throughout the region but episodic		Technologies generally understood.	Countries able to handle routine outbreaks of fire, pests, and diseases.	II
<b>Illegal logging</b>	Large scale in Russia, Ukraine, Albania, and Bulgaria; small scale in rest of region		Technologies being pioneered through FLEG, certification, etc.	Countries now making serious efforts; problem may be diminishing.	I
<b>Climate Change</b>					
<b>Lack of mitigation</b>	Throughout the region but especially in larger countries		Carbon sequestration technologies well understood but institutional and financial mechanisms still a challenge.	Only modest efforts in Moldova, Romania, and Russian forestry to date. Very large scope in the region.	I
<b>Lack of adaptation</b>	Throughout the region, but especially in the south		Along with knowledge on likely impacts, ideas on adaptation are being developed. Important for both agriculture and forestry.	Almost nothing has been done to develop and implement explicit adaptation action plans. Awareness being raised now.	I

Key: box with dark shade = major impact; box with light shade = lesser impact.

Notes:

1. The categorization of impacts was adapted from World Bank/OECD (1998). A category, global commons, was added to reflect the growing importance of trans-boundary impacts.
2. The rating of impacts, assessment of responses, and setting of priorities are qualitative and partly subjective, for which the authors take responsibility. Priorities for future action were assessed by balancing the seriousness of the threats (while giving greater weight to the impacts on human health) with the effectiveness of possible responses.

region, current nutrient runoff from the EU15 is significantly higher than from the EU8 or Russia. However, this situation will change as transition economies continue to grow. For example, by 2015, pig meat production is expected to increase by over 70 percent in the EU8, and poultry production is expected to increase by over 50 percent in Russia, leading to significant increases in manure. By 2016, nitrogen fertilizer use is expected to increase by 30 percent in Poland (HELCOM and NEFCO 2007). As a result of these developments, by 2020, surpluses of nitrogen and phosphorus are expected to grow by 63 percent and 84 percent, respectively, in the EU8, while they will shrink by 12 percent and 25 percent in the EU15.<sup>10</sup>

Countries have had to adjust to the changing role of the state in agricultural production. Instead of directing every step of the production process, ministries of agriculture now support and regulate the emerging private sector. Several countries have not yet completed that transition, and numerous vestiges of the old system remain.<sup>11</sup> Although many of the impacts of agriculture and forestry on the environment and on the economy in the region are similar to those observed elsewhere in the world, some may be traced to the historical legacy of this region. For example, the emphasis on food self-sufficiency in Albania during socialism led to cultivation of unsuitable land, which exacerbated soil erosion and diminished forest areas. The “virgin lands” scheme in Kazakhstan, which aimed to promote cereal cropping, had a similar motivation and caused extensive damage to the resource base.

The economic impacts may be so significant due to the long-term nature of many of these problems. To continue with the erosion example, the economic damage it causes each year may be small but the cumulative impact after 10 or 20 years may be extremely significant. In the Anatolia region of Turkey, a watershed rehabilitation project is working to restore the resource base and increase household incomes. The resulting reduction in erosion, increases in yields, and flood control are expected

to generate an economic rate of return of 19 percent, even if other environmental benefits are excluded. Another impressive example of economic damage is salinity in Uzbekistan, which is estimated to cost that country \$1 billion per year.<sup>12</sup> An ongoing World Bank project (World Bank 2003) aimed at reducing salinity over an area of 100,000 ha and enhancing wetlands is expected to give an economic rate of return of 24 percent. In neighboring Kazakhstan (World Bank 2001), restoration of the northern part of the Aral Sea is beginning to generate substantial environmental benefits but also major economic benefits in the form of fish production, with an estimated economic rate of return of 20 percent. Finally, going back to the example of eutrophication in the Baltic Sea, the upper bound on the costs of eutrophication caused primarily by agriculture and forestry is estimated at Euro 4.5 billion (HELCOM and NEFCO 2007).

Solutions to environmental issues related to agriculture and forestry are often known, as evidenced by the number of times that “technologies well understood” appears in Table 2. Western countries have faced the same issues listed in the table, with the possible exception of radioactive contamination; thus an array of policy and technical measures is available—for example, manure management to minimize nutrient outflows (Box 6) or conservation tillage and buffer strips to reduce soil erosion. Nevertheless, such technologies are often not implemented, perhaps because they usually need to be adapted to local conditions through research or pilot projects. Most of the region’s countries are still at this stage on most of the issues. Table 3 shows trends with respect to

<sup>10</sup> HELCOM and NEFCO. (2007). Projections from EEA (2005).

<sup>11</sup> In a few countries, such as Belarus, Turkmenistan, and Uzbekistan, major parts of the old system, such as “state orders” and managed prices, have not been dismantled and are a major impediment to private entrepreneurship.

<sup>12</sup> World Bank staff estimates.

**Table 3: Reported Trends of Selected Mainstreaming Indicators in EECCA and SEE Countries since 2000**

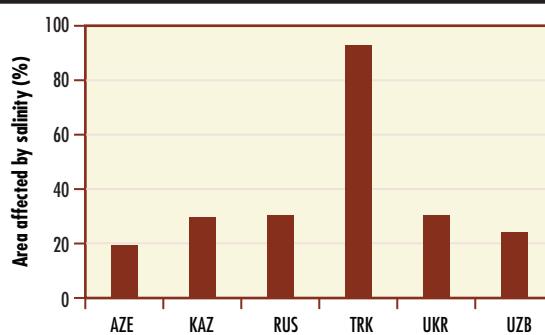
Indicator	EECCA													SEE								
	ARM	AZE	BEL	GEO	KAZ	KYZ	MOL	RUS	TAJ	TRK	UKR	UZB	ALB	BIH	BUL	CRO	KOS	MAC	ROM	SER	TUR	
<b>Agriculture</b>																						
Soil Protection	↓	↓	↑	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Nutrient Conservation	↑ <sup>(a)</sup>	...	↑	↑ <sup>(a)</sup>	...	...	↑ <sup>(a)</sup>	↔	↑	↔ <sup>(a)</sup>	...	...	↔	↔	↔ <sup>(a)</sup>	↑	...	↔	↑ <sup>(a)</sup>	...	↔	↔
Water Use Efficiency	↑ <sup>(b)</sup>	↔	...	↑	↑ <sup>(b)</sup>	↑ <sup>(b)</sup>	↔	↔	↑	↔	↔	↑+	↑ <sup>(b)</sup>	↔ <sup>(a)</sup>	...	↑ <sup>(b)</sup>	...	↑	↑+	↔	↔	↑
IPM Coverage	↔	↔	↔	↔	...	...	↔	↔	↑	↑	↑↑	↑↑	↔	↑ <sup>(a)</sup>	...	↔	↑ <sup>(a)</sup>	↑ <sup>(a)</sup>	↔	...	↔	↑ <sup>(a)</sup>
<b>Forestry</b>																						
Protected Areas	...	↑	↑	↑	↑	↑	↑	↑	↑	↑↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	...	↑
Forest Health	↑	↔	↑	↑	↑	↑	↔	↓	↔	↔	↑	↑	↑	↑	↑	↑↑	↑	↑	↑	↑	↑	↔
Certification	↑	...	↑	↔	...	...	↔	↔	↑	↑	...	...	...	↑	...	↑	...	...	↑	↑	↑	↔
Sustained Yield <sup>©</sup>	↓	↑	↑	↑	...	...	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	...	↑	↑	↑	...	...

Note: Given the difficulties in presenting quantitative data for indicators included in this table, trend indicators (up or down arrows) have been used as proxies. Trends reported here refer to the period 2000–2006. When available, data reported in local specialists' reports, supplemented by parallel qualitative analysis by the Bank team working on this study, were used to derive these trends. See Annex 3 for a detailed list of indicators and an explanation of how they were used to define mainstreaming trends.

- ↑ = positive trend; ↑↑ = very positive trend; ↓ = negative trend; ↔ = no change; ... = no data or none.
- (a) Pilot level work only.
- (b) Projects to rehabilitate irrigation and drainage systems will have some impact on water use efficiency, but have generally not yet focused on this objective.
- (c) An "up" arrow indicates that annual harvesting is less than incremental growth but may mask factors such as over-harvesting of more accessible or higher-value forests.

DISCLAIMER: The mainstreaming trends reported in this table are pending full review and validation by the respective national governments.

**Figure 1: Share of Irrigated Area Affected by Moderate to Severe Soil Salinity, Select Countries (%)**



Source: GEF (2003). Also, local consultant reports for this study.

selected mainstreaming indicators. How the indicators were selected is explained in Annex 2. The limitations of the table should be borne in mind: the data are of variable quality, and “up” arrows do not mean the issue is being fully addressed.

The outlook is more positive for forestry than for agriculture. As reflected in the trends reported in Table 3, harvested timber volumes are less than the incremental growth in all countries for which data are available, protected forest areas are increasing throughout the region, and certification of forest products is gaining momentum. For example, certification covers more than 90 percent of Croatia’s forests, is growing rapidly in Russia (which accounts for 93 percent of the region’s forests), and is starting in Armenia, despite its limited financial resources. The status of forest health is more mixed; trends are difficult to discern, but most countries are taking action to manage fires, pests, and diseases, including a major program in Russia. In agriculture, the most disturbing finding is that soil erosion is generally not being addressed—with the exception of several projects in Turkey—and is consequently getting worse across the region. Positive results are being achieved in nutrient management and IPM, although mostly on a small scale. The most progress on IPM has been made in Central Asia. As for water management, most countries with exten-

sive irrigation systems (Russia and Ukraine being major exceptions) are acting to rehabilitate those systems, with some likely, albeit modest, improvements in water use efficiency and salinity control (see Figure 1). It should be noted that differences between the two sub-regions are relatively minor at this level of aggregation.

In each country, questionnaires were used to assess progress, especially on institutional issues and government services.<sup>13</sup> Results show that, in most EECCA countries, the latest agricultural and forest strategies incorporate environmental targets (see Annex 2). There are ongoing reforestation or afforestation programs in all EECCA countries, and most SEE countries have agricultural and forestry research systems that address environmental and sustainability issues. Common areas of good practice in the agricultural sector in the region as a whole include: good inter-ministerial cooperation in most countries; nutrient management research programs and pesticide regulations established; environmental impact assessments of farm operations and investments; and programs to improve water use efficiency and soil management.<sup>14</sup> In the forestry sector, mainstreaming efforts are more prevalent than in the agricultural sector. The main weaknesses reported were in the following areas: environmental capacity in the ministries of agriculture; extension services; programs to manage manure and capture methane; integrated pest management; support to organic farming; forest certification; the use of strategic environmental

<sup>13</sup> This work was initiated by OECD for its study *Progress on Environmental Management in Eastern Europe, Caucasus and Central Asia*, 2007, and expanded under the present study to include SEE. However, the results should be interpreted with caution as the respondents in the OECD study were government officials and, in the case of the World Bank questionnaire in SEE, a different consultant in each country. Comparability between countries may therefore be limited.

<sup>14</sup> However, these innovations are often on a small scale.

assessment of policies; and lack of cooperation between ministries of agriculture and ministries of the environment on strategy development.

Many of the impacts noted are trans-boundary or global in nature. As already mentioned, agriculture and forestry are major generators of greenhouse gases, and most of the emissions from these sources come from developing and transition countries. It is beyond the scope of this report to provide a comprehensive assessment of the impact of climate change on agriculture and forestry in transition countries.<sup>15</sup> However, given the growing concern on this issue and on finding ways to mitigate the release of greenhouse gases, the study did consider the potential in forestry and agriculture for carbon sequestration and methane capture (Table 2 and Boxes 2, 9, and 10), as well as the importance of adaptation to climate change. Nutrient pollution often impacts downstream water bodies, which is why early actions have focused on the Danube-Black Sea and Baltic Sea basins

(Boxes 5 and 6 and para. 5.3 and 7.1). Salinization of irrigated land is widespread and increasingly trans-boundary in nature, especially in Central Asia; efforts to combat salinity in the future will require more cooperation at the river basin level (Table 2, paras. 2.6 and 4.5, and Annex 5). Programs to improve food safety (Table 2, Boxes 1 and 5, and paras. 3.1 and 6.6) or combat avian influenza also have important trans-boundary dimensions that require international cooperation.

<sup>15</sup> The report "Climate Change 2007: Impacts, Adaptation and Vulnerability" (2007), the Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, does consider the impacts of climate change on "food, fibre and forest products" (Ch. 5), as well as the implications for Europe (Ch. 12). A forthcoming World Bank report will look specifically at adaptation in the ECA region.

## Focusing on the East and on Agriculture

# 3

**A**ccelerating implementation of environmental integration will require increased efforts in the EECCA countries and the agricultural sector. At the 2003 Environment for Europe Conference in Kiev, there was strong support for the view that greater attention was needed to ensure environmental sustainability in the EECCA sub-region. This study confirms the validity of that assessment with respect to integrating environment into agriculture and forestry.<sup>16</sup> Annex 5 compares the two sub-regions with each other and with the relatively new EU member states Poland and Hungary. Major issues such as water and rangeland management, radioactive contamination of farmland and forests, and illegal cutting of forests are much more prevalent in the EECCA sub-region. Food safety and organic farming are much less developed in the east. As the analysis in Annex 2 suggests, policy and institutional development are less advanced in EECCA, where more of the mainstreaming indicators in Table 3 and Annex 3 are showing a worsening trend. Nevertheless, there is considerable overlap between

the two sub-regions, and the best performing EECCA countries, such as Kazakhstan, are ahead of SEE laggards, as is Uzbekistan in the area of IPM (see Box 3).

The impacts of agriculture on the environment are different from those of forestry. Except perhaps for Russia, environmental impacts from agriculture are arguably of greater magnitude than those from forestry and not as well addressed. Despite the dislocations of transition, forests in the region are managed with a considerable degree of sustainability, especially when compared with those in tropical regions. Throughout the region, harvesting is considerably less than the incremental growth (even when estimated illegal cutting is

<sup>16</sup> An internal World Bank assessment in 2005 of environmental performance of regional countries (covering all sectors) showed a clear gradation from new EU member countries, which scored 5.25 (out of 6), SEE countries at 3.75 and EECCA at 3.2. The EECCA countries have work to do to reach the level of SEE, but the latter sub-region is still well behind its EU neighbors.

### Box 3: Integrated Pest Management in Uzbekistan

In Uzbekistan the growing concern over chemical pesticide application in cotton cultivation in the 1980s gave rise to research on biological pest control methods. At that time, as many as 12 kg/ha of herbicides and pesticides were being applied to the crop. After independence, interest in IPM was revived, initially under the World Bank's Cotton Sector Project (1995–2002), which supported the production and distribution of predator insects and other IPM techniques. Uzbekistan's Ministry of Agriculture and Water Resources subsequently expanded the program, but the main work of producing predator insects is done by nearly 900 laboratories, 40 percent of which belong to the private sector; they produce 12 tons of wasps and other insects per year. Biological controls are now used on 90 percent of cotton fields, where effective pest management has been achieved. Not only has chemical pesticide use been reduced by 75 percent in the last five years, but biological methods have the added advantage that they cost less than 50 percent than do the chemicals.

included).<sup>17</sup> Generally, forest areas are increasing, for several reasons: the European forestry tradition of resource conservation, which was followed by the Soviet Union and other countries; growing external scrutiny; and enhanced incentives for sustainable management, for example, through certification. A major qualification to this optimistic picture is illegal logging, which remains prevalent in all EECCA and a few SEE countries. Most countries are now taking serious steps to curb illegal cutting, but these efforts may take years to produce full results (see Box 4). Forest fires are also a major threat in some countries, including Russia.

Proximity to the EU is a major driver for mainstreaming in both agriculture and forestry, whether proximity is defined in a purely geographical sense or in terms of progress towards EU accession. Even when accession is some time off, its possibility may focus decision makers on issues of concern to the EU, such as sustainability. In the pre-accession process itself, the need to harmonize legislation and fulfill criteria for pre-accession funding attracts greater attention to integration matters. Finally, EU funding itself may provide considerable momentum for turning good intentions into reality. Box 5 provides an overview of how this process has worked in recent and current EU candidate countries. At the same time, there is still room for improvement among new EU member states; many prefer to shift CAP Pillar 2 funds,

which could be used to support environmental integration in agriculture, to Pillar 1 income supports instead. This reveals the need for increased awareness even in these countries.

In contrast, in non-accession countries, such as those of EECCA, drivers towards integration are much weaker, and generous external support (especially grants) is less likely. These countries, therefore, need to do more with less, for example, by focusing on setting the “foundation” for integration—i.e., *governance, awareness, capacity building, and incentives*—before launching major investment programs. The cost of building these components, described in more detail in the following sections, can be relatively low. Donors and IFIs are well disposed to providing assistance to governments in the mainstreaming area. Non-accession countries, therefore, need to work closely with donors to achieve a shared vision and strategic support. But donor-sponsored and government projects can only go so far. Ultimately, incentives have to be created for the private sector to integrate environmental concerns into their production processes. A potentially powerful tool for achieving this is through trade preferences in the West

<sup>17</sup> However, this may not be true in every locality. Often, forests are overcut close to settlements or roads, and forest quality may be decreasing.

#### Box 4: Russia Combats Illegal Logging

Access to information, stakeholder participation, and accountability are key elements of good governance that protect not only the rights of people and communities, but also their natural environment. The Russian Federation is custodian of 22 percent of the world's forests, but faces serious economic losses from illegal logging. Estimates of the volume of illegal logging range from 10 to 60 percent of total harvest, according to region. In response, Russia has recently emerged as one of the major contributors to international efforts to improve forest governance and combat illegal logging and the associated corruption. Since 2004, the Russian Government and the World Bank have worked together to develop and launch the Europe and North Asia Forest Law Enforcement and Governance (FLEG) Ministerial Process. The Russian Government is also poised to implement its own comprehensive National Action Plan to Combat Illegal Logging and Illegal Timber Trade, which, if implemented fully and consistently with good detection practices, would be a step in the right direction.

for environmentally sound products. This tool is just beginning to be utilized.

Selected public investments in environmental integration in transition countries are justified, especially where there are substantial economic, as well as environmental, benefits to be gained. Rehabilitation of irrigation and drainage systems (with a focus on water conservation and salinity reduction) and large-scale soil conservation programs are examples of worthwhile investments, as is reforestation with carbon sequestration benefits. Some good practice examples from EU member states Poland and Hungary are described in Box 6.

Donors and IFIs have played a critical role in successes achieved so far in integrating environment into agriculture and forestry, and must continue to do so, with the EU dominant in SEE, and the World Bank and GEF in EECCA. In fact,

the Country Reviews show that few initiatives have been undertaken without initial donor support. There are obvious reasons for this to continue: donors bring technical expertise, access to global knowledge, funding, and an ability to link project assistance to policy and institutional reforms. However, donors may need to take a more systematic and strategic view of environmental integration priorities and constraints in each country, as well as ensuring that the “foundation” is in place, rather than promoting innovations in isolation or copying projects from one country to another. It is also imperative that they coordinate with one another and take the time to build ownership by client governments. Donor support will continue to be crucial for trans-boundary issues, such as climate change, and global public goods, such as agricultural biodiversity, because in these areas,

### Box 5: Integration and the EU Accession Process

To emphasize the importance of the environment in rural development and agriculture, farmers' eligibility for agricultural subsidies from the EU is tied to their compliance with EU environmental policies. Similarly, support for nature protection in private landscapes is integrated under the Common Agricultural Policy (CAP) Pillar 2, starting in the 2007–2013 programming period, as are support payments to promote more environmentally sustainable rural landscape management. Previous EU funds for SEE countries are being replaced with an Instrument for Pre-Accession Program for Rural Development (IPARD) in 2007–2013. Accession to the EU is a strong driver for mainstreaming; despite this, the implementation of environmental components within national agricultural strategies is still lagging in all SEE countries. For example, in Macedonia, environmental objectives are acknowledged in the national agricultural policy agenda but full financial support for implementation is lacking.

In the case of Bulgaria and Romania, EU funds played an important role in mainstreaming in agricultural and forestry sectors during the pre-accession period. Access to CAP financing required harmonization with the EU Acquis (directives, regulations, programs, plans, and projects) of national legislation in the agricultural and forestry sectors. Recent availability of EU structural funds has led, among other things, to strengthening, harmonizing, and implementing legislation for soil, water, nutrients, pests, biodiversity, crops and forestry, improved water management, and soil conservation. In Bulgaria, the National Strategy for Sustainable Development of Forests (2006–2015), a draft Action Plan for the Development of the Forest Sector (2007–2011), and a draft of the new Forestry Law (2007) are based on the envisaged use of EU Structural Funds as specific financial instruments to better support the national forest management system and the sustainable use of forest resources.

Even for the EU-8, challenges to integration remain. As a result of political and social pressures, many EU-8 countries have opted to shift CAP resources from Pillar 2 environmental programs to Pillar 1 farm income supports when given the choice. This demonstrates the need for more public awareness efforts, particularly to demonstrate that environmental integration also has important economic benefits. Further, the EU Nitrates Directive and Water Framework Directive require members to improve water management and reduce pollution. But new member states continue to have difficulties in meeting their obligations under these directives.

New EU members are rewarded for adapting well to food safety, veterinary, and phytosanitary systems. At the same time, they are aware that they may be at a competitive disadvantage with older members, as direct CAP payments will be phased in over nine years.

Sources: WB Consultants' reports, as well as World Bank (2007b); CAP: *new members have felt benefits but more needs to be done*. Agriculture, European Parliament, 2007.

## Box 6: Good Practice from Hungary and Poland

Since Hungary and Poland joined the EU in 2004, both countries have made substantial progress in mainstreaming environment into agriculture and forestry. For example, in the area of **crop protection**, Poland was faced with a problem of about 23,000 tons of obsolete pesticides, some as old as 50 years, stored under very precarious conditions at numerous scattered underground sites. Since 1999, about half the products have been excavated and disposed of safely in hazardous waste incinerators, initially outside Poland but now within. The program will be completed by 2010. The key to success was grants to local authorities for the collection process. In Hungary, a program of subsidies to farmers allowed them to switch from pesticides to IPM techniques. As a result, IPM went from being practiced on zero to 12,000 ha in only three years; the area has since expanded to 290,000 ha.

Both countries have given active support to organic farming by putting in place appropriate legal and support frameworks and providing subsidies to eligible farmers. In Hungary, 150,000 ha of organic farming was reached in three years. In Poland, the figure has already reached 200,000 ha, and a new program plans to expand this to 600,000 ha (20,000 farms) by 2013. Lessons learned include: the need for careful calculation of subsidy amounts; the importance of promotion among farmers and consumers; and the need for support in marketing. Poland is also a regional leader in **nutrient management**; results from modest GEF, EU, and other grant programs in three counties were evaluated and used to design a national program, with tens of thousands of manure storage sites, to meet Poland's obligations under the EU Nitrates Directive. The result is reduced nutrient levels in aquifers, rivers, and lakes. Poland has also been active in improving the sustainability of **forestry** through a number of programs that support private forest owners, pest suppression, genetic resource conservation, reforestation, afforestation, and biodiversity protection. Among the results is an increase in Poland's forested area of 222,000 ha, of which about 50 percent is private land. Forest cover in Hungary has also grown in the last decade.

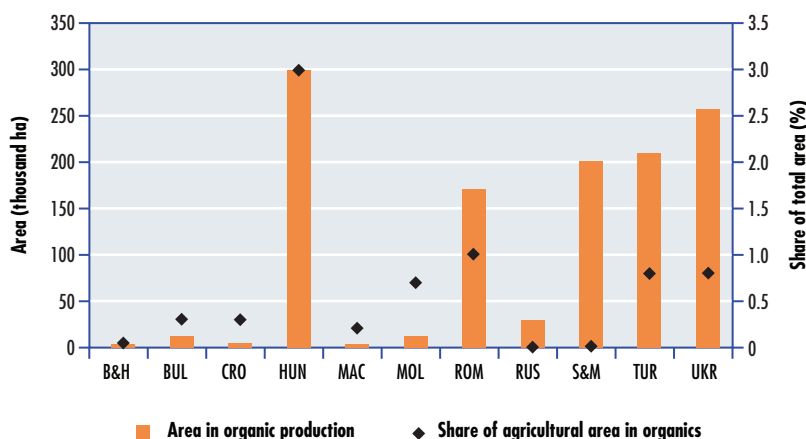
countries cannot capture the full benefits of their own investments.

Public-private partnerships have considerable potential. Examples include: water user as-

sociations for irrigation management (pioneered in Turkey); provision of extension services by private providers and even processors; community management of forests (as in Albania, Armenia,

and Georgia), and watershed programs (as in Turkey and Tajikistan). Perhaps the most dynamic example is organic farming (see Box 7 and Figure 2), which a decade ago was non-existent and is now a promising contributor to food exports in most SEE (and a few EECCA) countries. Nevertheless, it is important for countries to have realistic expectations about the potential for private sector involvement. The private sector will not take care of everything, especially where public goods are concerned (see the discussion below on advisory services).

**Figure 2: Areas of Organic Production by Country (thousand hectares; %)**



Source: All data from local consultant reports for this study, except Bosnia & Herzegovina (2005), Turkey (2006) and Romania (2006), which are from USDA Foreign Agricultural Service GAIN Reports: <http://www.fas.usda.gov/scriptsw/AttacheRep/default.asp>.

### **Box 7: Prospects for Organic Farming**

Producing food and other agricultural commodities without agrochemicals clearly reduces pressure on the environment and on ecosystems, although in most cases some yield reduction does occur. More and more consumers, especially in richer countries, perceive health benefits from organically grown products and are willing to pay a price premium, provided that a certification system guarantees that the product is what it purports to be. The EU and some regional governments are prepared to stimulate organic production through targeted subsidies.

The SEE countries have been quick to seize the opportunity offered by this new market and are setting up legal frameworks, certification systems, and support services. Bulgaria, Romania, Serbia, and Turkey are among the leaders in organic farming, although coverage remains much less than Hungary's 3 percent of farmland. In EECCA, Ukraine has managed to convert nearly 1 percent of its farmland to organic production, despite a lack of government support and no subsidies. Moldova and Georgia are also making progress without subsidies. However, little or nothing is happening in the other eight EECCA countries.

Given the scant use of agrochemicals in the past and their low labor costs, the SEE (and some EECCA) countries have a comparative advantage in organic production and need assistance to expand it through further development of legal frameworks, certification systems, marketing support, and training and advisory services. However, markets in Western Europe will remain limited, and newer EU entrants, such as Bosnia, Croatia, and Macedonia, may face stiff competition and lower prices. As environmental awareness grows, all countries may find greater marketing opportunities domestically.

# Improving Awareness of Sustainability Issues in Agriculture and Forestry

## 4

An important first step in setting the foundation for integrating environment will be to improve awareness of the extent and impact of sustainability issues in agriculture and forestry. This is because change is unlikely unless and until the main stakeholders—including non-environment government agencies, the private sector, and the general public—are well informed about the issues and press for change. The local consultant reports on which this study is based showed that, in nearly all countries, public awareness of the environmental impacts of agriculture and forestry is quite low.

Data from environmental monitoring are important for raising awareness. Environmental monitoring systems generate data on the extent of the problem and provide a way of measuring progress towards its solution. Such systems have advanced considerably over the past decade, especially in terms of establishing basic parameters for air and water quality. Although data are still lacking in many areas related to agriculture and forestry,<sup>18</sup> donor support is improving such monitoring in selected areas, such as forestry and nutrient management in Georgia and dryland management in Kazakhstan. There is a need for quantitative, time-series data on such parameters as soil erosion; nutrient levels in streams, aquifers, and drinking water; salinity levels in soils and water; food safety inspections; forest health; illegal cutting; and forest certification. While environmental monitoring is primarily a government function, NGOs also have a role to play in generating and, especially, in disseminating such data.

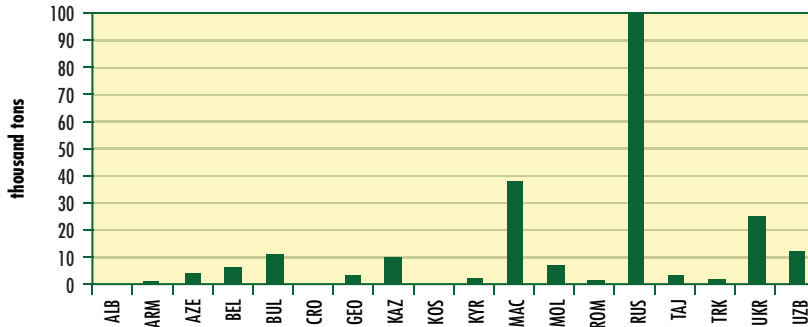
Until recently, information on obsolete pesticides was sketchy at best. However, ratification of the Stockholm Convention on Persistent Organic Pollutants has led to greatly improved data (see Figure 3). While the overall picture remains quite alarming, with about 225,000 tons of toxic materials inadequately stored in the study region, progress is being made in several countries. In Albania, Croatia and Romania, disposal of stocks is almost complete, while programs have started in Armenia, Georgia and Moldova.

Ready access to environmental information is a pre-requisite to public awareness. Although 15 of the 22 study countries have signed the Aarhus Convention<sup>19</sup> and passed national legislation to ensure access to information, some major countries (including Russia, Turkey, Serbia, and Uzbekistan) have not. Moreover, many practical barriers still hinder information access, especially in the east. There is bureaucratic reluctance to share information, a tradition of not questioning authority, and technical barriers such as limited access to the internet, especially in rural areas. NGOs can play a catalytic role in overcoming these barriers.

Awareness among government decision makers also needs to be improved. An important role

<sup>18</sup> As illustrated by the inability of this study to get comparable country statistics on many areas of concern, such as the indicators in Annex 3.

<sup>19</sup> *The Convention on Access to Information, Public Participation in Decision-making and Access to Justice, 1998*. Its Secretariat's Compliance Committee has documented a number of cases in EECCA countries where the public has been denied reasonable access to environmental information.

**Figure 3: Obsolete Pesticide Stocks by Country (thousand tons)**

Source: POPs Newsletter (2007).

Note: Total recorded stocks for these countries = 224,500 tons. Data not available for BiH, SER, or TUR.

for ministers of the environment is to provide concise data on the nature and extent of priority problems, as well as their economic, environmental, and social implications to cabinet colleagues—both in relevant line agencies such as agriculture, forestry, and water, and in ministries of finance and economy, where resource allocation decisions are made. In many cases, special efforts will be needed to inform those who allocate budgets, because of their lack of familiarity with the sectors, as well as regional and local government officials who administer agricultural and forestry programs.

Awareness of the need to adapt to climate change is becoming increasingly critical. Until recently, attention has focused primarily on the need to reduce greenhouse gas emissions in order to reduce the effects of global warming. But most experts now agree that despite mitigation efforts to date, the climate is already warming and will likely continue to do so, and the agriculture and forestry sectors will be among the most affected (Parry et al. 2007). The EECCA and SEE countries will not be immune from these changes: while some of the most northerly areas may initially benefit from slightly increased agricultural and forestry productivity as a result of initial warming (1–3°C), even mild warming will reduce productivity in more southerly areas due to a variety of causes (heat

stress, droughts, flooding, wildfires, pests and diseases), and warming above 3°C will have negative implications even for higher latitudes (Alcamo et al. 2007). The transition countries should therefore begin to proactively integrate climate change risk management into their development plans for the agriculture and forestry sectors. Adaptations could include actions such as altering varieties, improving water management, investing in irrigation,

altering the time or location of activities, rural income diversification, improving pest management, and increasing the effectiveness of weather forecasting. Thus far, there is little evidence that this important work has begun. Undertaking it on a sufficient scale will require increasing awareness among the public and policy makers about the potentially devastating implications of climate change for agriculture and forestry. The EU has recently made promising progress in this direction with the release of the “Green Paper” on climate adaptation (Commission of the European Communities 2007). The transition countries should use this example to raise awareness of their particular situations, and most importantly to begin taking action.

While adoption of innovations from the rest of the world is encouraged, robust agriculture and forestry research systems are needed to adapt technologies to local conditions and test them in the field. This is especially true for more intractable issues such as IPM or salinity. In many regional countries, research systems have not adapted to a new role in support of the private sector or have been weakened by transition. Funding is generally scarce. Nevertheless, responses to questionnaires in the SEE countries (Annex 2) suggest that most research systems are addressing environmental

and sustainability issues. Although a comparable question was not asked in the EECCA countries, the picture there appears less optimistic. However, in a number of countries, including Azerbaijan, Georgia, and Serbia, World Bank projects have introduced competitive grants and targeting of priority problems, with evident success. Romania has recently increased staffing and funding for agricultural research.

A robust, widespread, and cost-effective system of agricultural advisory and extension services is needed to disseminate relevant research findings—including Good Agricultural Practices—to farmers and to receive feedback from them on problems of current concern (see Box 8). Experience in the region is extremely varied. The SEE countries generally have a “conventional” government extension service, with regionally based extension agents providing advice on agro-technical issues on a no-cost basis. However, these services vary considerably

in their effectiveness and ability to advise farmers on sustainability concerns. For example, even Poland’s large extension system is providing limited value to farmers because of low pay, inadequate travel allowances, and a high administrative burden. The situation in Turkey is similar.

Problems in advisory and extension systems are more acute in the EECCA sub-region, where the previous system of top-down directives to collective farms is no longer relevant but has yet to be replaced, in most cases, with a fully effective alternative. Governments are reluctant to shoulder the full cost of a “conventional” system and also wish to address the need for advice on business planning and marketing for farm workers turned farmer entrepreneurs. Consequently, a number of innovations are being tried, often with outside support. For example, under a World Bank-financed project in Kazakhstan, a private corporation has been contracted by the government to recruit and

### Box 8: Modernizing Agricultural Extension

It is generally recognized that an effective two-way channel of communication among farmers, researchers, and administrators is needed, if agricultural output is to grow in a sustainable fashion. A system usually called *agricultural extension* provides such a channel. In moving from central planning to a market economy, regional countries have followed a number of paths with varying success. There is a stark contrast between the two sub-regions; in SEE countries extension services are able to reach private farmers (Turkey is a good example), although some are quite new and many lack full effectiveness. Extension agents are often constrained by low pay, lack of mobility, and excessive paperwork. Many EECCA countries, however, provide few services to private farmers and are making do with the vestiges of the old Soviet system, directed mainly at privatized former collective farms. Moldova is a refreshing exception, and Kazakhstan and Ukraine are beginning to build new systems.

In both sub-regions, there is a clear trend towards supplementing the conventional system of regionally based government extension agents with various forms of private sector support on a fee-for-service basis. This “second tier” of services is typically directed at larger commercial growers and provides business planning services, in addition to agricultural technology. In some cases, farmer associations provide a third tier of services. While this is a logical way to limit budget outlays in countries that already have a widespread conventional service, there are dangers in relying solely on the private sector in countries (such as Georgia) where the bulk of farmers are poor. There are already examples of new models of extension that collapsed after the donor project was completed. In virtually all regional countries, extension services are doing relatively little to promote sustainable agriculture, indicating a need to redirect priorities and staff training.

It seems clear that integrating environment into agriculture will only become widespread when governments and donors take decisions to modernize extension systems and provide a full range of services to farmers at all levels. This implies costs to governments, but studies show that benefits will likely greatly exceed such costs. A comprehensive global meta-analysis of returns on investment in agricultural extension services found a median rate of return of 44 percent (Alston et al., 2000). A review of estimated rates of return for World Bank agricultural extension projects in EECCA countries found similar results, ranging from 16 percent to over 200 percent.

train extension agents to provide both agro-technical and business advice. However, it remains to be seen how this system will survive when project funding is over, and whether the agents can also deliver messages on sustainability. In Georgia, the government intends to rely on the private sector to provide services on a charge-back basis, but this seems unlikely to work for the bulk of poor farmers. In several countries, effective services have been set up in certain regions with donor project support, but there is no mechanism to expand them towards national coverage.

The challenge for countries and donors alike is to examine the strengths and weaknesses of current extension systems in the light of present needs, including the need to advise farmers on good agricultural practices and other sustainable technologies, and to review and evaluate successful innovations from other regional countries. Important considerations will be cost-effectiveness; the feasibility of cost recovery from farmers; the role of farmer associations; input suppliers; processors/wholesalers; mass media; and achieving equity between the needs of larger commercial

growers and small subsistence farmers. The old approach of top-down extension services fully funded by governments is no longer seen as being particularly effective or affordable, and therefore needs to be replaced by demand-driven systems that rely on a combination of public and private support.

The SEE countries with substantial areas of private forests are in the process of establishing forestry extension services (for example, Croatia). However, these should not be expected to solve all the challenges faced by the new forest owners: small holdings; lower productivity compared to state forests; and lack of knowledge of sound silvicultural practices. Owners are also faced with the temptation to sell their timber for a quick profit. Romania illustrates the need for reasonable but enforceable regulations on private forests. Forestry departments may need to develop other tools, such as integrated community development programs for forest villages (e.g., in Turkey) or programs aimed at educating the public about multiple-use concepts or the advantages of certification for domestic consumption, especially in the east.

## Building Capacity for Implementation

5

The region needs to build capacity for implementation, especially in the EECCA countries. Countries of the region should review and, where needed, update their policy and strategy documents on the environment, agriculture, and forestry specifically to identify capacity constraints and needs. National Environmental Action Plans (NEAPs) are often a good vehicle for doing this, as they are generally prepared by inter-ministerial working groups with participation from NGOs and civil society. At the very least, “capacity” has financial, human, and institutional dimensions. While all three dimensions (further explained below) are challenging, institutional change is often the most difficult and time consuming. As the questionnaire analysis (para. 2.9 and Annex 2) shows, institutional weaknesses are prevalent across the region.

Consideration should be given to making permanent any *ad hoc* inter-agency environmental working groups or consultative bodies. By their nature, integration issues need a multidisciplinary approach. For example, the safe use of chemical pesticides includes consideration of public health issues for a range of stakeholders (applicators, rural residents, consumers of farm products), ecological safety (including persistence and accumulation in the food chain), technology for disposing of hazardous waste from obsolete products, and international conventions. Adaptation to climate change is another issue that requires inter-agency cooperation, and due to the new challenges posed by climate change risk, there is a lack of capacity in agricultural and forestry agencies to manage it.

Agriculture ministries should consider how to strengthen their environmental capacity, including staff training and the establishment of special environmental units. A few regional countries, such as Serbia and Belarus, have already done so. Alternatively, environmental review of policies, programs, and projects can be delegated to the ministry of the environment through strategic and project environmental assessment procedures. Where the forestry agency is part of the ministry of environment, as in some EECCA countries but not in SEE (except Turkey), coordination is less of an issue. In either case, the capacity to enforce environmental regulations currently in place (such as those on nutrient discharge) needs to be strengthened and focused on the biggest culprits—industrial-scale agribusinesses, often with foreign backing.

Some ministries of agriculture are still completing the transition from being directly responsible for organizing and directing agricultural production, under the socialist model, to regulating and supporting the private farm sector, for example, the ministries in Belarus, Turkmenistan, and Uzbekistan. Even where transition is relatively complete, a bias towards directing ministry programs to maximize agricultural production is still evident, as seems to be the case in Russia and Ukraine. This leads to continuation of old programs that subsidize inputs and crop production,<sup>20</sup> and pressure to ensure that all agri-

<sup>20</sup> In Uzbekistan, Turkmenistan, Moldova, Georgia, Belarus, Armenia, and parts of Russia. Source: World Bank consultant reports.

cultural land is kept under production, with consequent neglect of longer-term issues such as soil conservation. Accession countries such as Croatia and Serbia provide good examples of how to redirect agriculture ministry programs and budgets from direct support to production to resource conservation and sustainable management. However, this change in focus remains only partial, as indeed it does in most Western countries. Similar considerations apply in the forestry sub-sector, though the transition there has been less radical, especially in EECCA.

The capacity for economic analysis in ministries of environment and agriculture needs to be enhanced. Making the case for investing in environmental integration often means providing rigorous economic cost-benefit analyses to ministries of finance and economy, and politicians. The capacity for such analysis is often lacking in ministries of environment and agriculture, which weakens their position when seeking funding, as well as their ability to rank long lists of investment “priorities” by order of importance. Once investments are made, it is essential to demonstrate their impact in both environmental and economic terms, in order to justify continued support. Even the newer EU member states are often unable to demonstrate the impact of CAP Pillar 1 cross compliance and Pillar 2 environmental investments.

Farmers need reliable advice on sustainable production techniques. As indicated in Chapter 4, virtually no regional country has a fully functional and effective agricultural advisory and extension service through which to communicate knowledge on sustainability to farmers, especially the smaller and poorer ones. In SEE, the challenge is to modernize existing services, improve cost-effectiveness, and expand the range of advice provided. In EECCA, the need is to evaluate the pilot approaches currently being implemented, expand their geographic coverage, and turn them into communication channels that support the

integration of sustainability issues in production and processing. Such an evaluation should focus on the appropriate role of the private sector and the potential for cost recovery from farmers. This should alleviate the strain on government budgets caused by a full-fledged extension service based on western models. Countries may find a two-tier approach desirable, with limited government and greater private sector involvement in services to larger commercial growers and a more conventional approach of geographically based extension agents for the large number of small subsistence farmers.

The SEE countries (and some in EECCA) are developing Codes of Good Agricultural Practice, both to educate farmers on sustainable agricultural technologies and to set standards for certain support programs. Although these codes have good potential to increase the integration of environmental concerns in agriculture, they have clear limitations. Despite their name, they are typically just voluntary guidelines rather than legally binding codes. Also, they cannot anticipate the conditions on every farm or the knowledge and financial capacity of every farmer. These considerations need a more “hands-on” approach, which extension agents can provide.

A recent study of forest institutions in transition (World Bank 2005) points out the importance of a culture of service delivery in forest organizations. The same could be said for agricultural agencies. Organizations should have performance standards for services to their clients, monitoring information, and accountability. There is no single model for success, and numerous cultural and historical factors must be taken into account. Finally, trying to improve organizational performance merely by providing tools such as strategies, training, and equipment will likely be futile, without a thorough analysis of the organization and a strong willingness to change.

All of the above proposals imply a need for more staff with appropriate specialized

training. For example, in Turkey, of the 4,500 staff of the General Directorate for National Parks and Protected Areas, who are mostly qualified forest engineers, fewer than 2 percent have any training in ecology. Many other agencies in the region face similar situations. Building specialized skills takes time and, in many transition countries, the process is undermined by moribund agriculture and forestry education systems in desperate need of restructuring and reform. This has clear budgetary implications, although in some cases new programs could be financed by curtailing old programs that are no longer needed, and by improving the cost-effectiveness of services.

Regional countries, especially in EECCA, do not score well on published indices of good governance. For example, on average, the SEE countries received a score of 3.19 out of 10 on Transparency International's Corruption Perception Index, while

EECCA countries scored only 2.50. Unfortunately, this affects performance in the agricultural and forestry sectors, and especially in the latter. The persistence of illegal logging is largely due to the connivance of corrupt officials,<sup>21</sup> although countries are now beginning to address corruption (see Box 4) through processes such as Forest Law Enforcement and Governance (FLEG). A major role of government in a market economy is to ensure impartial enforcement of the laws.

<sup>21</sup> According to allegations by a number of independent observers and recently confirmed by the head of the Russian Federal Forest Agency, Roshchupkin, Valery P., 2007, "Results of Inspection in Chita Oblast, Measures to Prevent Illegal Logging and Trade of Illegal Timber," presentation by the Head of Russian Federal Forest Agency to the Illegal Logging and Associated Trade Meeting, Chita, 19 May, 2007.

# Increasing Incentives for Implementation

## 6

Incentives for implementation need to be increased, especially in non-accession countries. Governments should use their policy instruments and public expenditures to discourage unsustainable behavior and provide incentives for the dissemination of good agricultural and forestry practices, and to encourage the provision of environmental services. The international community, particularly the West, can also play an important role through the powerful tool of trade incentives.

The first priority should be to eliminate perverse incentives, such as taxes and subsidies that encourage unsustainable practices. For example, the “state order” systems in Uzbekistan and Turkmenistan tell farmers what crop to grow, subsidize inputs and credit, and require a fixed portion of production to be sold to the state at below world market prices. Although these systems have been loosened since independence, they still drain a huge amount of resources from the rural sector, severely constraining farmers’ capacity to invest even in irrigation infrastructure maintenance, let alone in efforts to improve water use efficiency. Many regional countries (see Footnote 21) still maintain subsidies on recurrent chemical inputs such as fertilizers and pesticides, causing negative impacts on both the environment and the state budget. It should be noted, however, that fertilizer use, in particular, is still generally quite low, and in some cases amounts to soil mining. The present low levels of nutrient application and runoff provide a valuable window of opportunity to expand the use of good agricultural practices designed to minimize nutrient runoff. Extensive international

research shows that subsidies on recurrent inputs do little or nothing to enhance long-term productivity, and can even have a negative impact on economic growth (Allcott, Lederman, and Lopez 2006; Fan and Rao 2003). Instead, regional governments should use public resources to encourage investments in public goods, including those that generate positive environmental consequences, such as under the EU’s CAP Pillar-II approach (see Box 5). For example, EU support has helped Croatia to refine subsidy policies, harmonize veterinary standards, improve integration with other sectors, enhance monitoring, and implement the Nitrates Directive.

Governments should apply the “polluter pays” and “user pays” principles in agriculture and forestry, to which they have generally given rhetorical support.<sup>22</sup> Indeed, most regional countries impose pollution fees and fines on major pollution sources such as animal feedlots. However, enforcement is often variable (and subject to corruption), and fees are set so low that they do not provide any incentive for the producer to change his behavior, nor enough revenue for the state to finance remedial investments. As for user charges, irrigation water use is a good example. Raising charges to a level that would provide an incentive for conservation by users could contribute greatly to national water management goals, provided farmers could afford to pay such charges.

<sup>22</sup> The principles that polluters of the environment should compensate society for the damage they cause and that users of natural resources should pay for the use of those resources.

This points to the limitations of an approach that relies solely on economic instruments in situations where farmers are poor, lacking in knowledge, and without functioning infrastructure.

Although incentives there are stronger, EU-accession countries still need capacity development to respond properly to them. EU-accession countries have a clear path to follow and significant amounts of funding they can access. Nevertheless, considerable domestic funding is also required, there are complicated procedures to be followed, and the countries' capacities for managing and utilizing the funds effectively may be limited at first. One should therefore not expect rapid change. However, more can and should be done to develop the capacity of accession countries to tap EU resources and use them effectively to comply with environmental requirements. The international community can play an important role in this, as illustrated by a new World Bank-financed project designed to assist Romania in meeting its obligations under the EU Nitrates Directive.<sup>23</sup>

The challenge in non-accession countries is even greater, as domestic incentives and external funding will remain much more limited. There is a clear role for IFIs and other donors as agents of change, especially in EECCA. However, donors should begin any program of assistance to integration in agriculture and forestry with a broad view that encompasses line agencies and ministries of finance and economics as well as ministries of the environment, plus a strategic approach that is consistent with the countries' own integration strategies. For example, in mountainous regions, an integrated watershed management approach might be desirable, both to protect the environment and improve rural livelihoods. The best examples of such projects (e.g., in Turkey) give equal emphasis to economic, social, and environmental goals and work with a large variety of stakeholders.

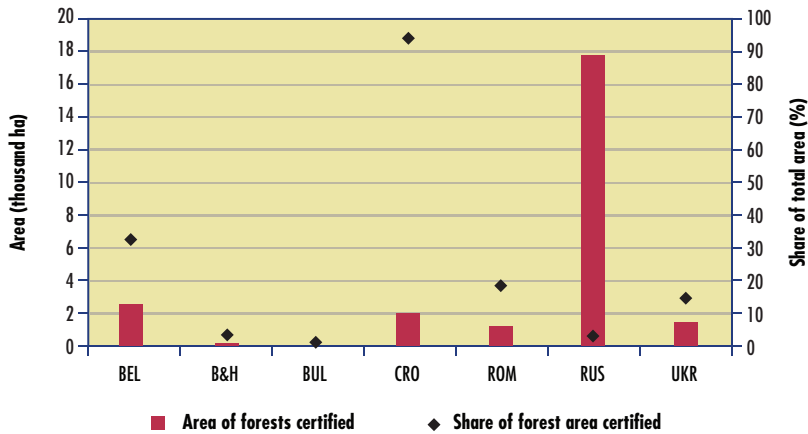
International trade opportunities can be a powerful driver for integrating environmental

considerations into the production of export commodities. Import requirements by western countries typically include provisions that the traded goods meet food safety standards and, increasingly, that they be produced in a sustainable manner. In addition, public concern about food safety and consumer demands for "green" and organic products are growing with awareness in the West, and producers in transition countries must meet these requirements if they wish to export to lucrative western markets. For example, EurepGAP is a private sector entity, initiated by EU retailers, with a secretariat in Cologne, that sets voluntary standards for the certification of agricultural products around the globe. Certification is by independent third parties. The reward of growers who manage to satisfy such standards is access to larger, higher-value markets and premium prices.

The SEE and EECCA countries should be well placed to meet the demands of western importers, given their lower labor costs and scant use of agro-chemicals in the past. Indeed, most SEE countries are now marketing organic produce in the EU. But many others, particularly in EECCA, need to improve their agricultural product standards and certification systems, and help producers and processors enhance their capacity to meet the requirements.

Certification that forest products are sustainably produced is rapidly gaining ground in the region (Cashore et al. 2006). By 2005, over 3 million hectares of forest had been certified as sustainably managed in SEE, and nearly 22 million hectares in EECCA (though this only amounts to 11 percent and 3 percent of the total forest area in each sub-region). Presently, nearly all of Croatia's timber is certified, and the Russian Federation, the region's biggest timber exporter, has made a

<sup>23</sup> The Integrated Nutrient Pollution Control Project, which aims to reduce nutrient discharges into water bodies by promoting behavior change through strengthened institutional and regulatory capacity, and demonstrated community-based actions.

**Figure 4: Extent of Forest Certification by Country (million ha; %)**

Source: FSC (2007).

Note: The remaining EECCA and SEE countries and territories (Albania, Armenia, Azerbaijan, Georgia, Kazakhstan, Kosovo, Kyrgyz Republic, Macedonia, Moldova, Montenegro, Serbia, Tajikistan, Turkey, Turkmenistan and Uzbekistan) do not have certified forest areas.

promising start in three production areas, though none of these are in the east, where it is needed most (see Figure 4). There remains great scope for increasing forest certification and strengthening standards, especially in chain of custody documentation. Poland was one of the first European countries to seek certification, which now covers 80 percent of its forest area. Romania provides a valuable tax incentive for certified producers. However, a concern is that many major timber importers, especially in Asia, do not require certification. For more information, see Annex 1.

Western countries could do much to encourage sustainable production in the region by opening their markets to more agricultural imports from transition countries, combined with rigorous requirements for safe and environmentally sound production. Much has been made of the tremendous positive impact that reducing agricultural supports and protection to farmers in the West could do for growth and poverty reduction in transition and developing countries. Much less has been said of the potential for increased trade to encourage environmental integration. Unfortu-

nately, rather than using this potentially powerful tool, EECCA countries have become increasingly dependent on exports to other regional countries, where environmental standards are much lower, and as a result, their share of exports to the EU has decreased significantly since 1993 (Broadman 2005). More could also be done to increase the demand for certified forest products by raising awareness among consumers in the U.S., where sales of certified products as a share of the total are much lower than in the EU.

Incentives should also be increased to encourage

the provision of environmental services from agriculture and forestry. For example, sustainable watershed and forest management can generate environmental services like improved water quality, stable water flows and reduced flooding, carbon sequestration, and biodiversity conservation. But more often than not, these services are not remunerated, which results in sub-optimal levels of provision from the perspective of society. The market failure can be addressed by setting up systems of payment for environmental services. This is already happening in other regions, such as in Latin America, where there are examples of users of clean water (municipalities, food processors) paying upstream farmers to maintain the vegetative cover on the land in order to reduce erosion and maintain water quality. The EU has made important steps in this direction by introducing support to landowners under CAP Pillar II (Axis 2) for promoting the sustainable management of agricultural and forestry land, and compensating them for the production of environmental public goods, such as bird habitat. But efforts in this direction need to be expanded, and similar measures

### **Box 9: Abandoned Farmland: Threat or Opportunity?**

Land abandonment, which occurs when farmers cease to use land for agricultural purposes, is inevitable in the transition to a market economy. The causes of abandonment are largely economic, as farmland is abandoned when it no longer yields a positive economic return, or when the farming system is no longer viable when faced with new forms of competition. In the SEE region, the decline in viability accelerated with the collapse of state-owned and collective farms in the early 1990s. Additional causes included civil wars (Bosnia and Herzegovina, Serbia, Croatia, and Kosovo), uncertain land ownership, and demographic change.

In the nine SEE countries for which data are available (Annex 4), abandoned land, typically the steeper, rocky, infertile soils and the areas farthest from market, represents approximately 8 percent of total farmland. The lack of active management often results in the growth of tall grasses, scrub, and, eventually, forest, which generally has positive environmental consequences. However, extensively farmed land that has been used for grazing tends to be rich in both flora and fauna, so abandonment of these lands may result in a loss of biodiversity.

While land abandonment can accelerate the economic and social decline of communities, it may also create new opportunities for tourism, recreation, and forestry. Afforestation of such land also offers opportunities for carbon sequestration (which can result in payments; see Box 2) within the framework of the United Nations Framework Convention on Climate Change. However, few regional countries are developing plans and programs along these lines.

adopted in non-EU countries. With regard to carbon sequestration, a number of EECCA countries in particular have potential to benefit from carbon payments through the Clean Development Mechanism (CDM) of the Kyoto Protocol, and some already have (see Box 2). Nevertheless, the CDM is very restrictive and covers only afforestation and reforestation, while offering no incentives for the preservation of existing forests. In addition, there is currently no mechanism for encouraging the sequestration of carbon in soils (such as through conservation tillage), which is an important contribution of agriculture. Efforts should be made to correct these flaws during negotiations for the period after 2012. In addition, it should be recog-

nized that carbon sequestration services provided by transition countries are a global public good that will be furnished in less-than-optimal quantities unless rich countries transfer more resources to compensate for them.

Abandoned farmland, especially in SEE, presents both an environmental challenge and an opportunity to capture national and global benefits. As Annex 4 and Box 9 indicate, the amount of land that has gone out of production for economic and war-related reasons is a substantial 8 percent of all farmland in SEE (excluding Turkey). While farming could be restored on a portion of this land, countries should also examine the potential for afforestation for carbon credits.

## Building on Success



Progress on integration can be accelerated by scaling up successful pilot initiatives and disseminating good practices. The study has found several areas where sustainable practices have been successfully introduced on a small scale through a pilot project (often with GEF support) and where the next step is to scale up such initiatives. For example, promising results have been obtained in manure/nutrient management in the Baltic and Danube-Black Sea areas (with support from GEF, Sweden, and others) specifically in Russia, Turkey, Romania, Bulgaria, Serbia, Moldova, and Georgia. Following the examples of Poland and Romania, these countries could turn pilot projects into national programs and begin to make serious inroads into the problem of eutrophication, with its damaging impact on water quality. In Kazakhstan, the virgin lands program of the 1950s introduced grain cultivation into semi-arid land, previously used for grazing, with serious environmental consequences. A World Bank/GEF project is succeeding in reversing that process, and the Kazakh government has expressed interest in scaling up the project to the national level (see Box 1).

Integrated pest management is another case in point. While IPM is generally regarded as a much more sustainable alternative to the blanket use of chemical pesticides, most regional countries have applied it only on specialized crops (such as fruit or greenhouse production) or organic produce. It is now time to apply that experience to other crops and on broader expanses, perhaps following Uzbekistan's success in using IPM on 90 percent of its cotton production.

Minimum tillage is a proven technique that minimizes soil erosion, but requires specialized farm equipment and adaptive research to meet local conditions. Pilot results in Kazakhstan look promising, but less so in Georgia. However, governments should be prepared to continue experimentation in this important area.

A major challenge when scaling up is to maintain momentum after donor funding ceases. In the area of nutrient management, Poland provides a good example of a successful World Bank-financed operation for manure management that was followed by a national program established with EU support. Romania is planning to follow a similar course. Successful scaling up involves several elements:

- pilot project results well documented in environmental, economic, and social terms;
- building government ownership of the innovation;
- dissemination of technical information and results;
- institution building to support a larger program;
- streamlining of project models to improve cost-effectiveness; and
- step-by-step rather than wholesale expansion.

Regional knowledge sharing should be increased. As the region presents a wide diversity of conditions and experiences, but also a degree of commonality through culture and history, much can be gained when regional countries learn from

## Box 10: Money from Manure in Georgia

Biodigestors installed in western Georgia have proven a recent success, with considerable potential for scaling up. Between 2001 and 2007, under the Agricultural Research, Extension, and Training (ARET) Project, the World Bank financed the installation and maintenance of 272 biodigestors in 56 villages. Other donors funded 80 units, and the Adjara Region government has also contributed. A biodigestor is a simple device for the collection, storage, and processing of manure that the farmer can easily install and use for producing biogas (methane) for cooking and biomass to improve soil structure and replace mineral fertilizers. Methane is a potent greenhouse gas that would otherwise escape into the atmosphere. The biodigestor can be sized to fit very small livestock operations of 3 to 10 cows.

Careful monitoring of the ARET project is revealing significant benefits, including the annual production of 180–200,000 m<sup>3</sup> of methane, which replaced about 2,000 m<sup>3</sup> of fuelwood, often the result of unregulated cutting and deforestation.<sup>24</sup> Though significant, reductions in carbon emissions have not yet been quantified. Finally, between 2002 and 2007, annual savings of about 200 lari (82 Euros) per farmer were recorded on purchases of mineral fertilizers that have now been replaced by organic fertilizer produced on farm from manure and other waste; the cost of firewood and liquid gas consumption was reduced by 600 lari (247 Euros) over the same period of time.

each other.<sup>25</sup> Regional organizations, such as the EU, UNECE, and OECD, could take the lead in strengthening the means to disseminate such knowledge. New EU member countries might have a special role to play in information sharing. While learning will often be from “west” to “east”, there are important exceptions. For example, Uzbekistan and Turkmenistan make the most widespread use of IPM, Kazakhstan is pioneering rangeland management, and Georgia is showing success with biodigestors (see **Box 10**) and food safety. Countries and donors might consider holding regular forums for exchanging experiences, particularly at the sub-regional level. A useful model might be the Mediterranean Environmental Technical Assistance Program (METAP), which has specialized in knowledge transfer through numerous regional workshops. Subjects of interest might include:

- soil erosion;
- nutrient management;
- pest management, including IPM and the disposal of outdated pesticide stocks;
- salinity control;
- food safety;
- organic farming;
- illegal logging; and
- sustainable forest management, including community participation.

<sup>24</sup> On average, a typical 6 m<sup>3</sup> biodigestor can produce 700–800 m<sup>3</sup>, or 14–20 tons, of biomass per farm annually; the consumption of fuelwood was halved, from 15 to 7 m<sup>3</sup> per year.

<sup>25</sup> A series of sub-regional workshops is planned for the dissemination of this report.

## Meeting the Challenges Ahead

8

Countries of the region have shown their commitment to integrating environmental concerns into agriculture and forestry through their policy statements and action plans, including the EECCA Environment Strategy adopted in Kiev. Many, however, are finding it difficult to turn those commitments into action on the ground. This report has made a number of suggestions for addressing constraints and providing momentum to such implementation. **These have been summarized into ten overarching recommendations in Table 1** for consideration by the governments of the region, involving all relevant ministries, as well as NGOs, regional organizations, and the IFI and donor community.

Moving to implementation will require, first, a review of existing policy documents and action plans, as well as careful setting of priorities in a multi-stakeholder context. Priority actions can then be delineated in terms of their costs, expected benefits, institutional responsibilities, skilled staffing needs, and other factors. Early actions will likely be “win-win,” that is, they will produce economic and social benefits that outweigh their costs.

Economic evaluation needs to play a greater role in integration-related decision making. Most of the mainstreaming issues identified in this study involve damage that can be evaluated in economic terms, but such calculations may not always be easy. Difficulties in obtaining reliable data may indicate the need to strengthen monitoring systems. However, once the results of cost-benefit analyses of environmental programs and investments are available, they will compete

on an equal footing for public or private sector funds with more conventional investments aimed at increasing productivity.

The EECCA sub-region has further to go in integrating environment into agriculture and forestry but, at present, has less access to external support, especially from the EU. This was recognized at the Kiev meeting where the EECCA Strategy was adopted. To implement that strategy, EECCA will need to do more with less and focus on clear priorities. However, donors and IFIs should be prepared to expand support to those countries willing to commit to an environment integration agenda. Granting market access for environmentally certified food and forest products would be another valuable means of support.

The EU is already the main driver on mainstreaming progress in the SEE sub-region, and its grant assistance could play a catalytic role in EECCA, especially in foundation issues such as governance, awareness, capacity building, and incentives.

The World Bank and other IFIs and donors should build on the foundation with well-targeted projects, in all regional countries, scaling up successful pilots where available. Particular consideration should be given to soil conservation; pest management; reforestation and carbon sequestration; rangeland and watershed management; research and extension; food safety; and continuing the extensive ongoing work in water and salinity management. New investments should be based primarily on evaluation of past activities.

Governments should re-examine their policy instruments, including taxes, subsidies, and sup-

port services (research, extension, food safety, etc.) to ensure that their support to integration is consistent and cost-effective. The first priority should be to remove perverse incentives, such as subsidies for agro-chemicals. These public resources should be shifted to public support services necessary to facilitate integration. In nearly all regional countries, support services, particularly agricultural extension, need to be modernized and expanded to better meet the needs of private farmers.

Certification systems for food and forest products, as important drivers of sustainable management, should be encouraged and supported by governments, NGOs, and donors, as should the use of the powerful incentive of market access. Forestry certification should include chain of custody documentation. Certification, along with strong law enforcement, community management, and provision of alternative income and energy sources, are important tools in the struggle against the illegal logging that is rife in many regional countries.

Pilot projects in mainstreaming should be evaluated and their results disseminated; where warranted, their success should be scaled up to achieve national impact. Successful scaling-up involves several elements: well-documented pilot project results, in environmental, economic, and social terms; building government ownership of the innovation; dissemination of technical information and results; institution building to support a larger program; streamlining of project models to improve cost-effectiveness; and step-by-step rather than wholesale expansion.

Regional mechanisms for the exchange of experience between countries should be strengthened. For most of the issues studied, one or more regional countries has already shown some success, but mechanisms for knowledge transfer are weakly developed. New EU member states have much to share with countries following in their footsteps. Regional organizations should make this process a priority.

More opportunities should be pursued to make use of the full potential of forestry and agriculture for carbon sequestration by scaling up successful pilots, and using the negotiations for a Kyoto follow-up agreement to push for the inclusion of forest preservation and carbon sequestration in soils as ways for transition countries to benefit from carbon finance. More use should also be made of emerging innovative instruments that provide compensation for verifiable hydrological and biodiversity conservation benefits from improved resource management. Meanwhile, it is critical for EECCA and SEE countries to build awareness and capacity for the proactive integration of climate change adaptation into agricultural and forestry sector policies, programs and investments.

The potential of abandoned farmland for reforestation and carbon sequestration should be evaluated, and action programs developed. Such abandonment is an inevitable consequence of development but should be viewed not as a problem, but as an opportunity, with potential environmental, economic, and social benefits.



# Key Economic, Agricultural, and Forestry Statistics

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Annex

1



Annex Table 1.1: Agriculture and forest indicators of EECCA and SEE countries and territories, various years

INDICATORS	Unit	EECCA countries											
		ARM	AZE	BEL	GEO	KAZ	KYR	MOL	RUS	TAJ	TRK	UKR	UZB
Land area <sup>(c),(2)</sup>	1,000 ha	2,820	8,266	20,748	6,949	269,970	19,180	3,287	1,638,139	13,996	46,993	57,938	42,540
Population <sup>(c),(7)</sup>	1,000	3,016	8,388	9,776	4,474	15,146	5,144	4,206	143,114	6,507	4,766	47,075	26,167
GDP per capita <sup>(c),(7)</sup>	current US\$	1,625	1,498	3,024	1,429	3,772	475	694	5,336	355	1,414***	1,761	533
<b>Agriculture</b>													
Agriculture share in GDP <sup>(c),(7)</sup>	% of GDP	19	9	8	15	6	31	14	5	21	19***	10	25
Agriculture share in total employment <sup>(c),(7)</sup>	% of total emp	..	39	..	54	..	..	41	10	..	..	19	..
Agricultural area <sup>(c),(2)</sup>	1,000 ha	1,390	4,759	8,860	3,006	207,598	10,745	2,518	215,680	4,255	32,966	41,304	27,259
<b>Main land uses (as percentage of agricultural area) <sup>(c),(2)</sup></b>													
Arable land	%	35.6	38.73	61.57	26.68	10.77	11.95	73.39	56.46	21.86	6.67	78.57	17.24
Permanent crops	%	4.3	4.65	1.31	8.78	0.07	0.67	11.83	0.83	2.98	0.20	2.18	1.25
Permanent pasture	%	60.1	56.61	37.12	64.54	89.16	87.38	14.77	42.70	75.16	93.13	19.25	81.51
Foreign trade in agriculture <sup>(b),(3)</sup>													
Agricultural exports	million US\$	79	189	1,076	184	693	113	592	2,197	204	86	3,415	835
Agricultural imports	million US\$	272	419	1,450	403	934	102	283	12,363	111	99	1,691	166
<b>Forestry</b>													
Forest share in GDP <sup>(a),(6)</sup>	%	0.1	n.s.	2.3	0.2	0.1	0.1	0.6	0.8	n.s.	n.s.	1.2	n.s.
Forest share in total labor force <sup>(a),(6)</sup>	% of total labor force	0.2	0.1	2.6	0.2	0.2	0.3	0.2	1.2	0.1	0.4	0.5	0.0
Total forest area <sup>(a),(1)</sup>	1,000 ha	305	936	7,849	2,760	3,365	858	326	809,269	410	4,127	9,510	3,212
Share of private forest <sup>(a),(1)</sup>	% of total forest area	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Designated functions of forest (as percentage of total forest area) <sup>(a),(1)</sup></b>													
Production	1,000 ha	0	0	4,012	0	0	0	211	623,120	22	0	4,558	6
Protection of soil and water	1,000 ha	189	864	2,246	2,163	0	680	22	70,386	44	4,023	2,894	2,995
Conservation of biodiversity	1,000 ha	52	72	395	227	33	52	44	16,190	344	104	249	211
Social services	1,000 ha	64	..	1,196	370	218	14	..	11,827	0	..	1,809	..
Multiple purpose	1,000 ha	0	0	0	0	3,114	112	..	87,746	0	0	0	..
No (or unknown) function	1,000 ha	0	0	0	0	0	0	49	..	0	0	0	..
<b>Production of selected forest products <sup>(c),(4)</sup></b>													
Industrial Roundwood	1,000 m3	4	7	6,446	162	130	9	27	139,500	0	0	6,461	8
Pulpwood, Round & Split	1,000 m3	0	4	1,612	0	13	0	0	49,700	0	0	953	0
Roundwood	1,000 m3	41	14	7,543	616	301	27	57	186,500	0	3	14,606	27
Sawlogs and Veneer Logs	1,000 m3	4	4	2,304	81	104	5	3	74,200	0	0	4,632	8

(continued on next page)

Annex Table 1.1: Agriculture and forest indicators of EECA and SEE countries and territories, various years (continued)

INDICATORS	Unit	EECA countries											
		ARM	AZE	BEL	GEO	KAZ	KYR	MOL	RUS	TAJ	TRK	UKR	UZB
Sawnwood	1,000 m3	2	0	2,304	69	265	22	5	22,500	..	..	2,184	..
Wood Fuel	1,000 m3	37	6	1,097	454	171	18	30	47,000	0	3	8,146	18
Wood-Based Panels	1,000 m3	1	0	856	10	10	..	10	8,103	..	..	1,502	..
Paper and Paperboard	1,000 tons	2	148	279	..	58	2	0	7,024	..	..	760	11
Wood Pulp	1,000 tons	..	0	61	..	0	..	0	7,011	..	..	27	..
Wood Charcoal	1,000 tons	..	0	1	..	0	..	0	60	..	..	22	..
<i>Foreign trade of forest products (c),(8),*</i>													
Exports	million US\$	0.9	1.8	258.4	18.0	5.4	0.8	3.7	7,633.3	0.1	0.5	684.8	2.7
Imports	million US\$	18.2	48.4	211.3	5.1	239.1	20.5	29.3	1,404.9	4.0	3.9	731.2	53.9
Total certified forest area (d),(5),**	1,000 ha	0.0	0.0	2,501.5	0.0	0.0	0.0	0.0	17,808.2	0.0	0.0	1,353.1	0.0
<i>SEE countries and territories</i>													
Indicators	Unit	ALB	BIH	BUL	CRO	KOS	MAC	ROM	SER9	TUR			
Land area (c),(2)	1,000 ha	2,740.0	5,120.0	10,864.0	5,592.0	2,543.0	22,998.0	10,200.0	76,963.0				
Population (c),(7)	1,000	3,129.7	3,907.1	7,740.0	4,443.4	2,034.1	21,634.4	8,064.3	72,065.0				
GDP per capita (c),(7)	current US\$	2,677.7	2,546.3	3,442.9	8,665.9	2,834.8	4,556.0	3,250.8	5,030.2				
<i>Agriculture</i>													
Share of GDP (c),(7)	% of GDP	19.6	8.2	8.0	5.8	10.9	8.9	12.9	9.7				
Share of total employment (c),(7)	% of total emp.	58.4	..	8.9	17.3	19.5	32.1	..	29.5				
Area (c),(2)	1,000 ha	1,123.0	2,147.0	5,265.0	2,695.0	1,242.0	14,513.0	5,590.0	41,223.0				
<i>Principal land uses (as percentage of agricultural area)</i>													
Arable land	%	51.5	46.6	60.3	41.2	45.6	64.0	62.7	57.8				
Permanent crops	%	10.9	4.5	3.8	4.3	3.7	3.7	5.7	6.7				
Permanent pasture	%	37.7	48.9	35.9	54.5	50.7	32.3	31.6	35.5				
<i>Foreign trade in agriculture</i>													
Exports	millions US\$	24.9	113.5	1,065.6	659.0	260.0	765.3	687.6	5,957.9				
Imports	millions US\$	288.6	992.8	848.5	1,402.6	403.9	2,144.9	867.9	4,659.5				
<i>Forestry</i>													
Share of GDP (a),(6)	%	0.4	2.2	0.7	1.6	0.8	2.0	3.1	0.8				
Share of total labor	% of total	0.2	0.6	1.2	1.3	0.8	1.3	0.7	1.0				

(continued on next page)



## Analysis of Questionnaires

**P**erformance indicators are useful tools for measuring the extent of the countries' efforts to integrate environmental considerations into the agricultural and forestry sectors. These indicators should encompass the multi-dimensional nature of progress/performance, including not only the existence of specific environmental programs in the two sectors, but also their effectiveness and the strength of institutional mechanisms that are key for supporting their sustainable implementation.

To obtain comparable information from regional countries on key mainstreaming variables, data were drawn from three sources:

- *OECD EECCA<sup>26</sup> Questionnaire*. This questionnaire was developed by OECD before the present World Bank study on mainstreaming began. Its emphasis is mainly on institutional aspects and implementation of environment-related programs in different economic sectors. Responses were received from official contacts in each country's ministry of the environment (or equivalent agency).
- *For EECCA states, Supplementary Questionnaires*. These were given to the local consultants of the mainstreaming study to provide more detail on some key questions in the EECCA Questionnaire.
- *Questionnaire for Southeast European countries (SEE)*. Local consultants working with the mainstreaming study were asked to complete the questionnaire as fully and accurately as possible, using published sources and/or interviews with knowledgeable of-

ficials, academics, or NGOs. The responses, however, also represent the consultant's best professional judgment of the situation.

It should be noted that data from these questionnaires should be used with caution, especially where they appear to contradict findings in the main text. The OECD data were obtained from official sources that might have had a bias towards reporting positive developments. Yes/no answers do not convey the extent of progress or the nuances of each situation. For some data or responses, attempts have been made to obtain clarification or supporting information. However, it would be difficult to ensure total comparability across countries because responses represent the subjective views of many informants.

The tables in Annex 2 are meant to present a snapshot of mainstreaming efforts across different countries in the region, and to identify strengths and weaknesses, geographical variation, and areas for action. In general, the questionnaires covered such aspects as institutional mechanisms, research, extension, and the measures or programs that support environmental management in the agricultural and forestry sectors. The responses indicate the status of the aforementioned variables as of 2006, and pertain to one of the following: Yes

<sup>26</sup> EECCA = Eastern Europe, Caucasus and Central Asia, also known as the Commonwealth of Independent States (CIS), whose members are: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

(dark shade); Partial Yes (light shade); and No (no color). A “partial yes” corresponds to those variables that, although existent, have limited scope and no public participation, are weakly enforced, and/or were recently implemented. Thus it is too early to assess their effectiveness.

*Annex Tables 2.1 and 2.2* show whether or not environmental mainstreaming has taken place in the agricultural and forestry sectors, respectively, of EECCA countries. Data were obtained from the OECD EECCA Questionnaire. *Annex Table 2.3*, on the other hand, shows the mainstreaming efforts of both sectors in SEE countries. Questions common to both the OECD and SEE questionnaires were amalgamated into a table for the whole region, *Annex Table 2.4*.

Based on the four tables, the following areas of good progress can be identified.<sup>27</sup>

- In most EECCA countries, the latest agricultural and forest strategies incorporate environmental targets, and the latter have been subjected to environmental assessment. Only half the countries reported having farm advisory services on environmental management.
- All EECCA countries have ongoing reforestation or afforestation programs.
- Most SEE countries have agricultural and forestry research systems that address environmental and sustainability issues. However, agricultural and forestry extension services were judged effective in only two out of nine countries.
- Just three SEE countries offer extension advice on manure management, and only four countries offer advice on the timing of fertilizer application to reduce runoff. None has a program to capture methane.
- Integrated pest management was reported to be widely used in two SEE countries, but this appears to be an overstatement.
- Common areas of good practice in the agricultural sector in the two sub-regions include:

good inter-ministerial cooperation in most countries; research programs on nutrient management; pesticide regulation; environmental impact assessment of farm operations and investments; and, in about half the countries, programs to improve water use efficiency and address soil management.

- In forestry, most countries in the region have good inter-ministerial coordination on environmental issues, and staff have undergone relevant training. Effective regulations and enforcement systems to ensure sustainable harvesting are in place in about 60 percent of countries. Mainstreaming efforts in this sector are more prevalent than in the agricultural sector.

There also remain weaknesses concerning certification, policies, and nutrient management, for example:

- In EECCA countries, implementation of the following is very limited: (i) strategies to promote organic farming or a formal system of organic certification; (ii) a system of voluntary certification of forest stands; and (iii) outsourcing or delegation to the private sector of pest and fire management in forests.

In the region as a whole, a majority of countries lack the following: (i) collaboration between the ministry of agriculture and ministry of the environment in preparing strategic reports in the past three years; (ii) environmental assessment of policies, and price support and subsidy schemes for agricultural products; (iii) regulations on managing and handling organic manure; and (iv) programs to capture methane gas emissions. The main differences between EECCA and SEE countries include the lack of a specialized environmental

<sup>27</sup> To have a realistic view of progress, “Partial Yes” responses in the tables were not counted as a “Yes” response in this analysis.

unit in the ministry of agriculture, prevalent in SEE, and voluntary certification of forest stands, which is practiced more widely in SEE. Results in Table 2.4 also demonstrate that, although countries with higher per capita income (such as Russia and Romania) appear to be faring well with respect to mainstreaming, a closer look at the data shows that income and mainstreaming progress are negatively correlated. This may reflect the fact that relatively more donor support is given to lower-income countries, where project components may include aspects of mainstreaming.

### Priority Areas for Action

*Institutional mechanisms* for integration are in place in both the forestry and agricultural sec-

tors of most countries; however, inter-ministerial cooperation and collaboration on environmental issues need to be strengthened and supported, especially in countries where such mechanisms are still lacking. Past experience shows that strong institutions are key for the sustainability of development projects/programs. *Certification schemes* for organic and forest products should also be promoted and supported more widely in view of potential access to international markets. *Methane offset programs* likewise need to be encouraged and supported. They will facilitate the compliance of Kyoto Protocol signatory countries (of the 13 SEE and EECCA countries that signed the Protocol, only three have government programs for agricultural methane capture).

**Annex Table 2.1: Integration of Environmental Considerations into the Agricultural Sector, EECCA Countries, 2006**

Questions	Armenia	Azerbaijan	Belarus	Georgia	Kazakhstan	Kyrgyz Rep.	Moldova	Russian Fed.	Tajikistan	Turkmenistan	Ukraine	Uzbekistan
<i>Institutional mechanisms in place to support environmental management in the agricultural sector</i>												
1. There are inter-ministerial working groups where agricultural and environmental issues are discussed											..	
2. Officials from the ministries of agriculture and environment have regular and easy contacts											..	
3. Ministry of agriculture staff have received training on environmental issues											..	
4. Environmental responsibilities in the ministry of agriculture are spread across units								..			..	
5. Environmental responsibilities in the ministry of agriculture are dealt with by a specialized unit											..	
6. The ministry of agriculture has provided significant input to strategic reports produced by the ministry of environment in the previous three years											..	
7. The latest Agriculture Strategy has been subjected to some sort of environmental assessment											..	
8. The latest Agriculture Strategy incorporates environmental targets				..								
9. Irrigation schemes have been subjected to some sort of environmental assessment												
10. Price support schemes for agricultural products have been subjected to some sort of environmental assessment											..	
11. Subsidy schemes for agricultural products have been subjected to some sort of environmental assessment											..	
<i>Measures or programs in place to support environmental management in the agricultural sector</i>												
12. General advice to farmers on environmental management								..			..	
13. Programs to improve the management/storage of organic manure								..			..	
14. Programs to improve water use efficiency in irrigation								..			..	
15. Programs to support better soil management to prevent soil erosion/compaction								..			..	

(continued on next page)

**Annex Table 2.1: Integration of Environmental Considerations into the Agricultural Sector, EECCA Countries, 2006** (continued)

Questions	Armenia	Azerbaijan	Belarus	Georgia	Kazakhstan	Kyrgyz Rep.	Moldova	Russian Fed.	Tajikistan	Turkmenistan	Ukraine	Uzbekistan
16. Programs to support better management of agrochemicals								..			..	
17. Programs to support management of biodiversity or the creation/maintenance of landscape elements											..	
<i>Acquisition of environmental management skills in the following areas (through either formal education programs or on-the-job training by agricultural extension workers/providers)</i>												
18. Management/storage of organic manure											..	
19. Water use efficiency in irrigation											..	
20. Soil management to prevent soil erosion/compaction											..	
21. Management of agrochemicals											..	
22. Management of biodiversity or creation/maintenance of landscape elements											..	
<i>Organic farming in place in the country</i>												
23. Is there a strategy to promote organic farming?											..	
24. Is there a formal system of organic certification?											..	

Source: OECD EECCA Questionnaire.

Color Legend:

Yes

Partial Yes

No

Note: ".." means no answer was provided

**Annex Table 2.2: Integration of Environmental Considerations into the Forestry Sector, EECCA Countries, 2006**

Questions	Armenia	Azerbaijan	Belarus	Georgia	Kazakhstan	Kyrgyz Rep.	Moldova	Russian Fed.	Tajikistan	Turkmenistan	Ukraine	Uzbekistan
<i>Institutional mechanisms in place to support environmental management in the forestry sector</i>												
1. There are inter-ministerial working groups where forestry and environment issues are discussed												
2. Officials from the ministries of forestry and environment have regular and easy contacts												
3. Staff from the ministry of forestry have received training on environmental issues			..								..	
4. Environmental responsibilities in the ministry of forestry are spread across units				..					..			
5. Environmental responsibilities in the ministry of forestry are dealt with by a specialized unit		..										
6. The ministry of forestry has provided significant input to strategic reports produced by the ministry of environment in the previous three years				..								
7. The latest Forestry Strategy has been subjected to some sort of environmental assessment				..								
8. The latest Forestry Strategy incorporates environmental targets				..		..					..	
<i>Measures or programs in place to support environmental management in the forestry sector</i>												
9. Decisions on forest use regularly subjected to environmental impact assessment												
10. Decisions on forest use regularly subjected to state environmental expertise assessment												
11. There is a system of voluntary certification of forest stands								..	..			
12. There are ongoing programs for forest reconstruction or afforestation												
13. There are laws/regulations on technical requirements for equipment, technologies, and transportation used for harvesting timber				..					..			
14. Pest and fire management in forests has been delegated or outsourced to the private sector				..								

source: OECD EECCA Questionnaire.

Color Legend:

Yes

No

Note: "..." means no answer was provided

**Annex Table 2.3: Integration of Environmental Considerations into the Agricultural and Forestry Sectors, SEE Countries and Territories, 2006**

Subject	Question	Albania	Bosnia & Herzegovina	Bulgaria	Croatia	Kosovo	Macedonia	Poland	Romania	Serbia	Turkey	
<i>Agriculture</i>	1. There are inter-ministerial working groups where agriculture and environment issues are discussed											
	<i>Policy/strategy</i>	2. Ministry of agriculture staff have received training on environmental issues										
		3. Environmental responsibilities of the ministry of agriculture are dealt with by a specialized unit										
		4. The ministry of agriculture has provided significant input to strategic reports produced by the ministry of environment in the last three years										
	<i>Research</i>	5. The ministry of environment has provided significant input to strategic reports produced by the ministry of agriculture in the last three years										
		6. Policies, including price support and subsidy schemes, are subject to strategic environmental assessment (EIA), with public participation										
		7. Agricultural projects, including water management, are subject to EIA, with public participation										
		8. Farm operations and investments are subject to EIA procedures										
		9. Agricultural research is addressing environmental and sustainability issues										
	<i>Extension</i>	10. Agricultural extension services are effectively reaching private farmers with Good Agricultural Practices										
11. Government has a substantial program to address issues of soil erosion, desertification, etc.												
<i>Soil management</i>	12. Are any of the following in place, and how effectively do they work?											
	Research programs on reducing environmental impacts of agriculture or on recycling nutrients (N and P)											
	Regulations on the timing and amount of fertilizer applications so as to minimize nutrient runoff											
<i>Nutrient management</i>	Extension advice or farmer training on the timing and amount of fertilizer applications to minimize nutrient runoff											

(continued on next page)

**Annex Table 2.3: Integration of Environmental Considerations into the Agricultural and Forestry Sectors, SEE Countries and Territories, 2006 (continued)**

Subject	Question	Albania	Bosnia & Herzegovina	Bulgaria	Croatia	Kosovo	Macedonia	Poland	Romania	Serbia	Turkey
	Regulations on the management, storage, treatment, and disposal (including field application) of organic manure										
	Extension advice or farmer training on the management, storage, treatment, and disposal (including field application) of organic manure										
	Programs to capture methane gas emissions										
	13. Are any of the following in place and how effectively do they work?										
<i>Water management</i>	Programs to rehabilitate and improve irrigation and drainage systems										
	Programs to improve water use efficiency										
	Control of lower level systems by water user associations										
	Programs to reduce land salinization and mitigate its effects										
<i>Pest management</i>	14. Is integrated pest management (IPM) being widely used, and does the ministry of agriculture provide adequate support through research and extension?										
	15. Are any of the following in place and how effectively do they work?										
	System for registering all imported and locally manufactured pesticides										
<i>Forestry</i>	System for packaging and labeling pesticides, including hazard levels										
	Regulations for operator training and certification and protective clothing for the application of hazardous products										
	Regulations for the disposal of surplus and outdated pesticides										
	16. There are inter-ministerial working groups where forestry and environment issues are discussed										
<i>Institutional</i>	17. Ministry of forestry staff have received training on environmental issues										
	18. Environmental responsibilities of the ministry of forestry are dealt with by a specialized unit										




(continued on next page)

**Annex Table 2.3: Integration of Environmental Considerations into the Agricultural and Forestry Sectors, SEE Countries and Territories, 2006** (continued)

Subject	Question	Albania	Bosnia & Herzegovina	Bulgaria	Croatia	Kosovo	Macedonia	Poland	Romania	Serbia	Turkey
Policy/Strategy	19. The ministry of forestry has provided significant input to strategic reports produced by the ministry of environment in the last three years										
	20. The ministry of environment has provided significant input to strategic reports produced by the ministry of forestry in the last three years										
	21. Forest management plans and harvesting plans are subject to EIA, with public participation										
Research	22. Forestry research is addressing environmental and sustainability issues										
Extension	23. Forestry advisory services are effectively reaching private owners with sustainable forestry practices and supporting certification										
Forest health	24. Effective programs are in place to combat fire, pests, and diseases										
Illegal logging	25. Effective programs are in place to combat illegal logging										
Sustainable harvesting	26. Effective regulations and enforcement systems are in place to ensure sustainable harvesting										
Certification	27. Voluntary certification is in general use										

Source: World Bank Questionnaires answered by local consultants.

Color Legend:

-  Yes
-  Partial Yes
-  No

**Annex Table 2.4: Combined Table for Questions Common to OECD and World Bank Questionnaires. EECCA and SEE Countries and Territories, 2006**

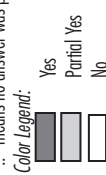
Subject	Question	ARM	AZE	BEL	GEO	KAZ	KYR	MOL	RUS	TAJ	TRK	UKR	UZB	ALB	BIH	BUL	CRO	KOS	MAC	POL	ROM	SER	TUR	
<i>Agriculture</i>	1. There are inter-ministerial working groups where agriculture and environment issues are discussed											..												
	2. Ministry of agriculture staff have received training on environmental issues											..												
	3. Environmental responsibilities of the ministry of agriculture are dealt with by a specialized unit											..												
	4. The ministry of agriculture has provided significant input to strategic reports produced by the ministry of environment in the last three years											..												
	5. Policies, including price support and subsidy schemes, are subject to Strategic Environmental Assessment, with public participation											..												
	6. Farm operations and investments are subject to EIA procedures																							
	7. Government has a substantial program to address issues of soil erosion, desertification, etc.									..														
	8. Are any of the following in place and how effectively do they work?																							
<i>Soil management</i>	Research programs on reducing environmental impacts of agriculture or on recycling nutrients (N and P)																							
	Regulations on the timing and amount of fertilizer applications so as to minimize nutrient runoff																							
	Extension advice or farmer training on the timing and amount of fertilizer applications to minimize nutrient runoff																							
	Regulations on the management, storage, treatment, and disposal (including field application) of organic manure																							
	Extension advice or farmer training on the management, storage, treatment, and disposal (including field application) of organic manure																							
<i>Nutrient management</i>	Programs to capture methane gas emissions																							
	9. Are any of the following in place and how effectively do they work?																							
<i>Water management</i>	Programs to improve water use efficiency								..			..												

(continued on next page)

**Annex Table 2.4: Combined Table for Questions Common to OECD and World Bank Questionnaires. EECCA and SEE Countries and Territories, 2006 (continued)**

Subject	Question	ARM	AZE	BEL	GEO	KAZ	KYR	MOL	RUS	TAJ	TRK	UKR	UZB	ALB	BIH	BUL	CRO	KOS	MAC	POL	ROM	SER	TUR		
<i>Pest management</i>	10. Are any of the following in place and how effectively do they work?																								
	System for registering all imported and locally manufactured pesticides																								
	System for packaging and labeling pesticides, including hazard levels																								
	Regulations for operator training and certification and protective clothing for the application of hazardous products																								
	Regulations for the disposal of surplus and outdated pesticides																								
<i>Forestry</i>																									
	<i>Institutional</i>	11. There are interministerial working groups where forestry and environment issues are discussed																							
		12. Ministry of forestry staff have received training on environmental issues																							
		13. Environmental responsibilities of the ministry of forestry are dealt with by a specialized unit																							
	<i>Policy/ strategy</i>	14. The ministry of forestry has provided significant input to strategic reports produced by the ministry of environment in the last three years																							
		15. Forest management plans and harvesting plans are subject to EIA, with public participation																							
	<i>Sustainable harvesting</i>	16. Effective regulations and enforcement systems are in place to ensure sustainable harvesting																							
<i>Certification</i>	17. Voluntary certification is in general use																								

Notes and sources: EECCA data are from the OECD questionnaires given to the ministries of environment and from the supplementary questionnaires to local consultants for the mainstreaming study. SEE data are from questionnaires sent to local consultants for the mainstreaming study. " .. " means no answer was provided.



## Explanation of Indicators

A study of this kind uses indicators for two purposes:

- i) to show progress over time of mainstreaming in each country.
- ii) to allow comparisons between countries, in order to identify good practice examples and countries that need further support.

Two complementary approaches were considered:

**A. The scenario approach.**<sup>28</sup> This would use a process of expert consultation to derive scenarios or frameworks for progressing from a Soviet model to an ideal western model, using dimensions such as soil management, water management, and forest management. Countries would be awarded points based on how far along the continuum they had progressed. However, since data available at the outset of the mainstreaming study were not sufficient to support this approach, it has been deferred to the final stage of the study.

**B. The key indicators approach.** In this approach, a small set of key variables is chosen to represent major mainstreaming themes. In principle, the variables should be either deterministic (yes/no) or quantifiable. Deterministic variables are well suited to policy and institutional issues, such as the ones covered by the OECD Questionnaire for EECCA Countries. Annex 2 describes how this approach was used for both sub-regions.

For the purposes of *quantitative* analysis, four indicators were chosen for agriculture and four for forestry. They were:

### Agriculture

- Reduction in soil erosion (percent)
- Reduction in nutrient (N and P) exports (percent)
- Improvement in irrigation water use efficiency (percent)
- Effective coverage of IPM (percent of vulnerable cropped area)

### Forestry

- Protected areas (ha, percent of total area)
- Forest health (percent of area affected by disease, fire)
- Certification (percent covered)
- Sustained yield (percent of Annual Allowable Cut felled)

Agricultural indicators were the result of consideration by the study team of published documents and their discussions with colleagues. Forestry indicators were taken from a World Bank report.<sup>29</sup> Such a small set of indicators cannot cover all dimensions of the integration problem and, in hindsight, it is evident that the selected variables do not cover important issues such as salinity management, biodiversity in agriculture, organic farming, food safety, illegal logging, and carbon sequestration.

<sup>28</sup> Adapted from World Bank (2000a).

<sup>29</sup> World Bank (2005).

Local consultants in each country were given the following guidance on indicators:

The ideal report would have time-series, quantified data for each indicator, going back 10 to 15 years. As this ideal is unlikely, consultants should report, in summarized form and quantified wherever possible, available information on each subject. For example, if data are only available for one or a few years, then that should be reported. If no numerical data can be found, a qualitative assessment should be given, for example, "Soil erosion is moderately severe, especially in the southern part of the country, and is gradually getting worse." In addition, specific guidance notes are given below each indicator.

In most cases, the consultants had considerable trouble obtaining quantified information on many of the agricultural indicators and even more trouble getting time-series or trend data. The situation in forestry was somewhat better, although it should be noted that the team had a lot of trouble obtaining up-to-date data on indicator F.3 (certification). It appears that neither ministries of agriculture/forestry nor ministries of environment have yet recognized the importance of monitoring variables such as the above as a way of measuring mainstreaming progress. For example, soil erosion is a major problem in nearly all the countries studied. In the EECCA sub-region data are normally in the form of "percent of agricultural land severely eroded, moderately eroded..." which gives little idea of the economic impact. Although SEE countries tend to use the more relevant formulation of t/ha/yr, no time series were found.

As a result, it was not possible to present quantified data on the indicators. Instead, trend indicators (up or down arrows) were used in the summary (Table 3). This is an area with considerable potential for further study.

## Explanation of Agricultural and Forestry Indicators AND Indicator:

### *Indicator A. 1: Soil protection*

The major problem is soil erosion from wind and water. Other problems, such as changes in soil fertility and structure (e.g., compaction from heavy equipment use), should be assessed in the report but not as part of this indicator.

The ideal erosion indicator would be in **t/ha of arable land**. The next best, which seems to be more widely available in the region, is **percent of arable land affected by erosion**. In either case, absolute figures are of less importance than trends: e.g., is the problem getting better or worse?

### *Indicator A. 2: Nutrient conservation*

The nutrients of concern are nitrogen (N) and phosphorus (P). The two main agricultural sources are excess organic or mineral fertilizers applied to cropland and livestock waste. Data on total fertilizer use and livestock numbers (especially where production is intensive, i.e., large numbers of animals in a limited space) are a useful starting point for indicating the total nutrients applied in the farming system. Ministries of agriculture will normally have these data. However, the variable of real interest is the proportion of applied nutrients that is released into water bodies: rivers, lakes, seas, and aquifers. These data are likely to be found as water quality data compiled by ministries of environment or, possibly, health, as excessive nitrate in drinking water is a public health concern. As there is a considerable time lag between changes in applied nutrients and changes in runoff, because of storage in the soil profile, trends in runoff are likely to be subtle.

### *Indicator A. 3: Water use efficiency*

This is only relevant in countries where irrigation is practiced. Water use efficiency may be defined as **water used by the crop as a percentage of total water delivered at the head of the sys-**

tem, although other definitions may be used, as it is trends that we are looking for. This indicator is a proxy for the effectiveness of irrigation system management and for waterlogging and salinity management. Data on the latter problems should be reported in the main text.

#### **Indicator A.4: Integrated pest management coverage**

Most countries have programs to promote IPM techniques, but many have had limited success in implementing them. Measures of progress might include **percent of agricultural land where IPM is practiced; percent of farmers trained in IPM; percent of farmers practicing IPM; and amount of beneficial insects released.** These measures are likely to be imprecise estimates.

#### **Indicator F.1: Protected areas**

Data on **protected areas as a percentage of total forest areas**, by year, should be relatively easy to obtain.

#### **Indicator F.2: Forest health**

Forest departments should be a good source of data on **areas affected by fires, pests, and diseases, year by year, as a proportion of total forest area.**

#### **Indicator F.3: Certification**

This indicator is the **percentage of forest production certified by an accredited agency as having been produced in an environmentally sustainable manner.**

#### **Indicator F4: Sustained yield**

This is defined as the **actual amount of timber harvested, as a percentage of annual incremental growth.** Harvested amounts should include illegal fellings.

### **Annotations on Indicators in Table 3**

Sources of information for Table 3 include the following:

#### **Albania (ALB)**

**Nutrient conservation.** The use of fertilizers in agriculture is relatively low, 120–150 t/yr, while agricultural needs are for 380–450 t/yr. The total number of livestock has decreased somewhat since 2001 (from 728,000 to 655,000 head of cattle, and from 3,450,000 to 2,701,000 sheep and goats by 2005). Assessments of ground water quality (rivers, streams, lakes) show low levels of nitrates (State of the environment 2003–2005, MEFWA 2007). These data did not vary significantly during the last years 2001–2005 (State of environment 2000–2002; 2003–2005, Ministry of Environment, Forests and Water). The same report concludes that agriculture and livestock production have very low impact on water pollution (local consultant's report, p. 24).

#### **Azerbaijan (AZE)**

**Nutrient conservation.** The amount of fertilizers used have decreased dramatically since the late 1980s, i.e., from about 166 kg/ha of mineral fertilizers in 1985 to 5 kg/ha in 1999. Agricultural runoff of nutrients and chemical substances to rivers and groundwater is likely to be low because of the reduced use of pesticides and fertilizers over the past years. However, actual levels of contamination in water bodies and even in soils still need to be confirmed. Unfortunately, monitoring systems for these purposes are lacking (Azerbaijan Country Review, S. Pedroso-Galinato, pp. 11–12).

#### **Bosnia and Herzegovina (BiH)**

**Nutrient conservation.** Currently, there is no evidence that nutrient levels in drinking water are anywhere near the maximum allowed concentrations, or that they fluctuate significantly. Based on trends in the last 30 years, as reported by water utility companies, no special measures to combat this sort of pollution are necessary or envisaged (local consultant's report, p. 41).

**Water use efficiency.** Selected areas are covered by Water Users Associations. Until 1990, irriga-

tion covered only 11,600 ha, or 2 percent, of total arable land, compared to the world average of 15 percent. The potential for irrigation of arable land in this region has been estimated at approximately 155,000 ha (local consultant's report, p. 93, and questionnaire).

### **Bulgaria (BUL)**

**Nutrient conservation.** Since 2000, the application of fertilizers has stabilized at a low amount that does not threaten the environment. Application of mineral fertilizers in 2005 totaled 35.80 kg/ha, of which nitrogen accounts for 30.29 kg/ha, phosphorus for 4.77 kg/ha, and potassium for 0.73 kg/ha. The fact that N dominated could lead to changes in soil balance and quality. The presence of N in surface waters is an indicator of nitrate pollution. Data from the national monitoring system show that 92 percent of samples taken in 2002–2005 are below 5 mg/l, which corresponds to a category-I water body. Data also show that there are no samples containing more than 50 mg/l, which corresponds to a category-III water body (EEA, Green book, 2005; local consultant's report, p.20, Table 6).

### **Croatia (CRO)**

**Nutrient conservation.** The use of mineral fertilizers fell significantly after the war, and amounts currently applied are still much below pre-war levels. Therefore, it may be concluded that negative impact from this source is not a serious environmental issue (local consultant's report, Figure 2, p. 11).

**Water use efficiency.** Data on total amounts of water used are not reliable, with water use efficiency estimated at 70 percent (local consultant's report, p.11).

### **Georgia (GEO)**

**Nutrient conservation.** Between 1989 and 2005, fertilizer use (nitrogen, potassium, and phosphorus) dropped from 200,000 to 60,000 tons, or about

one-third of pre-independence levels. In 2006, on an average 45,000 ha of agricultural land, fertilizer applications were less than half of the amounts applied during the Soviet era 20 to 50 years ago. The use of organic fertilizers has also diminished significantly since the collapse of the Soviet Union. In the 1980s, about 3.5 million tons of manure collected from local cattle ranches and poultry farms were applied throughout Georgia on a yearly basis. Currently, the use of manure in agricultural production is estimated to be 0.5 million tons per year (Georgia Country Review, E. Montanari-Stephens, p. 18).

### **Kosovo (KOS)**

**Water use efficiency.** Water use efficiency is not measured during irrigation. Significant losses occur because the irrigation system is not fully repaired or properly maintained. The largest losses occur in open channels, especially in earthen channels which are widespread in Kosovo, specifically in "Drini I Bardhë" company in Pejë/Pec (local consultant's report, p. 21).

### **Macedonia (MAC)**

**Nutrient conservation** is not subjected to a monitoring system, and the use of fertilizers and manure is not regulated. There are no data on the impact of fertilizer applications and practices on water quality (though there are data on ground and surface water).

**Water use efficiency** is very low (60–80 percent) depending on irrigation schemes and the irrigation techniques applied. Efficiency is highest in closed-pipe networks and drip irrigation (about 80 percent) and lowest in open channels and surface irrigation (less than 60 percent in some cases). Waterlogging is common on more than 9,500 ha.

### **Moldova (MOL)**

**Nutrient conservation.** The use of mineral and organic fertilizers has decreased drastically in the last two decades (see "Additional Indica-

tors: Use of Mineral and Organic Fertilizers” in Annex 5), from 38,000 tons in the 1980s to 3,000 tons in 1996 and 2,700 tons in 2004. The use of pesticides and fertilizers has shown a stable declining trend for the last four to five years. As of today, approximately 30 percent of agricultural lands register a lack of phosphorus, contained in organic fertilizers, which seriously affects soil fertility (Georgia Country Review, E. Montanari-Stephens, p. 12).

### **Tajikistan (TAJ)**

**Nutrient conservation.** Management of soil organic matter, as well as commercial pesticides and fertilizers is very weak on irrigated lands. Poor farm management may cause expensive chemical inputs to be washed away before crops absorb them. This, in turn, triggers economic losses for the farmer and environmental damage downstream. Mineral fertilizers discharged into freshwater bodies contribute to their mineralization and eutrophication (Tajikistan Country Review, E. Montanari-Stephens, pp. 18 and 20).

**Water use efficiency.** Irrigation and drainage infrastructure seriously deteriorated during the 1990s. Destroyed irrigation networks and water pumping stations plus broken irrigation and drainage pipes and canals have become a serious problem. Poor management and an underperforming drainage infrastructure cause salinization and waterlogging problems, both of which affect soil fertility. Currently, collection and drainage networks cover less than half of the total irrigated land. As a result, about 15 percent of irrigated lands are over-saturated every year. Salinization affects approximately 16 percent of Tajikistan’s irrigated lands (*ibid*, pp. 18 and 19).

**IPM coverage.** Limited research funding, the poor conditions of bio-control laboratories, and the lack of qualified staff have left the country without the capacity to control pests using biological methods. At present, the government does

not support the development and implementation of alternative pest management methods. Farmers use a number of traditional methods to control insect pests, including tillage practices; burning straw and crop waste; converting straw into organic matter; manual weeding of crop fields; use of lure boxes to collect worms and caterpillars; and handpicking of eggs, caterpillars, and larvae during periods of high infestation. To promote IPM in the country, it is crucial to invest resources and train staff to disseminate information on the safe use of biological pest control techniques; and promote traditional weed control methods and the use of organic fertilizers to reduce consumption of agro-chemical inputs (*ibid*, p. 21).

**Forest health.** In the forestry sector, the most pressing environmental problems are deforestation and desertification. In many areas where wood has been cut, grazing has taken over, preventing forest regeneration. Land slides, fires, pests, and flooding have increased in recent years (*ibid*, p. 28).

**Protected areas.** Protected areas now cover about 510,000 ha, or 28.3 percent, of the total forest area. Between 1996 and 2006, protected areas increased by 1,800–2,000 ha (local consultant’s report, p. 45).

### **Turkey (TUR)**

**Soil protection.** Erosion, salinity, and soil pollution are worsening, the budget to implement erosion measures is limited, and coordination among institutions is needed. There is no substantive funding for preventing pollution caused by agriculture.

**Nutrient conservation.** In Turkey fertilizer application levels are low, staying at around 10 million tons over the last decades (Figure 4). In the mid 1990s, nitrogen and phosphate use per hectare of arable land was among the lowest in OECD

countries.<sup>30</sup> Also, the removal of input subsidies may have promoted more efficient fertilizer use in recent years (Oskam et al. 2004). However, fertilizer use is unevenly distributed across regions. In addition, Turkey's rivers that empty into the Black Sea are key sources of phosphorus and nitrogen pollution. It is estimated that Turkey discharges 38,000 t/yr of N and 5,800 t/yr P into the Black Sea. These amounts constitute approximately 20 percent and 12 percent of the total N and P produced in the non-Danube-Black Sea Basin (local consultant's report, p. 6 and Table 4).

**Water use efficiency.** See sections of the local consultant's report on water overuse, over-extraction of ground water, and declining water quality (pp. 7 and 8).

**Protected areas.** Although the proportion of protected areas is still low, new areas such as Artvin Camili have been added. In addition, NGOs have started to play an important role in raising awareness. More needs to be done, but the trend is positive.

**Forest health.** Afforestation/reforestation efforts are continuing. Degraded forests have increased by 450,000 ha, while the area of healthy forests declined by 55,000 ha between 1999 and 2004.

<sup>30</sup> Average fertilizer consumptions per agricultural land in 1995 were: England: 283 kg/ha; France: 240 kg/ha; China: 207 kg/ha; Mexico: 201 kg/ha; Spain: 155 kg/ha; Greece: 155 kg/ha; India: 120 kg/ha.; Brazil: 95 kg/ha; Turkey: 85 kg/ha; World: 116 kg/ha (Turkey State Planning Organization 2000).

## The Issue of Abandoned Land

### The Abandoned Farmland Issue across the SEE Region

Land abandonment occurs when farmers cease to use land for agricultural purposes. It is a widespread phenomenon with a variety of economic and social causes. Lack of active management often results in the regrowth of tall grasses, scrub, and, eventually, forest. This generally has positive environmental externalities; however, negative consequences may result if biodiversity is diminished.

Abandonment is largely an economic event, as farmers abandon farmland when it no longer yields a positive economic return, or when the farming system is no longer viable when faced with new forms of competition. Abandoned land typically includes steeper, rocky, infertile soils and areas farthest from market. Soils that are too wet or too dry are also more likely to be abandoned.

In the SEE region, the lack of viability began decades ago but accelerated during the collapse of state-owned and collective farms in the early 1990s. That transition resulted in a significant decline in agricultural production and particularly in the number of livestock in the region (DLG 2005, p. 22). Abandonment is likely to continue as regional economies continue to evolve. For example, before the transition, the government of Albania emphasized food self-sufficiency over economic efficiency. As Albania and other countries in the region have abandoned the goal of self-sufficiency and opened up to trade, some lands are not efficient enough to produce at world prices.

Uncertainties over land ownership can also lead to abandonment. After state-owned and col-

lective farms collapsed, some land was abandoned when ownership was not granted to individual farmers. Abandonment is also driven by demographic change. As the older generation of farmers retires, younger generations have sought work in other occupations, frequently migrating to cities or abroad in search of better financial rewards. Land abandonment can accelerate the economic and social decline of communities. As the area of abandoned land increases, communities can become further isolated and marginalized.

Abandonment is a widespread phenomenon in the SEE region. However, precise official data on the extent of abandonment are unavailable for many countries in the region. One reason data are difficult to obtain is that there is no agreed-upon definition of abandoned land, and the definitions used by each country may not account for land that is subject to “semi-abandonment,” that is, land that is not formally abandoned but receives minimal management (DLG 2005, p. 23). Some experts think that the amount of semi-abandoned land may be at least as great as the expanse of abandoned land in Central and Eastern Europe (DLG 2005, p. 23). Data in the following table were reported by World Bank consultants in each country. In the nine countries for which we obtained data, abandoned land ranges from 6 percent to 23 percent, and averages 8 percent of total agricultural land.

The range of abandoned land as a percentage of agricultural land in Annex Table 4.1 is consistent with estimates of abandoned land in the following countries: Estonia, 10 percent in 2002; Lithuania, 10 percent in 1999; Latvia, 21 percent in 2002; Hungary, 10 percent in 2002 (DLG 2005, p. 23).

**Annex Table 4.1: Abandoned Farmland across the SEE Region, Various Years**

Country and Territories	Total area* (1,000 ha)	Agricultural land* (1,000 ha)	Abandoned land** (1,000 ha)	Abandoned land as % of agricultural land
Albania	2,875	700 <sup>1</sup> -1,121	110 <sup>2</sup>	10-16
Bosnia and Herzegovina	5,121	2,148	502 <sup>3</sup>	23
Bulgaria	11,099	5,326	461 <sup>4</sup>	9
Croatia	5,654	3,137	146-175 <sup>5</sup>	6
Hungary	9,303	5,866	587 <sup>6</sup>	10
Kosovo***	1,100	265	24 <sup>7</sup>	9
FYR Macedonia	2,571	1,242	131 <sup>8</sup>	11
Poland	31,269	16,169	1,057 <sup>5</sup>	7
Romania	23,839	14,717	736-1,472 <sup>6</sup>	10
Serbia and Montenegro****	10,217	5,595	n/a	n/a

\* Data refer to 2003 unless otherwise indicated and were taken from FAOSTAT, <http://faostat.fao.org/site/418/DesktopDefault.aspx?PageID=418>.

\*\* Data derived from local consultants' reports in each SEE country. Unfortunately, there is some doubt that they accurately report on abandoned arable land because arable land is intensively cultivated land, and the literature review conducted shows that extensively farmed agricultural land, not intensively cropped arable land, is most likely to be abandoned. The former generally includes pasture and, occasionally, cultivated land. Hence, it is most accurate to report abandoned land as a percentage of agricultural land.

\*\*\* Data for Kosovo were reviewed in the consultant's report: Deda, Shkipe, "Mainstreaming Environment into Forestry and Agriculture Policies and Operations," April 14, 2007, p. 4 and Annex 10 on "Agricultural Surface Areas and Yields: 1980-2005."

\*\*\*\* Data for Serbia and Montenegro predate the separation of the State Union of Serbia and Montenegro in 2006.

<sup>1</sup> Data from the Ministry of Agriculture, Albania.

<sup>2</sup> Estimate for 2005.

<sup>3</sup> Reported for 2001.

<sup>4</sup> Reported for 2005 as a % of total agricultural area.

<sup>5</sup> Reported for 2005.

<sup>6</sup> Calculated as % of agricultural area in 2006.

<sup>7</sup> Calculated as % of agricultural area in 2005.

<sup>8</sup> Reported for 2007.

## Land Abandoned because of War

In Annex Table 4.1, the country with the highest percent of abandoned land is Bosnia and Herzegovina, one of the most heavily land-mined countries in the world. A recent FAO (2002) review of agriculture in Bosnia and Herzegovina summarizes the impact of landmines on agriculture:

Large tracts of strategically important agricultural land and forest areas remained mined after the war and therefore cannot be used. De-mining of the thousands of minefields may require many years to complete. Estimates do suggest that at current rates of de-mining, it

might take several generations before rural areas are again completely safe.

A clear agriculture policy response to the tragic problem of land mines in rural areas has yet to be developed. It is estimated that there are around 670,000 landmines and 650,000 unexploded ordnance remaining in BiH over more than 2,000 square kilometers. As urban areas and infrastructure have priority for current de-mining activities, the de-mining of agricultural land proceeds at a slower-than-average pace.

Landmines continue to kill and injure civilians throughout the country, and farmers and herders

are the most frequent casualties of landmines (SAC and HI 2003). The Bosnia and Herzegovina Mine Action Center reports that from May 2002 to May 2006, there were 187 mine-related incidents.<sup>31</sup>

Landmines are a widespread phenomenon across the Former Yugoslavia region. In Kosovo, during the civil war of 1998–99, land that used to be farmed remained idle. After 2000, the same plots remained uncultivated because of fear of mines and cluster bombs left from the war. Farmers often burn the land as a de-mining measure which highly contributes to the spreading of fires in Kosovo's forests. Only in the year 2000, 3,980 ha were affected by forest fires, a major environmental problem in Kosovo.

Serbia and Montenegro acceded to the Mine Ban Treaty in 2003 and began destroying its stockpile of antipersonnel mines in August 2005. By March 2006, it had destroyed 649,217 mines, almost half of its stockpile (MAC 2006).

Mine contamination is also a legacy of the armed conflict in Croatia during the period of 1991–1995. De-mining initiatives have so far progressed slowly, focusing primarily on settlements and roads. Farmland and forests have been targeted only marginally. Minefields are an economic burden for the government. It is estimated that, as of 2005, there were approximately 1,200 km<sup>2</sup> of minefields nationwide.<sup>32</sup> According to a recent report by the Land Mine Monitor (2006), minefields can be found in 12 of the 21 counties of Croatia; four of these counties are located in the agriculturally fertile region of Slavonia, which also has oil and natural gas reserves. About 1.1 million inhabitants are believed to live in 121 mine-affected municipalities across the country (MAC 2006).

Finally, in FYR Macedonia, the northwestern border is the main area affected by mines as a result of the conflict between government forces and ethnic-Albanian insurgents in 2001.

## Historical Perspective: Land Abandonment in Western Europe

Abandonment of agricultural lands is a worldwide process, frequently reflecting the decline of traditional agricultural methods. Abandonment is a long-term trend in many Western European countries, as farmers have left land that is remote, less fertile, and on steep slopes. It is estimated that forested areas in Switzerland have increased by one-third over the last 150 years; much of that expansion has been on abandoned agricultural land (Gellrich et al. 2007). From 1951 to 1981, 11 percent of farmland in Sweden was abandoned.<sup>33</sup>

Although the trend toward abandonment has abated in the EU since the CAP was implemented, abandonment may increase in the future due to demographic changes and CAP reform.

## Positive and Negative Environmental Consequences of Land Abandonment

Abandonment will cause positive environmental externalities in intensively farmed land as use of fertilizers and pesticides ceases. However, intensively farmed land is less likely to be abandoned than extensively farmed land, which generally produces lower economic returns.

Abandoning farmland that is marginally productive due to a steep gradient or lack of water may have positive environmental consequences as erosion is reduced and natural vegetation takes over the land. In many instances, afforestation of marginal farmland will increase biodiversity, but in

<sup>31</sup> Consulted in: <http://www.mineaction.org/country.asp?c=4>. This website quotes the Bosnia Herzegovina Mine Action Center (BHMIC) statistics.

<sup>32</sup> Data consulted in Matosevic, Ratko, consultant's report on "Croatia: Mainstreaming Environment into Agriculture and Forestry," Table 13. The total surface of minefields includes the following categories: settlements; infrastructure; agricultural land; forest land; meadows and pastures.

<sup>33</sup> Consulted at: [erae.oxfordjournals.org/cgi/reprint/19/3/351.pdf](http://erae.oxfordjournals.org/cgi/reprint/19/3/351.pdf).

certain types of land, abandonment may negatively affect biodiversity.

Extensively farmed land, such as pastures and meadows that have been used for cattle grazing, tends to be biodiversity-rich in both flora and fauna. Over time, many species have adapted to a mosaic landscape that includes both extensively farmed land and forests, but many species, including birds and butterflies, need grasslands in order to survive. Abandoning pastures and meadows that have been used for grazing can reduce the necessary habitat for these species. Thus, biodiversity may decline if these lands are abandoned (EEA 2004).

In recent years, policy makers in the EU have focused on the impact of land abandonment on biodiversity as one element of their efforts to conserve biodiversity. These efforts have centered upon “high nature value” (HNV) farmland areas, which are “areas where farming practices are associated with high biodiversity” (EEA and JRC 2006). The European Environmental Agency (EEA) has defined three different types of HNV areas:

- Farmland with a high proportion of semi-natural vegetation.
- Farmland dominated by low-intensity agriculture or a mosaic of semi-natural cultivated land and small-scale features.
- Farmland supporting rare species or a high proportion of European or world populations.

The EEA estimates that roughly 15–25 percent of the European countryside qualifies as HNV farmland, and that considerable areas of HNV farmland are located in Eastern Europe (EEA and JRC 2006, p. 2). Nevertheless, since HNV farmland accounts for only a portion of all abandoned farmland, there is significant potential to increase biodiversity through the regrowth of forests on land that is not HNV farmland.

Afforestation of abandoned land also offers opportunities for carbon sequestration within

the framework of the United Nations Framework Convention on Climate Change. In Romania and Moldova, for instance, the World Bank is actively involved in implementing carbon finance projects. In Romania, the Bank administers a Carbon Fund to afforest over 60,000 ha of state-owned degraded lowlands in seven counties. Soils are stabilized by planting semi-naturalized species and native tree species. In Moldova, the Prototype Carbon Fund and the BioCarbon Fund are being used to reforest approximately 20,000 ha of eroded state-owned and communal agricultural land, as well as to plant 14,500 ha of degraded pastureland. Overall, in addition to global benefits, both initiatives aim at restoring degraded lands, improving sustainable supplies of forest products to local communities, and building community management capacity (World Bank 2007a).

The amount of carbon that can be sequestered through the afforestation of abandoned farmland is difficult to calculate because it will vary according to soil and other conditions of the land. One expert has noted that “Soils of eroded or degraded sites generally have low carbon levels and therefore a high potential to accumulate carbon; however, revegetation of these types of sites will pose technical challenges” (Hidalgo 2006).

## Future Scenarios

Land abandonment in countries in transition presents important challenges as well as opportunities for environmental policy makers. Broadly speaking, the following policy options exist for abandoned land, each of which may have positive or negative environmental consequences, depending upon specific circumstances.

**1. Return abandoned land to agricultural use.** For some farmland, the process of land abandonment may be a temporary phase of the economic and social transition. Once new structures are fully developed for the sale and leasing of land and the financing and marketing of crops, farmers may find it beneficial to resume agricul-

tural production on much of the abandoned land. If abandoned land is farmed more intensively when it is returned to use, biodiversity may suffer, and there may be additional negative consequences from fertilizer and pesticide use. However, if the land is HNV land dependent upon active management for the preservation of its semi-natural habitat, biodiversity may benefit. It should be noted that, since HNV land is only a small portion of all farmland, environmental reasons would not justify returning most abandoned farmland to active farming.

**2. Natural revegetation.** The natural process of the regrowth of native species of tall grasses, shrubs, and trees will result in forest covering the abandoned land in most parts of SEE. This is the most likely scenario for much abandoned farmland, absent economic incentives to return the land to agricultural production, and absent formal programs of afforestation. For most abandoned land, this natural process is likely to produce positive environmental benefits.

**3. Planned afforestation.** If properly planned and implemented, actively converting abandoned farmland into forests can produce a number of economic and environmental benefits. Economic benefits of forests may include the harvest of timber products, tourism, and revenues from emissions traded for carbon sequestration. Environmentally, afforestation can result in more rapid growth than the natural regrowth of native vegetation. If proper attention is paid to the species of trees that are planted, afforestation can increase biodiversity.

## Encouraging Environmental Stewardship of High Nature Value Land

To maintain HNV landscapes such as semi-natural grasslands, additional economic incentives may be needed to encourage continued maintenance through activities such as mowing. While incentive programs are likely only relevant to a small portion of currently abandoned land, the incentives may be necessary to preserve the environmental benefits that have resulted from traditional extensive agricultural practices (EEA 2004).

## Conclusion

Some abandonment of land is inevitable in the transition to a market economy. Land abandonment is a human problem with environmental dimensions; its causes are diverse, as are its environmental impacts. National governments in the SEE region must assess their environmental, social, and economic objectives when developing policies to address land abandonment.

- National inventories of abandoned land should be prepared to inform policy making.
- Local and regional land use plans should be developed that balance economic, social, and environmental goals.
- Broader rural development policies are needed to address social and economic issues in rural communities facing land abandonment.
- High nature value farmland should be identified using a consistent analytical framework across countries.
- Strategies for abandoned land should consider high nature value farmland and its role in preserving biodiversity.
- Policy makers should evaluate carbon sequestration opportunities.

## Sub-Regional Comparisons

Subject	Good practice: Poland, Hungary	SEE: All countries and territories	EECCA: All countries
Polices and strategies	Fully aligned with EU	Generally satisfactory re sustainability, except perhaps Bosnia & Herzegovina	Generally satisfactory re sustainability
Privatization of farmland	Poland traditionally private (96 percent); Hungary, 88 percent	Generally complete or nearly so; Macedonia an exception	Above 70 percent only in four countries, reliance on leasehold and corporate farms not radically different to the former collective farms.
Forest ownership	Poland 18 percent private	Private forests 18.5 percent but ranges from 0 to 50 percent	Full state ownership
Interagency cooperation	Limited	Limited but gradually improving	Limited but gradually improving
Public awareness of agriculture and forestry sustainability issues	Moderately good	Generally inadequate	Generally inadequate
Public participation in policy, program, and project formulation	Follows EU requirements but may be <i>pro forma</i>	Increasingly aligned with EU standards on paper but may be less in reality	Some participation, e.g. on EIA, but generally limited, especially in less democratic states
Agricultural research	Active involvement	Moderate emphasis on sustainability/conservation issues	Emerging emphasis on sustainability/conservation issues
Agricultural extension/ advisory services	Poland has large, conventional extension service but effectiveness is limited, especially on sustainability	A mix of conventional services, with modest capabilities, and public-private partnerships of various kinds; varying impact; possibly better on business advice than on sustainability	Some countries have essentially none, except top-down directives; others experimenting with innovative, low-cost options involving private sector, but too early to see full impact; questions on sustainability after donor projects finish
Soils management: erosion	Limited programs, with EU assistance	Erosion problems prevalent in more arid countries; some efforts to address with EU assistance; Turkey making some progress	Erosion problems widespread in nearly all countries; limited available data indicates worsening trends; almost no programs to address this
Soils management: fertility	Acidification an important issue in Poland	Fertility has declined due to reduced use of chemical and organic fertilizers; acidification an issue in northern countries	Fertility has declined due to sharply reduced use of chemical and organic fertilizers; some programs to address this but few results as yet
Nutrient management	Pilot Bank/GEF project bloomed into national program in Poland with EU support; action program in Hungary.	Diagnostic studies and a few pilots under Danube-Black Sea program but national programs not yet developed, except in Romania	Diagnostic studies under Baltic and Black Sea programs and some pilot projects underway, especially in Russia and Georgia; follow-up limited; not a major issue in Central Asia

(continued)

Subject	Good practice: Poland, Hungary	SEE: All countries and territories	EECCA: All countries
Pest management: regulation	Full regulation	Full regulation	Full regulation but enforcement variable
Pest management: disposal of obsolete stocks	Program for disposal in Poland now 50 percent complete	Inventories underway in several countries; disposal programs in Albania, Croatia and Romania	Inventories completed or underway in several countries; disposal programs starting in Armenia, Georgia and Moldova
Pest management: integrated pest management	Limited use in Poland in fruit and vegetable production; area covered in Hungary increasing rapidly	Pilot projects in Bosnia & Herzegovina, Kosovo, Macedonia, and Turkey	Early efforts in whole Soviet Union not sustained except in Moldova, Turkmenistan, and Uzbekistan, which have effective full-scale programs, especially on cotton; efforts elsewhere quite limited
Water management: irrigation	National agricultural research system	Efforts to rehabilitate systems, with some impact on efficiency, including pricing mechanisms: underway in most countries, generally through donor projects	In Russia, Ukraine, and Georgia, irrigated area declining and efficiency receiving little attention; in Central Asia, donor-funded efforts to improve efficiency and introduce pricing are effective but do not yet cover a large proportion of the area
Water management: salinity	National agricultural research system	A problem in parts of Turkey but programs are being implemented	Major issue in nearly all countries with irrigation; efforts to improve efficiency and rehabilitate/expand drainage will alleviate salinity albeit on a limited area to date; long-term sustainability will require a broader approach, especially in Turkmenistan and Uzbekistan
Forestry: protected areas	Improving	Improving	Improving, especially in Ukraine
Forestry: forest health	Declining in Poland	Situation varies from year to year, but is basically under control	Situation varies from year to year, but is basically under control
Forestry: sustainable management	Fully satisfactory	Satisfactory in most countries	Illegal logging a problem in nearly all countries but promising programs to address this in most cases
Forestry: certification	Fully satisfactory	In place in some countries; 90 percent coverage in Croatia.	Starting in Russia, Ukraine, Belarus; other countries export little or no wood
Forestry: sustainable yield	Harvesting considerably less than annual increment	Harvesting considerably less than annual increment	Harvesting considerably less than annual increment, especially in Russia
Carbon sequestration	Potential both in methane capture and reforestation	Potential both in methane capture and reforestation, especially in large areas of abandoned farmland; little action to date, except in Romania	Potential both in methane capture and reforestation; apart from Moldova, little action to date
Organic farming	Programs moving beyond pilot stage with EU subsidies.	Several countries have promising pilot projects; some full-scale	Several western EECCA countries have promising pilot projects.
Trade and environment	Covered by EU regulations	Little information; forestry increasingly covered by certification	Few agricultural exports to western countries, except Central Asian cotton; forestry increasingly covered by certification

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