Environmental issue report No 37

Agriculture and the environment in the EU accession countries

Implications of applying the EU common agricultural policy

European Environment Agency

Environmental issue report | No 37

Agriculture and the environment in the EU accession countries

Implications of applying the EU common agricultural policy

European Environment Agency

Project managers: Jan-Erik Petersen and Ybele Hoogeveen, EEA

Cover design: Rolf Kuchling, EEA
Layout: Lorena Marcaletti, EEA
Photo: Mihály Bodnár, Hungary

ISBN: 92-9167-637-3

Printed in Belgium

European Environment Agency
Kongens Nytorv 6
DK-1050 Copenhagen K
Tel: (45) 33 36 71 00
Fax: (45) 33 36 71 99
E-mail: eea@eea.eu.int
Internet: http://www.eea.eu.int

Contents

Preface

This report is based upon a background study and data compiled and analysed by a multinational team. The team was led by David Baldock, Ferenc Tar, Andrew Farmer and Harriet Bennett of IEEP in London and had national partners from six accession countries: Viara Stefanova in Bulgaria, Jaroslav Prazan in the Czech Republic, Merit Mikk in Estonia, Zbigniew Karaczun in Poland, Miroslava Cierna in Slovakia and Eyup Yuksel in Turkey. Jane Feehan, Katalin Balazs and Peder Gabrielsen provided editing and data support at the EEA. We would like to thank them all for their important contributions. We are also grateful to Wolfgang Münch and Olivier Diana at DG Agriculture for supplying data and comments in the development of Chapter 4.

Executive summary

Scope of the analysis

Agriculture is very important for the environment in the 13 EU accession countries[1]. Large areas of farmland of high nature value are present, but at the same time farming may cause serious pollution and environmental stress. Most of these countries are also remarkable for the extent to which policies and socio-economic conditions have changed in recent decades. EU entry will bring further policy changes.

The structure of the report follows key policy questions that provide an insight into the relationship between agriculture and environment in the accession countries:

- What are the characteristics of agriculture in AC-13 in terms of farm structure, management, production and associated biodiversity and how do these compare to agriculture in the EU?
- What are the recent agricultural trends and their underlying drivers?
- How do these agricultural changes affect the environment and what are the main concerns?
- What will be the effect of the recent EU enlargement and CAP[2] reform decisions on agricultural land use and the environment in the acceding countries?
- What are the key agri-environmental policy options arising from the new policy framework?

This report uses forecasts published by DG Agriculture, environmental information from various sources and a certain element of expert judgement. More information is available on the ten central and eastern European countries (CEE-10) than on the Mediterranean countries (MED-3). The focus of economic analysis by DG Agriculture is on the ten countries that will join the EU in 2004 (ACC-10): Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia. For this reason the policy assessment covers principally these ten acceding countries (as well as Bulgaria and Romania where possible).

Agriculture characteristics and trends

Agriculture's share of the total national land area ranges from 30–60 % in the 13 accession countries. Average farm size is small compared to the EU-15, but considerable regional differences exist. Very small and very large farms exist alongside each other in CEE-10. Most of these rely on outdated machinery and buildings. Many private farmers in the accession countries also have low formal agricultural training.

The political changes in CEE-10 have affected agricultural development profoundly. Economic restructuring and lack of capital caused a sudden drop in agricultural investment in the 1990s, resulting in lowered pesticide and fertiliser inputs (with a consequent reduction of pollution), and in most countries abandonment of biodiversity-rich grassland systems. The reduced investment in erosion mitigation and in manure storage facilities poses significant environmental risks if agriculture intensifies again in the future. This applies particularly to the central European countries.

By contrast, agriculture has steadily intensified in the Mediterranean accession countries, where inadequate water management and erosion control are the principal environmental concerns. It is increased agricultural irrigation and overgrazing (the latter mainly in Turkey) that are the problems rather than abandonment and scrub encroachment.

(1) Country groupings as used in this report:
ACC-10 (acceding countries according to Copenhagen agreement): Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia.
AC-13 (all present accession countries): Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia, Turkey.
CEE-10 (central and eastern European accession countries): Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia.
MED-3 (Mediterranean accession countries): Cyprus, Malta, Turkey.
The formal status of Turkey is different from the other countries, since negotiations on accession have yet to be started.

(2) CAP: common agricultural policy of the EU.

Main environmental issues

National surveys and international data sets underlying this report show that agriculture exerts pressure on soil, air quality, water quality and quantity, biodiversity and landscape quality.

Soil erosion has been a problem in the accession countries for many decades, and it remains significant today. Land consolidation, field enlargement, the use of inappropriate machinery, and tillage practices are the most important factors involved.

The economic climate during the 1990s has not allowed sufficient investment in erosion mitigation features. Areas of grassland have been converted to arable land, increasing erosion risk and causing biodiversity loss.

Agriculture emits several polluting substances to the air, notably ammonia (eventually causing eutrophication and acidification of ground and surface water) and the greenhouse gases methane and nitrous oxide (causing global warming). Ammonia emissions in CEE-10 have dropped by 40–50 % since 1990 as a result of livestock reductions. While this has certainly relieved environmental pressure in the region, more than 70 % of its ecosystems are still exposed to eutrophying depositions above critical threshold levels. The corresponding figure for acidification is roughly 10 %.

The contribution of agriculture to greenhouse gas emissions is significant (currently about 10 % in AC-13), but in absolute terms this pressure has diminished considerably. Methane emissions have roughly halved since 1990, again as a consequence of livestock reductions (cattle). Total nitrous oxide emissions show no clear trend. Separate data on agricultural emissions of nitrous oxide are not available, but the contribution of agriculture has probably gone down, given the decreased use of nitrogenous fertilisers.

Agricultural water pollution, especially around large livestock facilities, is a major problem in many countries. In the CEE-10, irrigation and the environmental problems associated with it have decreased markedly since the 1990s, although facilities are currently being restored in some areas. The challenge now is to restore them within an environmentally appropriate management framework, avoiding the problems of the past. In the MED-3, irrigated area is still increasing, causing considerable environmental pressure.

Biodiversity on farmland is primarily affected by intensification and land abandonment. Surveys of important bird areas (IBAs) show considerable regional variation of these factors. While IBAs in Turkey appear to be experiencing little or no abandonment problems, this is a dominant issue in Slovakian and Estonian IBAs. Intensification is a more dominant problem in IBAs in the Czech Republic, Slovenia and Poland. The effects of abandonment on biodiversity depend on the intensity of previous land use and the species under consideration. In Latvia, for example, a number of bird species currently benefit from abandonment, while many grassland plant species are disappearing due to the cessation of grassland management. In general, abandonment of extensive farmland has mostly negative effects from a biodiversity perspective, while it can increase species diversity in intensively farmed areas.

Conclusions: implications of applying EU agricultural policy

The process of modernisation and intensification of agriculture has been disrupted by political changes and sector reforms in most accession countries around 1990. Agriculture is currently characterised by low inputs and productivity as well as a high associated biodiversity (compared to the EU-15).

Economic change and the implementation of the CAP in the acceding countries are expected to lead to some intensification and expansion of the arable crop area. While milk and beef production will remain more or less stable, DG Agriculture predicts a small increase in pig production and a significant expansion of poultry output. However, nearly all agricultural sectors will not reach their pre-1990 production levels again.

In spite of the limited increase in livestock production, overall air and water pollution are expected to be rather stable and will remain at relatively low levels compared to 1990. Present methane emissions are not likely to increase given overall stable numbers of the cattle herd. Nitrous oxide emissions, however, may go up as the result of increased nitrogenous fertiliser use in arable

production. Overall, agriculture will contribute to meeting the 2012 Kyoto targets for greenhouse gas reduction. Emission reduction targets for ammonia (2010)[3] will probably be reached, regardless of the new agricultural policy framework. Nevertheless, a considerable fraction of natural ecosystems will still suffer from eutrophication and acidification (currently 70 % and 10 % respectively).

If the expected intensification in the arable sector is accompanied by improved management of fertilisers and pesticides the consequences for soil and water resources may be limited. However, conversion of grassland, multi-annual fodder crops or long-term fallow to arable cultivation will increase the risk of soil erosion, in particular if this occurs on erosion prone soils, such as on slopes.

To minimise increases in environmental pressure associated with higher production intensity in all sectors, appropriate agri-environmental measures need to be put in place (cross-compliance, good farming practice, farmer advice and training, support for environmental investment, agri-environment schemes etc).

Conservation of semi-natural grasslands remains a major environmental concern. The current abandonment of high nature value grassland systems, particularly in the Baltic States and central European mountain ranges, indicates that present livestock levels do not provide sufficient grazing capacity. Economic support for an expansion of cattle and sheep numbers has been strongly limited by the Copenhagen enlargement agreement. Furthermore, intensification and conversion to arable land remain important threats to species-rich grasslands in productive areas.

Accession to the EU (and pre-accession funds in other countries) will make more resources available for agri-environment schemes and other rural development measures. These are important for reducing the environmental impact of the agricultural trends outlined above. National level implementation and capacity building are key factors for making EU enlargement a success in this regard. Improved monitoring and reporting should be an integral element in the planning and implementation of rural development policies.

(3) Agreed under the UNECE Convention on Long-Range Transboundary Air Pollution.

1. Introduction

1.1. Why this report?

Agriculture has played a central role in shaping and influencing the environment in numerous ways throughout Europe over the centuries, and the EU accession countries[4] are no exception to this. Here, the influence of agriculture on the environment is particularly clear: large areas of farmland of high nature value are present, but so are examples of severe pollution and environmental stress. The region is also remarkable for the extent of policy changes that have occurred in recent decades, and for the further changes entailed in joining the EU.

The common agricultural policy (CAP) is one of the most developed policy areas in the EU and the preparations for its implementation are a considerable challenge for all accession countries (AC-13). The CAP has been criticised for supporting agricultural specialisation and intensification with negative impacts on the environment. On the other hand, it is also a key policy tool for ensuring the delivery of public goods by farmers, e.g. via agri-environment schemes. The Copenhagen summit in December 2002 has completed the EU accession negotiations with ten countries of central and eastern Europe and the Mediterranean. Given the importance of agricultural policy for the environmental management of farmland, the accession treaty agreed in Copenhagen will have implications for the environmental resources of farmland in these ten countries as well as the remaining accession countries in the future.

1.2. Policy questions and structure of the report

The structure of the report follows key policy questions that provide an insight into the relationship between agriculture and environment in the accession countries:

- What are the characteristics of agriculture in AC-13 in terms of farm structure, management, production and associated biodiversity and how do these compare to agriculture in the EU?
- What are the recent agricultural trends and their underlying drivers?
- How do these agricultural changes affect the environment and what are the main concerns?
- What will be the effect of the recent CAP enlargement and reform decisions on agricultural land use and the environment in the acceding countries?
- What are the key agri-environmental policy options arising from the new policy framework?

Chapter 2 deals with questions 1 and 2 by setting out important socio-economic and farm structure parameters for the AC-13 and by reviewing the richness of biodiversity of farmland in central and eastern Europe in particular. The changes that have taken place in farm and land management and their socio-economic drivers are discussed. Building on this, Chapter 3 focuses on the associated pressures on the rural environment, positive as well as negative, and provides an indication of the most important agri-environmental concerns (question 3).

Chapter 4 focuses on the likely implications of the 2002 EU enlargement decision and the 2003 mid-term reform of the CAP for farming and the environment in the ten acceding countries (questions 4 and 5). Information from earlier chapters and underlying research is used to build an assessment of the potential farm management changes and impacts on environmental resources of farmland in central and eastern Europe in particular. This analysis utilises production forecasts

(4) Country groupings as used in this report:
ACC-10 (acceding countries according to Copenhagen agreement): Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia.
AC-13 (all present accession countries): Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia, Turkey.
CEE-10 (central and eastern European accession countries): Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia, Bulgaria, Romania.
MED-3 (Mediterranean accession countries): Cyprus, Malta, Turkey.
The formal status of Turkey is different from the other countries, since negotiations on accession have yet to be started.

published by DG Agriculture, environmental information from various sources and expert judgement. Given the scale and importance of the potential impacts of extending the CAP to accession countries, a full-scale sustainability impact assessment would be justified. This report seeks to explore some of the ground that such an assessment would cover.

1.3. Approach to data collection and analysis

There are few sources of consistent agri-environmental data covering the thirteen accession countries, FAO statistics being the main such source. Eurostat is building up its coverage of agricultural statistics in the accession countries, and economic and livestock data were already available for this report. In the area of biodiversity, information supplied by BirdLife International or compiled in ongoing semi-natural grassland surveys sponsored by the Dutch government had the best regional coverage. However, most of the agricultural and environmental information has been gathered from national sources and is generally not sufficiently standardised to allow reliable, quantitative comparisons to be made between countries. In the report a combination of international data sets, national level information and some expert judgement was used to provide a comprehensive analysis of agri-environmental issues.

The report covers all thirteen accession countries. However, far less information is available on the three Mediterranean countries Cyprus, Malta and Turkey (MED-3) which restricts the integration of the MED-3 in the various chapters. Agro-economic background studies by DG Agriculture analyse the central and eastern European countries (CEE-10) only. Due to these restrictions on background data, and to reflect the recent EU enlargement decisions, the policy assessment in Chapter 4 focuses for the most part on the ten acceding countries (ACC-10). Further research is required to fill remaining data gaps regarding relevant agro-economic and environmental information.

2. Agriculture in the accession countries

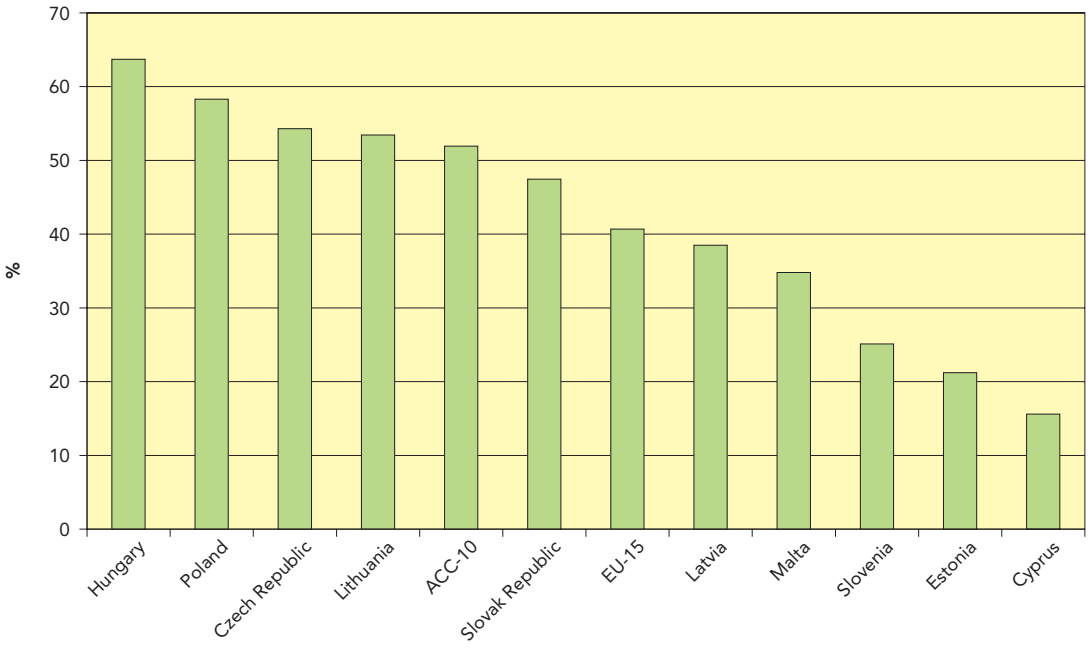
This chapter describes agriculture in the 13 countries on the road to EU accession and the development of agriculture in response to the shockwave of political and economic change during the 1990s. It focuses on the adaptation of the agricultural sector in the 1990s to a market economy. This was not an easy process, and the sector is in fact still struggling with severe socio-economic constraints. The actual impact of the agricultural transition on the environment will be discussed in Chapter 3.

2.1. General characteristics

Utilised area and products

On average, agriculture is an even more important land use in CEE-10 and Turkey than in the EU-15 (Figure 2.1). Its share of total national land area varies considerably but lies between 40–60 % for most countries, encompassing a wide range of different farming systems and cropping patterns. Forestry and woodland is an even larger land use in Estonia and Slovenia. Cyprus has only a very small share of its total land under agriculture due to its mountainous terrain and high population density in coastal areas.

Figure 2.1 **Share of utilised agricultural area (UAA) in total land area**



Source: Eurostat, 2003.

Note: The share of UAA in total land area is calculated as an average of the years 1999–2001. For the EU-15 data only cover 1999–2000, for Cyprus and Slovenia only 2000–2001, and for Malta only 2001.

The major agricultural products in the accession countries are similar to those in the existing EU, with cereals and livestock predominant in the north, and a wider range of crops including fruit, vegetables, wine and olives in the south. Farming accounts for a much larger share of employment than in the existing EU, particularly in Romania, Turkey, Bulgaria and Lithuania. On average nearly 30 % of the workforce is employed in farming, although this disguises a considerable degree of over-capacity of farm labour and includes a large number of semi-subsistence farms of a kind that are now rarely found in most parts of the EU. Agricultural area, employment, trade and major products are shown in Table 2.1.

Source: CEC, 2002c.

Table 2. 1 **Key features of agriculture in the accession countries in 2000**

	Utilised agricultural area (UAA)	Share of agriculture (%)			Major products
	in 1000 ha	total area	GDP	employment	
Bulgaria	5 582	50.3	14.5	25.2	wheat, maize, sunflower, wine
Cyprus	134	14.5	4.2	9.3	fruits and vegetables
Czech Republic	4 282	54.3	3.9	7.4	cereals, oilseeds, sugarbeet, pork
Estonia	986	21.8	6.3	7.4	beef, pork, poultry, milk
Hungary	5 854	62.9	4.1	4.8	wheat, maize, sunflower, pork
Latvia	*2 488	38.5	**4.5	**13.5	dairy products, beef and pork
Lithuania	3 489	53.4	7.5	19.6	barley, wheat, fodder, milk
Malta	12	38.1	2.5	1.8	potato, flowers, tomatoes, milk
Poland	18 220	58.8	3.3	18.8	cereals, potato, pork, milk
Romania	14 767	61.9	12.6	42.8	maize, wheat, sunflower, wine
Slovakia	2 444	49.8	4.5	6.7	wheat, oilseeds, sugar, milk
Slovenia	486	24.0	3.25	9.9	maize, wheat, potato, grape/wine
Turkey	39 050	50.3	14.3	41.3	fruits and vegetables, cereals, sheep
EU-15	130 004	40.2	2.0	5.0	

*1999 figure
**estimates

Farm structure and management

Farm size and structure vary greatly in central and eastern Europe. Most countries went through a period of collectivisation after 1950, resulting in the emergence of large-scale collective and state farms. At the same time, small (semi-)subsistence farms and household plots survived alongside the collectivised holdings and have remained a central feature of farming in many countries.

The collectivised holdings were largely privatised after the political changes in the 1990s. Considerable differences, however, exist between the accession countries. Small private farms have always characterised the agricultural sector in Poland and Slovenia. By contrast, large co-operative or joint stock holdings (successors to previous collective farms), dominate farm structure in the Czech Republic and particularly in Slovakia. In the Baltic States, Romania and to a lesser degree in Bulgaria and Hungary many new private farms have been established, often on the basis of pre-war farm infrastructure. In 1999, these private holdings accounted for about 50 % (in Bulgaria and Hungary) to 95 % (in Latvia) of all agricultural land.

Overall the accession countries are characterized by a juxtaposition of many very small and few very large holdings. In general, the share of large-scale previously collective farms in the total agricultural land area is declining (CEC 1998), with private holdings increasing in number and in size. Table 2.2 gives an overview of the current farm structure in a number of central and eastern European accession countries. Very small holdings are also common in the Mediterranean accession countries.

Table 2. 2 **Farm structure in selected CEE countries**

	Year	Share of UAA used by family farms / household plots (%)	Average size of family farms / household plots (ha)	Average size of private and state-owned holdings (ha)
Slovenia	2001	94	6	290
Poland	1996	82	7	426
Romania	1997	67	3	2 491
Hungary	2000	55	9	312
Czech Republic	2001	27	28	1 035
Bulgaria	1999	26	1	519
Slovakia	2000	23	4	1 399

Source: After Fritzsch *et al.*, 2003.

Many of the small private farms rely on very old and partly self-built machinery and farm buildings. While mechanisation is often limited, use of available land can be very intensive. Use of off-farm inputs, such as fertilisers and pesticides, is generally low. Livestock are often kept in old buildings and manure storage facilities are self-built where present. Many of the small private farmers belong to the older generation and have little formal education. (Semi-)subsistence farming is not unusual in this type of farming, which means that little or no farm produce is sold on the market.

Mowing of grassland with old machinery.
Photo: Mihály Bodnár, Hungary

Larger co-operative or joint stock holdings generally also work with outdated machinery, old buildings and restricted use of chemical inputs. Investment, if any, generally goes into machinery that provides immediate productivity gains rather than into environmental infrastructure or buildings. Most farm managers on such holdings possess either university-level or professional training, but the socialist agricultural education was rather production-oriented, covering little relevant environmental information.

Biodiversity on farmland in the accession countries

The process of creating very large state farms and cooperatives under the socialist regime led to the loss of many landscape elements and habitats, often accompanied by increased drainage and irrigation. However, in much of Poland, Slovenia, and mountainous areas elsewhere small-scale production still predominates. Thus, the accession countries contain sizeable areas of little disturbed semi-natural habitat and high nature value farming systems, usually associated with more traditional, less intensive forms of production. Table 2.3 gives an overview of the significant areas of semi-natural grasslands remaining in the CEE-10.

These semi-natural habitats, including large areas of both wet and dry grasslands, constitute a major conservation resource. Of the estimated 7 million hectares of semi-natural grasslands in the CEE-10, about 30 % are in Poland, a further 30 % in Romania and 12 % in Hungary. There is a very substantial area of grassland in Turkey — around 31 % of the agricultural area in 1984 (Baris, 1991). Turkey, with an estimated 9 000 species, has the richest flora of any country in Europe, with an estimated 2 800 endemic species (Byfield, 1998). It is likely that grassland habitats play an important role for the conservation of these species (Veen *et al.*, 2000). In Cyprus and Malta there is little permanent grassland, but precise data on its extent or habitat quality are not available.

Source: EEA, 2003 (original data derived from Brouwer *et al.*, 2001 and FAOSTAT).

Note: Semi-natural grasslands are defined according to their dependence upon continuing agricultural management in order to persist. Alpine pastures above 1 900 m that can be maintained without any human intervention are not included.

Table 2. 3 **Estimated distribution of semi-natural grasslands in CEE-10 countries in 1998**

Country	Total agricultural area (UAA) (1 000 ha)	Total area of permanent pasture (1 000 ha)	Total semi-natural grassland area (1 000 ha)	Total mountain grassland area (1 000 ha)	Semi-natural grassland % of UAA
Slovenia	500	298	268	30	53.7
Romania	14 781	4 936	2 333	285	15.8
Hungary	6 186	1 147	960	0	15.5
Czech Republic	4 282	950	550	1,8	12.8
Slovakia	2 443	856	295	13	12.1
Poland	18 435	4 034	1 955	414	10.6
Bulgaria	6 203	1 705	444	332	7.2
Estonia	*986	299	73	0	7.4
Lithuania	3 496	500	168	0	4.8
Latvia	2 486	606	118	0	4.7

* Figure adapted according to Table 2.1

Bird data confirm the importance of the CEE-10 and MED-3 countries for biodiversity. Many rare species are much more abundant than in the EU-15 countries (see Table 2.4). A number of Important Bird Areas (IBAs) have been identified in the accession countries. The purpose of the IBA concept is to identify and protect a network of sites that are critical to the long-term viability of bird populations (Veen and Seffer, 1999). The importance of agricultural management in IBAs across Europe has been extensively surveyed (Tucker and Evans, 1997, Heath and Evans, 2000).

Source: Heath and Evans, 2000.

Table 2. 4 **Populations of some breeding birds in the 15 EU Member States compared with the 13 accession countries**

Species	Estimated population in the 13 accession countries	Estimated population in the 15 EU Member States
Corn Crake	92 225	4 000
Lesser Grey Shrike	46 255	3 098
White Stork	79 809	15 439

Box 2.1: The Red-backed Shrike: a bird species in decline
The Red-backed Shrike (*Lanius collurio*) has shown a widespread decline in Europe. A large proportion of the European population breeds in eastern Europe, with particularly large numbers in Poland, Russia, Ukraine, Croatia, Romania and Bulgaria. While most of the European population — north-western Europe in particular — suffered a large fall in numbers during 1970 to 1990, key populations in Russia, Romania and Bulgaria remained stable. Preferred habitats in eastern Europe are open meadow landscapes, interspersed with scattered bushes and some forest. Other agricultural habitats include vineyards, heath and fallow land. In intensively farmed areas with few bushes, adults have problems feeding young because of the difficulty in foraging at long distances from the nest. It is thought that the triggering factor for the general population decline is heavy application of inorganic nitrogen fertiliser and the use of broad-spectrum insecticides that reduce the abundance of insect food.
Source: Pain & Pienkowski, 1997.

2.2. Recent developments

Socio-economic context

The collapse of the communist regimes caused a social and economic crisis that profoundly affected agriculture in central and eastern European countries. The market situation changed drastically, with a downward trend of gross domestic product (GDP). For example, Poland's GDP fell by 11.6 % in 1990, Romania's by 12.9 % in 1991, and Lithuania's by 34 % in 1992. This was associated with a decreasing average consumer income and a lowered demand for agricultural products. In addition, important foreign markets, such as the former Soviet Union, were lost.

The economic crisis also put pressure on national budgets. As a result, state support to the agricultural sector was reduced

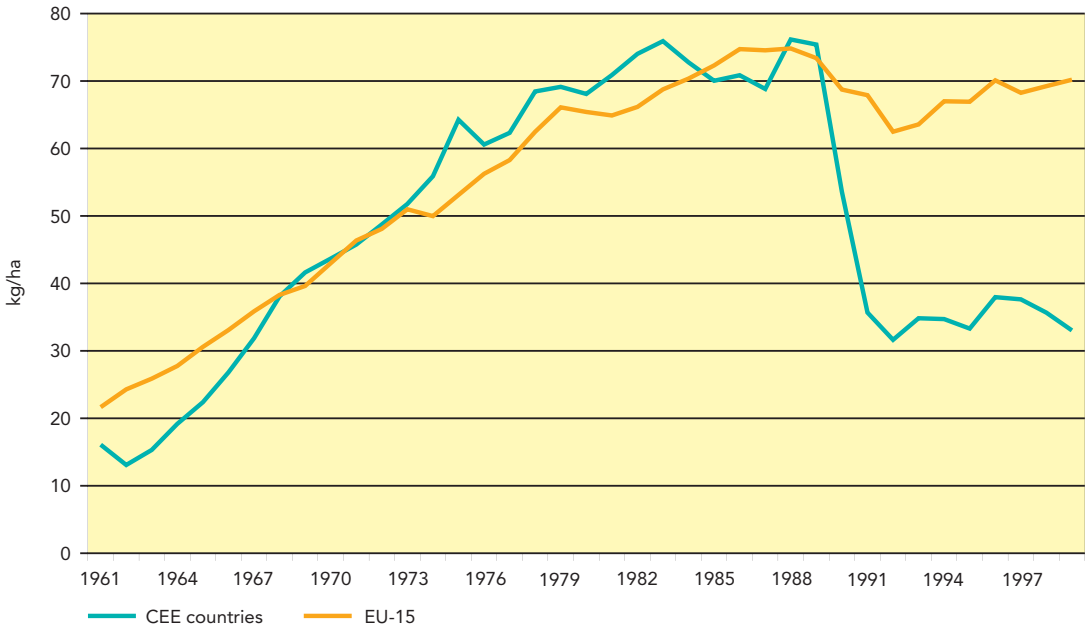
drastically. At the same time, large-scale restructuring of the agricultural sector occurred. Land was privatised and most of the collectivised farm structures were dismantled. The registration of new landownership, however, progressed slowly, adding to the uncertainties of the individual farmer. To make things worse, capital and credit facilities were lacking in the private sector.

Inputs

These changes led to a strong reduction in the use of external inputs. Having risen strongly for three decades the consumption of N-fertiliser in central and eastern European countries dropped by half around the year 1990 and is now far below the EU average (Figure 2.2). Similar declines can also be observed for phosphate and potash use. No similar decrease occurred in the Mediterranean accession countries although fertiliser use remains low in Turkey (at levels similar to central and eastern European countries).

Reliable data on pesticide consumption in the AC-13 are not available for the decades leading up to 1990. However, figures for the period 1989 to 1997 show a strong decline of pesticide use (to about 40 % of 1989 levels) in the CEE countries (Figure 2.3). No such decrease occurred in the MED-3 countries although average pesticide consumption per hectare of land remains low in Turkey (0.2 kg active ingredient/ha, similar to the CEE average).

Figure 2.2 **N-fertiliser consumption in selected central and eastern European countries and the EU**



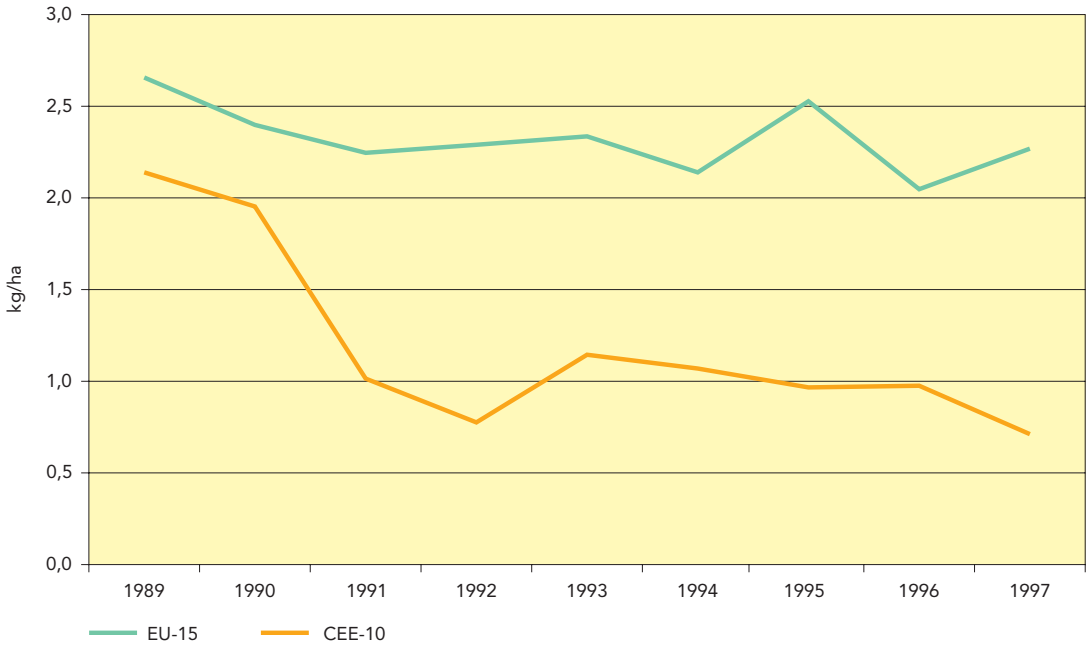
Source: FAOSTAT, 2002.

Note: Due to limited data availability, the description of the trend in fertiliser consumption is limited to the following accession countries: Bulgaria, Czech Republic, Hungary, Poland, Romania and Slovakia.

Source: FAOSTAT, 2002.

Note: The pesticide and agricultural land area dataset has an incomplete time-series for CEE-10 countries and for all EU-15 countries except Finland and Denmark. The graph expresses mean consumption of pesticides (active ingredients classed as insecticides, herbicides, fungicides and others) per unit area agricultural land.

Figure 2.3 **Pesticide consumption in CEE-10 and EU-15**



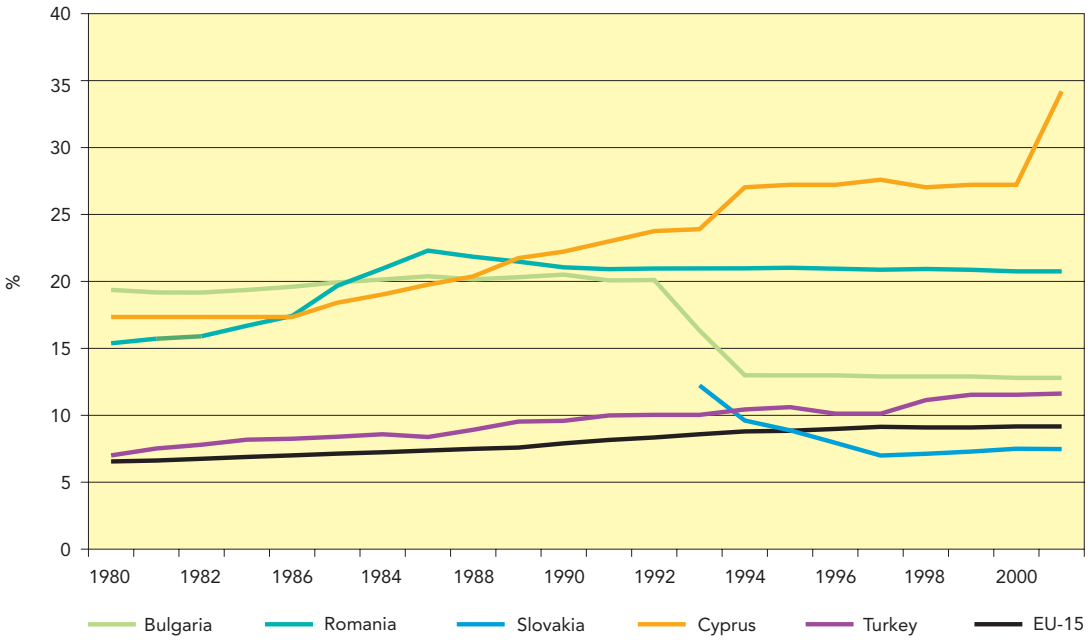
In most cases the reduction in the use of fertilisers and pesticides was a result of economic necessity rather than environmental awareness. The lack of running capital on new private holdings and remaining collective farms made it difficult to buy in more than the minimum of farm inputs. The low level and fluctuation of agricultural product prices as well as uncertainty over land ownership required farm managers to operate with minimum cost as returns on investment even into farm inputs are not guaranteed. As a result, farmers may have been relying on fertility reserves in the soil although data for nutrient input-output accounting at farm or national level are generally not available.

Irrigation

Irrigation played an important part in the large-scale collectivised agriculture promoted under the Soviet regime, particularly in the Pannonian and Danubian Plains. About 25 % of the agricultural area of Bulgaria and 21 % in Romania was under irrigation during the 1980s. By contrast, less than 1 % of the agricultural area in the Baltic States was irrigated (CEC, 2000).

The overall picture of lowered agricultural effort in the CEE countries is also reflected in the use of irrigation. There has been a decline in the proportion of irrigated agricultural land of up to 90 % in some countries. In Romania for example, water consumption for livestock farming decreased by 60 %. Extensive irrigation systems, constructed during the period 1950 to 1980 to provide water for 3.2 million ha of arable land, are now malfunctioning and deteriorating, and 40–50 % of the water used in Romanian irrigation systems is lost through seepage and percolation. In Slovakia, irrigation use has dropped from 12.2 % (1993) to 7.3 % (1999) of total agricultural land. On the other hand, irrigation has increased significantly in the Mediterranean. Between 1989 and 1999 the proportion of irrigated agricultural land rose from 9.5 % to 11.5 % in Turkey, from 21.7 to 27.2 % in Cyprus (Figure 2.4) and from 7.7 to 22.2 % in Malta.

Figure 2.4 **Average irrigated area as a percentage of agricultural land area for selected accession countries and EU-15**



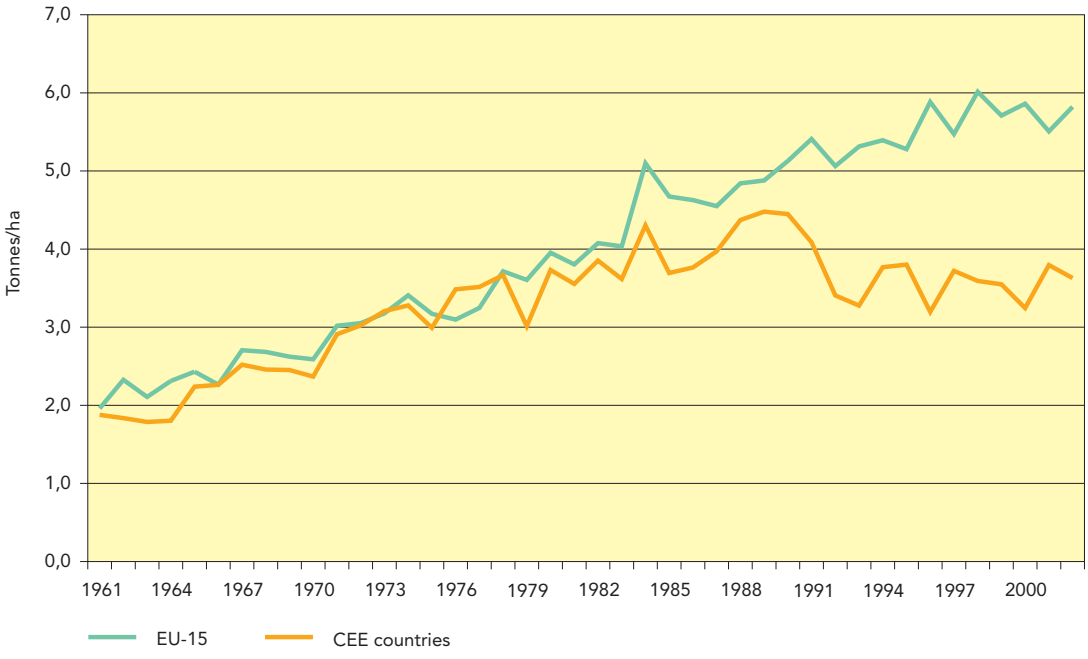
Source: FAOSTAT, 2003.

Note: Irrigated area data was not available for Slovakia until 1993. There is no direct correlation between total irrigated area and actual irrigation volumes.

Productivity

The above changes are reflected in agricultural productivity. Figure 2.5 shows the wheat yield since 1961. Up to the 1980s the EU and central and eastern Europe followed similar tracks of intensification. Not surprisingly, given the lowered investment and lack of fertilisers and pesticides, yields dropped significantly in the CEE-10 due to economic restructuring in the 1990s.

Figure 2.5 **Changes of wheat yield in selected CEE-10 countries and the EU-15**



Source: FAOSTAT, 2002.

Note: Due to limited data availability, the description of the trend in cereal yield is limited to the following accession countries: Bulgaria, Czech Republic, Hungary, Poland, Romania and Slovakia.

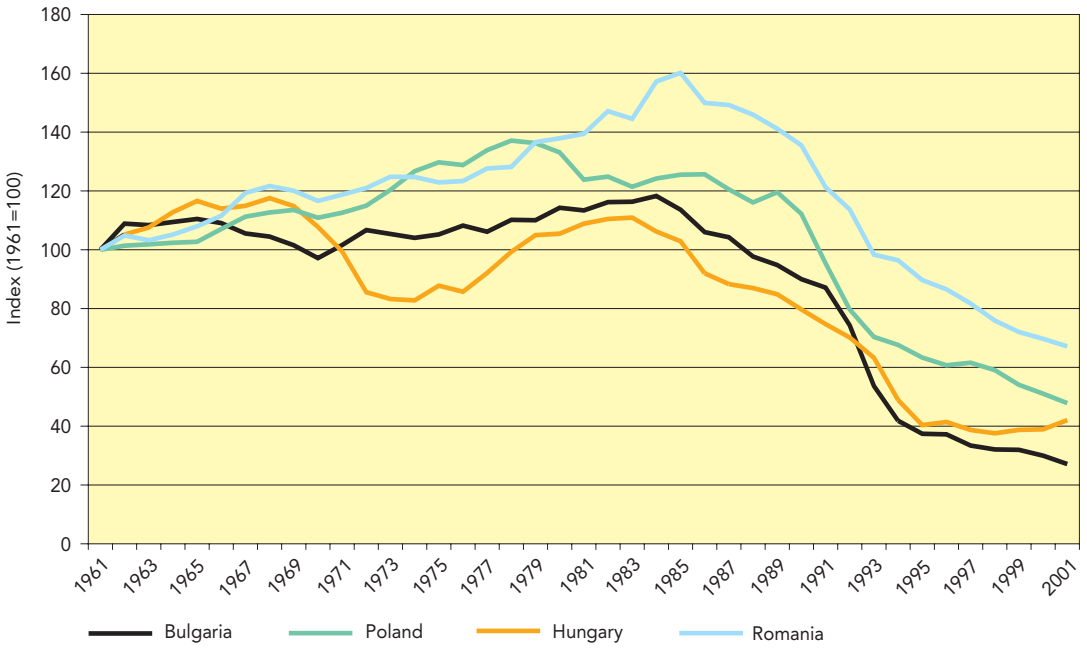
Significant changes also occurred in livestock production. Meat and dairy products are relatively expensive compared to other food items and it is more difficult to transfer large livestock production facilities into private ownership than arable land. In addition, meat production requires considerable capital for livestock and production facilities which was and is not available to many emerging producers in CEE-10. Figure 2.6

shows the strong decline of cattle and sheep population in a number of CEE-10 countries. Since around 1990 numbers of these livestock have fallen by approximately 50 % in most CEE-10 countries. Cattle and sheep are particularly relevant for the landscape and nature management function of agriculture throughout Europe.

The livestock figures for the MED-3 are much more stable although there seems to be a decline in Turkey since the 1980s (Figure 2.7).

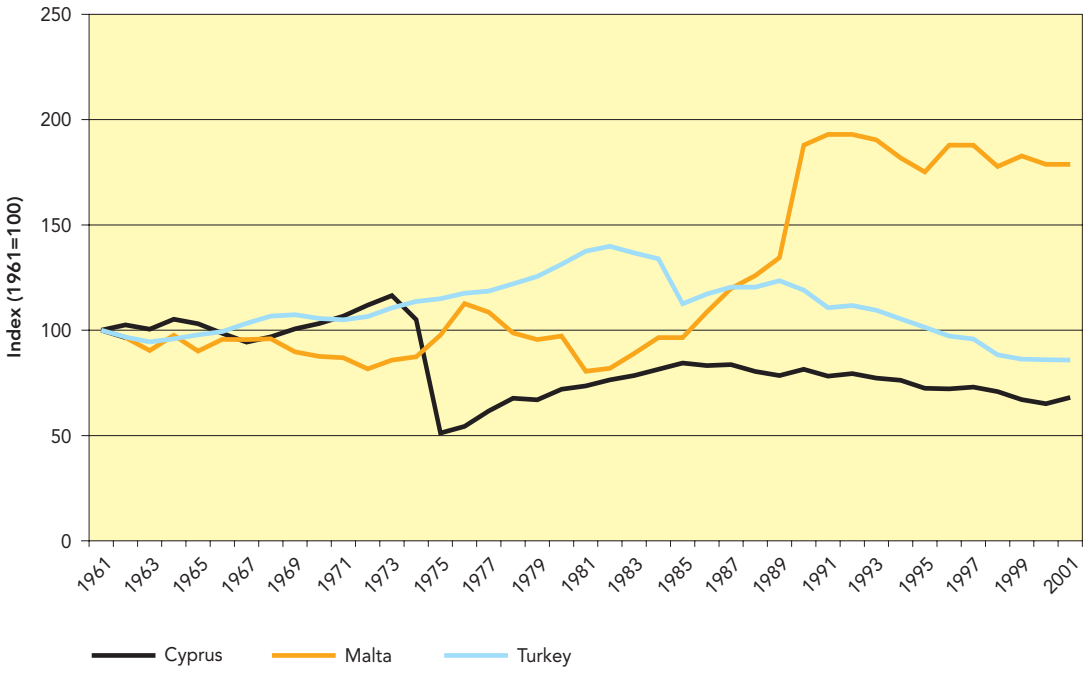
Source: FAOSTAT, 2002.

Figure 2.6 **Livestock index (cattle and sheep) in selected CEE-10 countries**



Source: FAOSTAT, 2002.

Figure 2.7 **Livestock index (cattle and sheep) in the Mediterranean accession countries**



2.3. Review

Agriculture is an important sector in the accession countries, both in terms of area and GDP. The sector is structured very differently within the various accession countries. On average farm size is relatively small, but in central and eastern Europe also very large holdings occur as remnants of collective farming systems. Productivity is generally low compared to the EU.

Agriculture in the CEE-10 and MED-3 country groups is different in many ways and has been subject to different socio-economic drivers. While the political and economic changes in CEE-10 caused a sudden drop in agricultural investment, agriculture has steadily intensified in the Mediterranean countries. In the 1990s agricultural developments in CEE-10 were dominated by lowered inputs and productivity, livestock reductions and regional land abandonment. This may be a temporary phenomenon, and when economic conditions allow renewed intensification can be expected.

The environmental consequences of the observed changes are not straightforward. Pressures on the environment are steadily increasing in MED-3, especially in terms of water stress and pollution. The situation in the CEE-10 is ambivalent. On the one hand, the observed reduction of inputs and general stocking density is beneficial for air and water quality. On the other hand, undergrazing and abandonment are a threat to the biodiversity value of semi-natural grasslands.

The environmental impacts of agriculture will be examined further in Chapter 3.

3. Impacts on the environment

Having explored the development of agriculture in the accession countries, this chapter focuses on the environmental pressures and impacts arising from these changes. In particular, the impacts on soil, water, air and biodiversity will be examined. There is a considerable shortage of data on the character and magnitude of many environmental issues, for example on biodiversity and landscape change. In many cases therefore, it was necessary to rely on national level data rather than drawing on recognised statistical data sources, such as Eurostat or FAOSTAT.

3.1. Soil

Soil degradation is a major environmental problem in large parts of Europe, including the accession countries. Some problems arise from urbanisation and industrialisation (such as soil sealing and contamination) but many are agriculture-related. The main pressures on soil caused by agriculture are:

- compaction, due to the use of heavy machinery;
- diffuse contamination with chemicals such as herbicides and pesticides;
- acidification caused by ammonia emissions;
- erosion.

A lack of reliable and geographically explicit data makes it difficult to pinpoint the problems exactly, but overall they raise considerable concern (EEA/UNEP, 2000). The first three problems have become less prominent because of the general decrease of agricultural production intensity, both with regard to livestock density and agricultural inputs. This is not due to a structural change of management, however, and improving economic circumstances may lead to renewed intensification and associated increasing pressures.

Erosion is the only soil-specific pressure for which more detailed information is available and will be dealt with below.

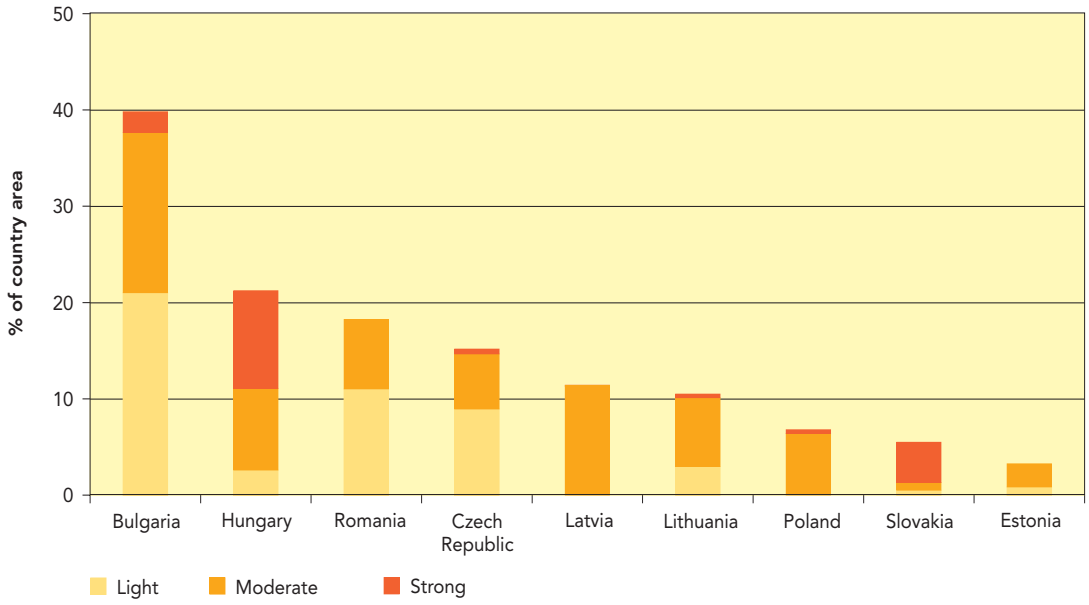
Erosion

Soil erosion has been a problem in the accession countries for many decades, and it remains significant today. Since 1950 soil erosion has gradually increased as a result of inappropriate land use in combination with natural vulnerability factors. Land consolidation, field enlargement, the use of inappropriate machinery, and tillage practices are the most important factors involved.

The economic climate during the 1990s has not allowed sufficient investment in erosion mitigation features. Currently soil erosion and degradation affect large areas in central and eastern Europe (see Figures 3.1 and 3.2). The situation is the most severe in Romania (6.7 million ha), Bulgaria (4.8 million ha, described in more detail in Box 3.1), Poland and Hungary (4.7 and 3.8 million ha). In Turkey, approximately three quarters of the 27 million ha of arable land are affected.

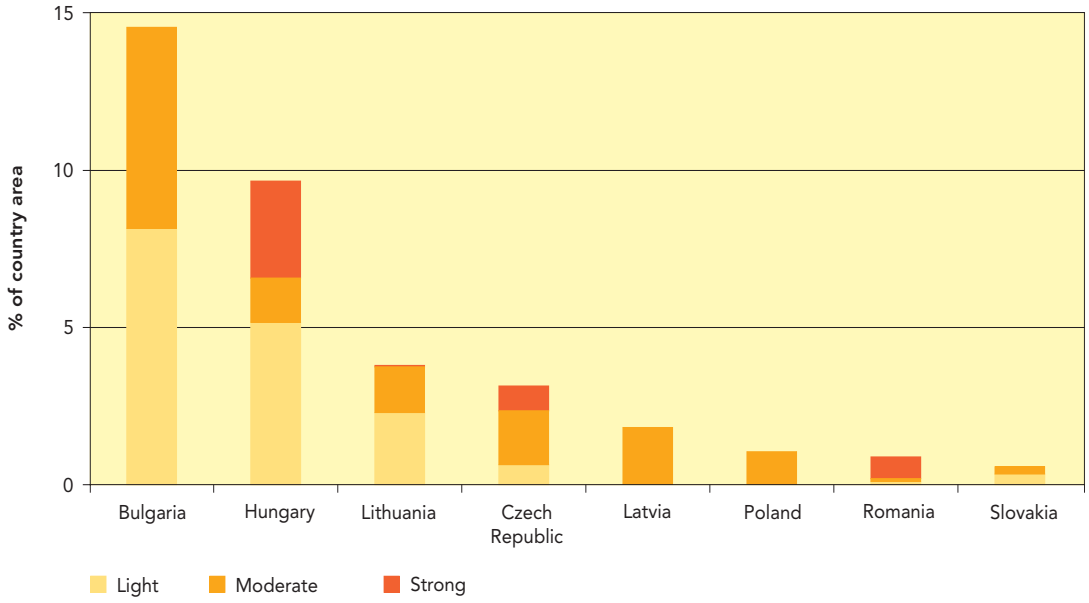
Example of serious gully erosion.
Photo: Csaba Centeri, Hungary.

Figure 3.1 **Topsoil erosion due to water in central and eastern Europe**



Source: Soil and Terrain Database, Land Degradation Status and Soil Vulnerability Assessment for central and eastern Europe. CD-ROM version 1.0 (1:2.5 million scale). FAOSTAT, 2000.

Figure 3.2 **Topsoil erosion due to wind in central and eastern Europe**



Source: Soil and Terrain Database, Land Degradation Status and Soil Vulnerability Assessment for central and eastern Europe. CD-ROM version 1.0 (1:2.5 million scale). FAOSTAT, 2000.

Despite efforts to fight erosion in several countries (in particular in Hungary, Slovakia, Estonia, the Czech Republic and Turkey), the extent of the problem and the lack of proper incentives for farmers to improve their practices now require comprehensive and concerted action to tackle the issue. It is possible that the abandonment of some agricultural areas and the subsequent development of permanent vegetation and scrub are reducing erosion in some areas. However, such processes do generally not occur in intensive arable regions that often suffer most from erosion. Combating erosion in these areas requires the planting or construction of windbreaks and other landscape features as well as the introduction of farm practices designed to minimise soil erosion processes.

Box 3.1: Soil erosion in Bulgaria

One of the major environmental problems facing agriculture in Bulgaria is soil erosion — both by wind and water. The risk of soil erosion is determined both by natural conditions (relief, climate and soil features), and the type of land use (e.g. crops cultivated, cropping patterns, soil cultivation techniques etc.). Soils in Bulgaria are naturally at risk of water erosion due to a number of factors:

- about half of the country is occasionally exposed to heavy rainfall with a considerable erosion risk;
- over 80 % of the country is hilly or mountainous with slopes greater than 3° and therefore susceptible to surface run-off and serious erosion during heavy rainfall;
- many soil types are naturally vulnerable to erosion.

Before 1946 most farmers in Bulgaria possessed relatively small areas of land with a mixture of crops grown on small fields or plots divided by boundary strips. From early times anti-erosion techniques, such as contour cropping and terraces, were practiced on sloping land. Old terraces reinforced by stones and now overgrown with bushes and trees can be seen in the mountain areas where grapes and tobacco were grown for many generations. From the beginning of the 20th century, eroded slopes and vulnerable river banks were planted with trees to control the risk of further erosion by water, whilst in those areas with larger fields (e.g. the cereal growing region of Dobrudja), shelter belts were planted to reduce the risk of wind erosion. When large-scale agriculture was first organised in the late 1940s and 1950s, field sizes were increased dramatically by destroying and ploughing-up the traditional field boundary strips and shelter belts. As a result wind and water erosion increased dramatically. In less than 20 years, about 10 % of arable land had been eroded so badly that it was no longer suitable for cropping or afforestation. Field crops were also lost periodically due to dust storms. In the early 1970s, soil erosion was recognised as a major national problem and many erosion control projects were planned and implemented — but rarely finished. Various estimates (Konishev *et al.*, 1999) suggest that currently:

- over 78 % of cultivated land and 15 % of forests are highly susceptible to water erosion and over 38 % are susceptible to wind erosion;
- the total average annual soil loss from all types of land in Bulgaria is approximately 136 million tonnes per year, of which 30–60 million tonnes are lost by wind erosion.

It is too early to identify the impact of privatisation and land restitution upon the incidence of soil erosion, but it seems reasonable to suggest that it will remain a major problem in Bulgaria — especially in the current economic circumstances where soil conservation is not a high priority for most farmers.

Source: Stefanova, 2002.

3.2. Water

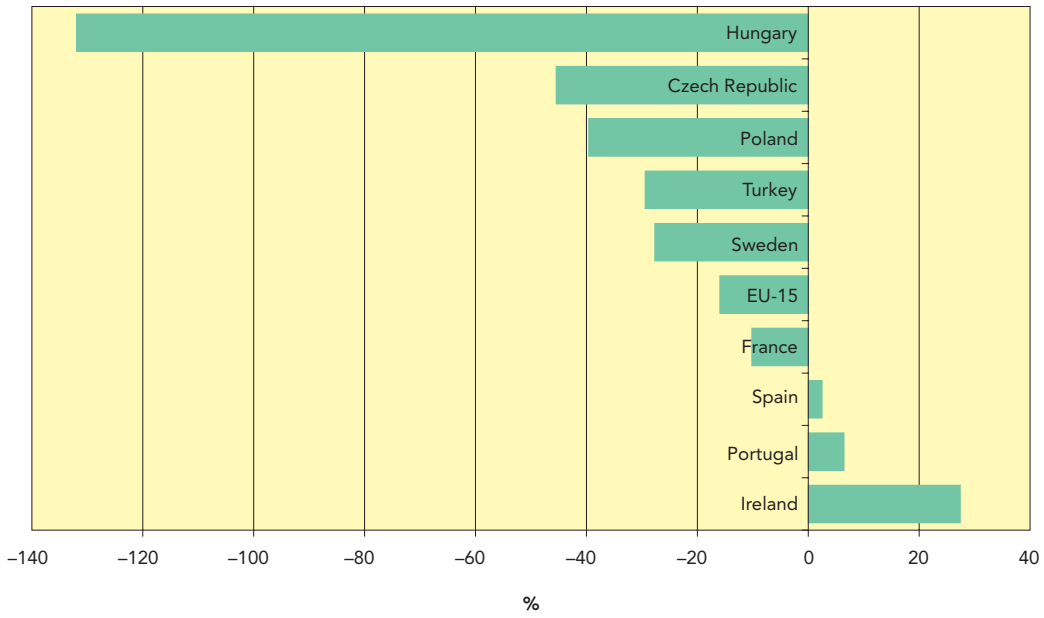
Agriculture has serious impacts on both water quality and quantity in almost all accession countries. The main environmental problems can be characterised as follows:

- Diffuse pollution of ground and surface waters with nitrates and phosphates due to the poor management and excessive application of mineral fertilisers and animal manures, especially on highly vulnerable soils. This problem is not widespread, but locally there are many farms with very intensive input use. The low level of environmental law enforcement allows such local problems to persist.
- Point source pollution of surface waters by poorly stored and managed manure, slurry, silage effluent and other farm wastes. Although livestock numbers decreased dramatically during the past decade, there are still a considerable number of highly specialised and very intensive establishments in the CEE-10. Few of these store their manure and manage their wastes according to official requirements and there are many examples of farm effluent causing the pollution of irrigation canals, rivers, streams and irrigation lakes.
- Point source pollution of ground and surface waters with pesticides due to their poor management. Average pesticide use in the CEE-10 is not very high currently, but poor management can lead to localised water pollution problems from inadequate storage, over-application, inappropriate disposal or accidents by spray operators.
- Drainage of wetlands and pollution of land by contaminated irrigation water.
- Data on pesticide concentrations in ground- and surface water and their effects are currently not available. The pollution section will therefore concentrate on nutrients.

Nutrient pollution

Excess nutrient input has generally decreased in the CEE-10 countries due to the strong decline in fertiliser use and livestock numbers. The relatively strong reduction becomes particularly apparent if one compares the CEE countries to those EU Member States that are closest to them in terms of agricultural share of GDP or general intensity of agricultural production (i.e. Ireland, Portugal, Spain, see Figure 3.3).

Figure 3.3 **Change in the nitrogen balance (kg/ha of total agricultural land) (1985–87 to 1995–97)**



Source: OECD, 2001.

Note: Nitrogen balance is the difference between annual nitrogen inputs to and outputs from the soil.

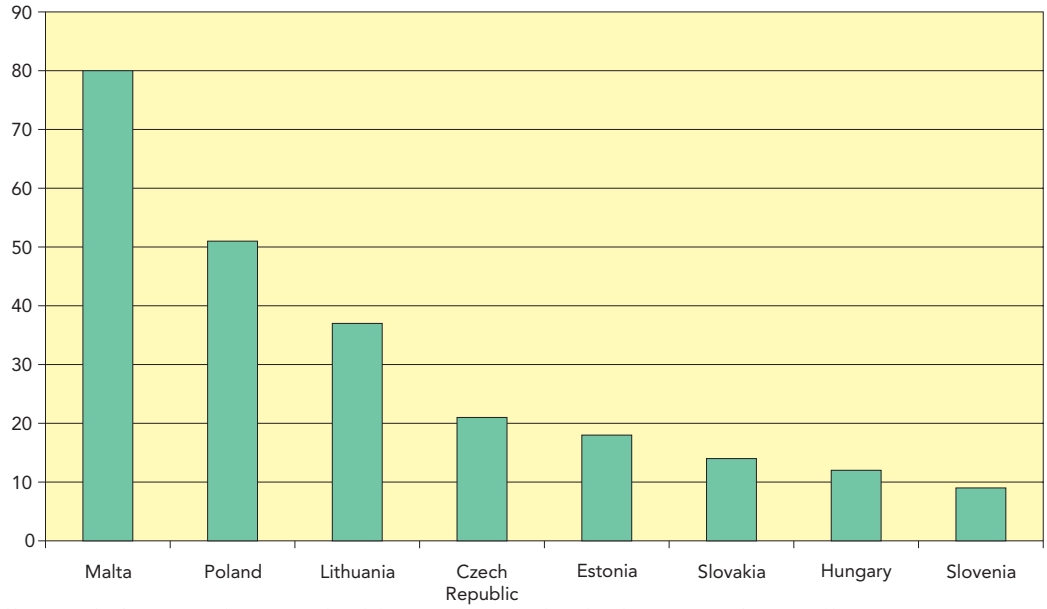
Nevertheless, national nutrient balances may hide considerable regional or local nutrient surpluses and do not provide any information about the quality of manure management. Inadequate storage and handling of manure was a key factor for eutrophication and water pollution problems during the socialist era. This problem was often linked to oversized livestock farms that made the proper use of manure and slurry difficult if not outright impossible. Sometimes the issue of manure storage and handling was not addressed at all in the planning of large livestock production facilities, leading to direct overspill of slurry into watercourses or rivers. Most of such oversized livestock production units have been closed down, but this problem is not yet fully eliminated (EEA, 2003). In most of the larger livestock farms that remain, manure storage and handling facilities are available but require considerable investment for upgrading and modernisation. Similar investment needs can also be found on most private or joint-stock holdings.

For both nitrogen and phosphorus, run-off tends to increase with the intensity of production. Despite the overall low input levels in the 90s the average run-off of nitrogen may be as high as 15 kg/ha in the most intensively farmed areas of Latvia. In low intensity areas, the typical figure is 5 kg per ha (data from 1994–98; Redman, 2002). Any renewed intensification as a result of a general recovery of the agricultural sector is thus likely to increase environmental pressure on water quality.

Excessive nitrate levels in ground and surface water are a widespread problem in the accession countries, despite the relief of environmental pressure that was associated with lowered fertiliser inputs and the reduced livestock in the 1990s. The percentage of localities where water samples contain more than 50 mg/l varies roughly between 10 and 50. In the Mediterranean countries, where such a productivity drop has not occurred, the situation is even worse, as is exemplified by the disturbing figure of 80 % for Malta (Figure 3.4).

Source: IEEP, 2002.

Figure 3.4 **Percentage of samples (national averages) where nitrate concentration exceeds 50 mg/l**



All of Malta's groundwater is highly vulnerable to nitrate pollution because of geological characteristics and the intensive nature of its agriculture. Approximately 116 000 tonnes of animal manure and slurry is produced each year. Storage is normally ad hoc and only a small number of animal units have adequate facilities. There is little provision for management of dilute effluents, such as dirty water, generated from dairy parlour washings, and for runoff from yards and hard standings used by stock. Mineral fertilisers are also applied to crops. It is suspected that at present fertiliser prices and in the absence of soil testing or nutrient budgeting (e.g. to make allowance for nutrients in animal manure) excessive 'insurance' fertilisation is practiced (Redman, 2002).

In Cyprus, problems caused by pollution from the spreading of livestock wastes and from the use of inappropriate irrigation water are both exacerbated by the nature of the Mediterranean climate. The most pressing problem for water pollution derives from the spreading of waste from intensive pig units on land, particularly since many intensive pig units are situated close to vulnerable aquifers. In Cyprus there are about 250 intensive pig units and production is aimed predominantly for the export market. The spreading of pig wastes results in nitrate pollution and contamination with salt (due to high levels in the waste). Interestingly, the salt contamination problem is considered to be more significant than the nitrate problem. The concentrations of salt (and other pollutants) from animal waste are made worse by the reduced dilution afforded by the low annual rainfall in Cyprus: groundwater is relatively slow to recover from pollution ingress. The recovery process for such groundwater bodies generally takes several decades, with considerable variation according to substance and groundwater renewal rate.

In summary, agriculture is placing a severe pressure on water quality in considerable areas, despite the overall sharp reduction in both fertiliser and pesticide use, as well as the dramatic decline in livestock numbers. While some of the impacts on water quality may be explained by delayed responses in groundwater, it is nevertheless clear that intensive cropping and livestock production remain important sources of pollution. This results from improper fertiliser/pesticide application methods and storage facilities and a lack of priority given to environmental protection. Pollution 'hot-spots' can be found in almost all accession countries and will continue to be found until management practices are changed and environmental requirements are enforced.

Irrigation

The impact of agricultural irrigation on the environment varies considerably from country to country. However, it is rarely singled out as a separate factor for habitat destruction or other negative environmental impacts, perhaps because it is one of a number of closely related stresses on water supply that include wetland drainage and industrial water consumption. Nevertheless, negative environmental impacts that still

persist today can be discerned in several countries where irrigation was widespread in the past.

In Romania about 7.1 million hectares of the plateau and plain areas in the south and east of the country are susceptible to drought due to low average rainfall. This led to a strong investment in irrigation facilities (see Chapter 2). Heavily polluted water from rivers was used for irrigation, and nitrate pollution of groundwater was particularly serious in irrigated areas along the Danube. Soil salinisation, oil pollution and salt water intrusion were all points of concern. Many of these irrigation systems are now in bad condition or have collapsed altogether, reducing productivity substantially. There are currently plans to modernise Romanian irrigation infrastructure with the assistance of World Bank funding, and the challenge clearly is to prevent or minimise such problems in the future. Water users and management organisations should be given environmental information and training, and projects should involve the environmental administration (CEC, 2000).

In Hungary, agricultural water consumption is one important factor behind the serious loss of wetlands that occurred in the 1950s. Reservoirs for water storage caused the destruction of riverine forests. Irrigation enabled the planting of new crops such as rice, which was grown on several thousand hectares in Hungary on areas that were previously wetlands, and which were thus suitable for flood irrigation. These rice paddies were all abandoned by 1990 leaving uncultivated 'wasteland' areas that are no longer suitable habitats for most wetland birds (CEC, 2000). In recent years, the impact of irrigation practices on wetlands has declined in Hungary and increasing water prices support a trend towards drip irrigation. This will hopefully minimise the recurrence or expansion of the environmental problems associated with irrigation in the past.

The biggest environmental concern, however, is the increasing irrigation in the Mediterranean countries. The situation in Turkey, with its vast areas of irrigated land, is highlighted in Box 3.2. In Cyprus water shortage has resulted in farmers using water from abandoned mines. These artificial ponds are often contaminated with metals from the mine works, most notably boron, but also arsenic and cadmium. Contamination arising from this irrigation water has been recorded in groundwater aquifers.

Box 3.2: Water abstraction and irrigation in Turkey

Annual water withdrawal in Turkey has more than doubled since 1980 and will soon reach 42 billion cubic metres. 80 % of this is from surface waters, but groundwater use has doubled since 1980, now accounting for 70 % of exploitable groundwater resources. Many aquifers are exploited beyond their sustainable yield (i.e. the quantities withdrawn are greater than the natural recharge locally), in particular in the Mediterranean region, where two-thirds of drinking water is supplied from groundwater. Around three-quarters of total freshwater withdrawal is for agriculture.

Most dams in Turkey are linked to irrigation schemes. Irrigated areas, which have increased by two-thirds over the last 15 years, currently represent 17 % of the total cultivated area. Since the 1960s, up to 100 thousand hectares of land per year have been converted to irrigation. Out of 8.5 million hectares with irrigation potential, 4.1 million hectares are already irrigated (60 % by dams).

Over the next ten years the South-eastern Anatolia Project (GAP) aims to develop an area of more than 7 million hectares within the basins of the Dicle (Tigris) and Firat (Euphrates), which constitute 30 % of Turkey's total river flow. The aim is to irrigate 1.7 million hectares; 10 % of this target has already been met. The Atatürk Dam alone can irrigate 882 000 hectares. The GAP project will have a series of positive and negative environmental impacts caused by dams and lakes, demographic changes, irrigation projects and increased availability of domestically produced hydroelectricity.

According to the 1998 national environmental action programme (NEAP), the land in the GAP area is already degraded due to deforestation, overgrazing, poor farming practices and rapid population growth. The region has insufficient basic infrastructure and low levels of education and environmental awareness. Major investment, especially in dams and irrigation, has altered disease vectors (e.g. for malaria), flooded vast areas of land, destroyed some historic sites and produced microclimatic change.

The NEAP proposes an environmental action plan for the GAP Region, which would include preparation of an EIA for GAP investments and mitigation measures. Important issues include soil salinisation and release of salts, nutrients and pesticides to the Firat (Euphrates). In April 1998, a protocol was signed between the minister for environment and the GAP administration regarding identification of existing and prospective environmental problems such as local climate change, emerging diseases, pollution, erosion and infrastructure problems due to rapid urbanisation.

Source: OECD, 2000.

3.3. Air

Agriculture affects air quality mainly through emissions of ammonia (NH_3), nitrous oxide (N_20) and methane (CH_4). Ammonia contributes to eutrophication and acidification, whereas nitrous oxide and methane are important greenhouse gases. In the following sections these topics will be dealt with separately.

Ammonia emissions

The agricultural sector remains a major source of ammonia emissions , with pigs, cattle and poultry rearing being responsible for the largest contributions. Ammonia volatizes into the air from animal manure. This type of emission accounts for roughly 20 %[5] of all emissions of eutrophying and acidifying compounds to the air (EEA, 2003).

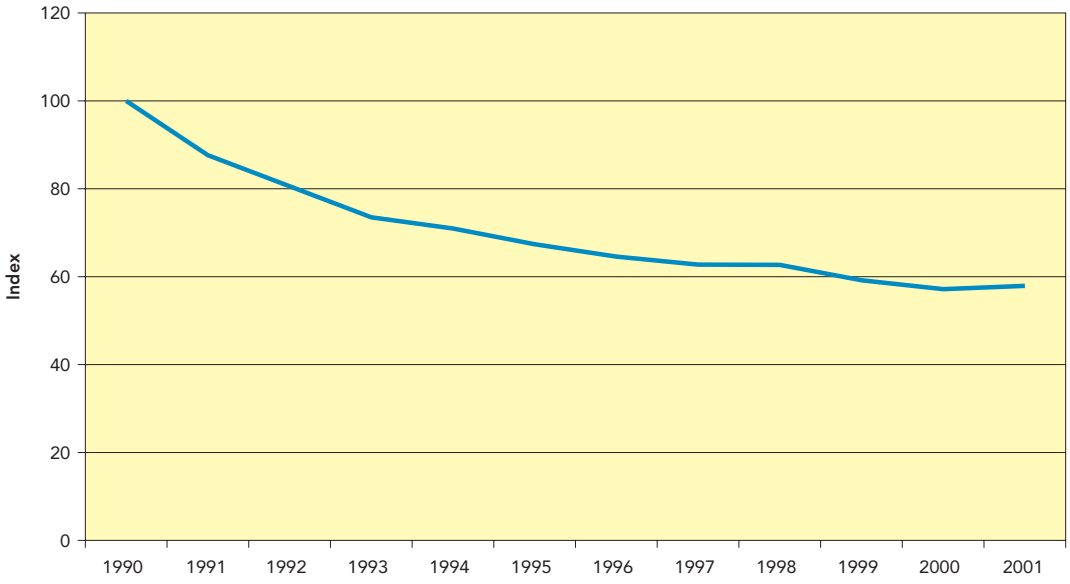
The ammonia emission to the air has wide-ranging consequences, since vulnerable ecosystems at a long distance of pollution sources may still be affected. Recent estimates indicate, that 50 % of western-European ecosystems are vulnerable to eutrophication of this kind, while more than 70 % in the accession countries are affected (EEA, 2003). The corresponding figures for acidification are lower, with roughly 10 % of ecosystems suffering from depositions above critical threshold levels.

Average ammonia emissions in the accession countries (excluding Malta) have been reduced by more than 40 % since 1990 as the result of reductions in livestock numbers (Figure 3.5). Nearly all these countries have thus reached their 2010 emission targets for ammonia of the CLRTAP (Convention on Long-Range Transboundary Air Pollution) Gothenburg Protocol. Emissions can be further reduced through improved manure management, including ploughing in manure that has been spread on the fields, covering slurry storage tanks and by different livestock feeding regimes.

Source: EEA, 2004.

Note: No data are available for Malta.

Figure 3.5 **Index of ammonia (NH_3) emissions in the accession countries**



Greenhouse gas emissions

The greenhouse gases emitted by agriculture are nitrous oxide (N_2O) and methane (CH_4). They account for approximately 10 % of total greenhouse gas emissions in Europe. These gases are responsible for global warming and climate change. European mean temperature has risen by about 1.2°C in the past 100 years and is expected to rise further with 1.4 to 5.8°C in the 21st century (EEA, 2003). This will have serious environmental consequences, not in the least for agriculture. Sea level will rise and

(5) Contribution to eutrophying agents: EU-15 24 %, CEE-10 20 %, contribution to acidifying agents: EU-15 31 %, CEE-10 13 %. **Source:** EEA, 2003

precipitation and growing conditions will change. These long-term effects, however, go beyond the scope of this report.

Nitrous oxide is formed in the soil out of nitrate (in a process called de-nitrification) and subsequently diffuses into the air. Nitrous oxide emission is therefore indirectly caused by (excess) appliance of nitrogen fertilisers. In EU-15 nitrous oxide emissions have fallen by 4 % during the 1990s as the result of a decrease in nitrogen fertiliser use. In CEE-10, nitrogen inputs dropped markedly around 1990 and have remained more or less stable since then. The nitrous oxide emissions in CEE-10 do not show a clear trend and were in 2000 at about the same level as in 1990 (EEA, 2003, see also Chapter 2).

Methane arises from enteric fermentation in cattle, sheep and goats. Cattle herds are the main source of methane emissions. Their reduction in CEE-10 has caused methane emissions to decrease by as much as 46 % since 1990. Herd reductions in EU-15 have been more moderate, resulting in a decrease of methane emissions of 9 % between 1990 and 2000 (EEA, 2002b).

3.4. Biodiversity

The developments in agriculture outlined so far all affect biodiversity in one way or another. The floristic diversity of agricultural landscapes is strongly related to agricultural inputs, such as fertiliser and herbicide use. Pesticides reduce the abundance of many invertebrates and also indirectly affect the organisms that feed on them, such as birds and mammals. Structural changes in the landscape, such as drainage of wetlands and field enlargement reduce the variety of habitats and the occurrence of small landscape elements such as hedgerows.

Extensive farming has in the past created the living conditions for a wide variety of species and habitats, such as semi-natural grasslands. Many of these are of great importance for biodiversity conservation at European level, and targeted by the EU habitats directive. The share of extensively used farming areas with valuable associated biodiversity is still relatively high in the accession countries, but two opposing processes threaten these systems.

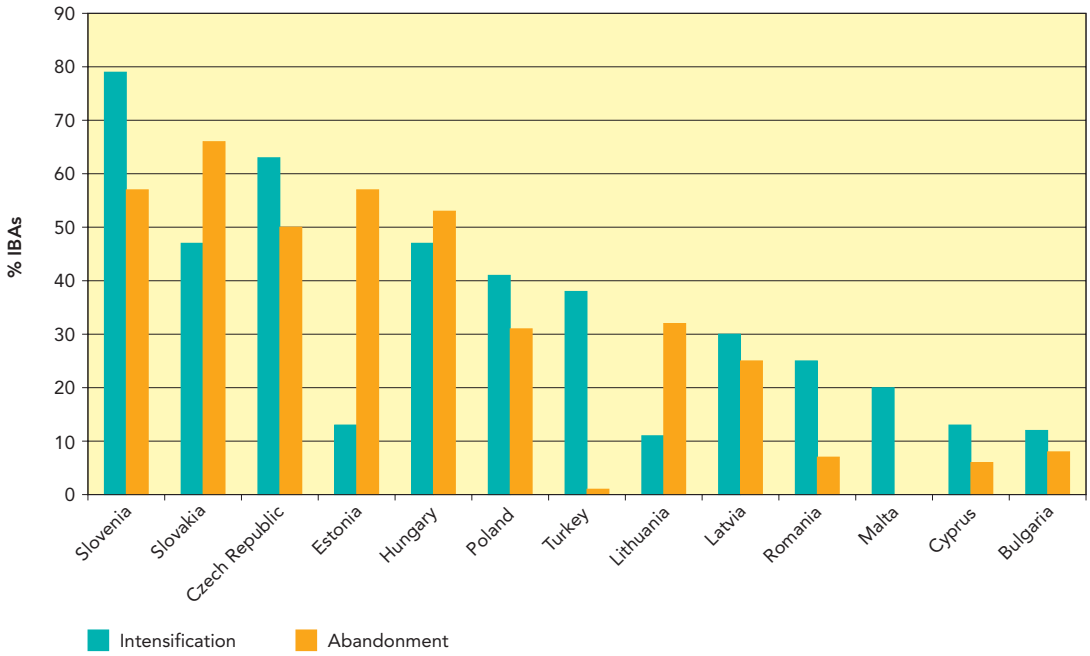
The first trend is intensification: the increased use of fertilisers, pesticides, modern machinery and rationalisation of land use, all of which generally cause biodiversity loss. The other process is land abandonment. Total cessation of agricultural land use avoids the negative impacts of fertilisers and pesticides but is generally not beneficial for biodiversity as it also eliminates positive management by farming, such as the mowing of meadows. Since land abandonment primarily occurs in extensively farmed areas it tends to affect biodiversity-rich farming systems the most.

Few data are available from the accession countries to clearly document biodiversity trends in response to agricultural change. At present, the best comparative figures arise from the BirdLife International Important Bird Areas (IBA) monitoring programme. Figure 3.6 displays the percentage of IBAs affected by abandonment and/or intensification. Out of a total of 571 IBAs in AC-13, 157 are affected by abandonment, and 189 by intensification. Many IBAs are experiencing problems with both processes, which reflects the size of the designated areas and the small-scale mix of farming practices in many of them. It must be emphasised that these figures concern only the designated IBAs, and therefore do not necessarily reflect the extent of abandonment and intensification on agricultural land as a whole. Nevertheless, IBAs generally encompass areas that are particularly biodiversity-rich, and it is very useful to have an indication of relevant agricultural trends in such areas.

Source: Important Bird Areas in Europe, BirdLife International, 2002.

Note: No data were available for abandonment on Malta.

Figure 3.6 **Percentage of IBAs affected by land abandonment and/or intensification**



Abandonment is of particular concern in the Baltic States and central European countries whereas intensification has a bigger weight in Mediterranean countries, in particular Turkey. This highlights the very different agricultural circumstances in the individual CEE-10 and MED-3 countries.

The effects of these two diverging pressures on biodiversity are described separately in the following paragraphs.

Abandonment

Agricultural management is a key factor in the maintenance of valued cultural landscapes and biodiversity-rich grasslands all over Europe. The cessation of such management has occurred in many marginal farming areas in various regions of Europe. It often leads to the loss of rich cultural features such as traditional stonewalls, the replacement of small-scale landscape mosaics with closed forested landscapes or even forest plantations. The decline of agricultural grazing or mowing results in the gradual overgrowing and elimination of species-rich semi-natural grassland habitats by encroaching bush and forest species.

The effects of land abandonment on biodiversity depend on the intensity of previous land use and the species under consideration. In Latvia, for example, a number of bird species appear to benefit from abandonment, while many grassland plant species are disappearing due to the cessation of grassland management (see Box 3.3). In general, abandonment of extensive farmland has mostly negative effects from a biodiversity perspective, while it can increase species diversity in intensively farmed areas.

The major forms and causes of land abandonment are the following:

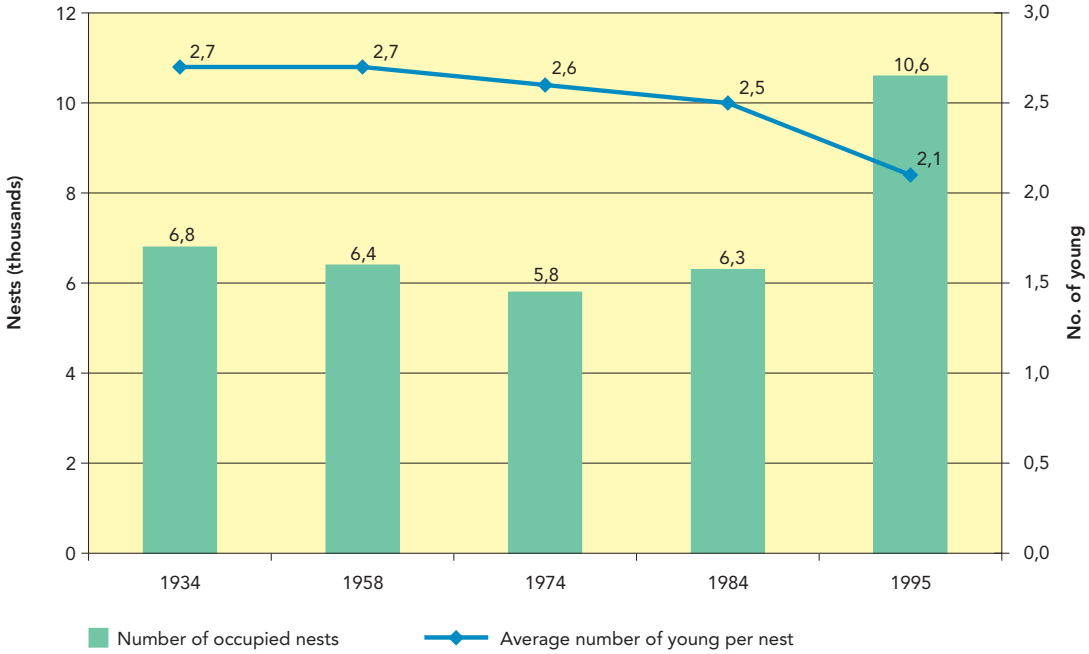
- cessation of management due to low (or even negative) profitability;
- insufficient grazing livestock in pastoral areas to maintain grasslands;
- cessation of management of grasslands and arable land purchased after privatisation for speculative reasons;
- abandonment of farmland due to financial and legal uncertainty or lack of capital for investment.

Box 3.3: Biodiversity changes due to abandonment in Latvia

In Latvia, the areas of cereals, sown grasslands and pastures have remarkably decreased due to land abandonment. Overall abandonment figures conceal a greater rate of grassland abandonment compared to that for tillage land. Combined with this, the use of fertilisers has decreased markedly, although it can still be considered quite high in certain areas.

The low intensity of agricultural activity is favourable for many bird species. Over ten thousand White Stork (*Ciconia ciconia*) pairs nest in Latvia, and despite the decreasing number of fledglings per nest, the overall population appears to be increasing substantially. The number of Corncrakes (*Crex crex*) also continues to grow, now estimated at 26 000–38 000 pairs.

Figure 3.7 **White Storks in Latvia**



Source: Latvian Ornithological Society, 1998.

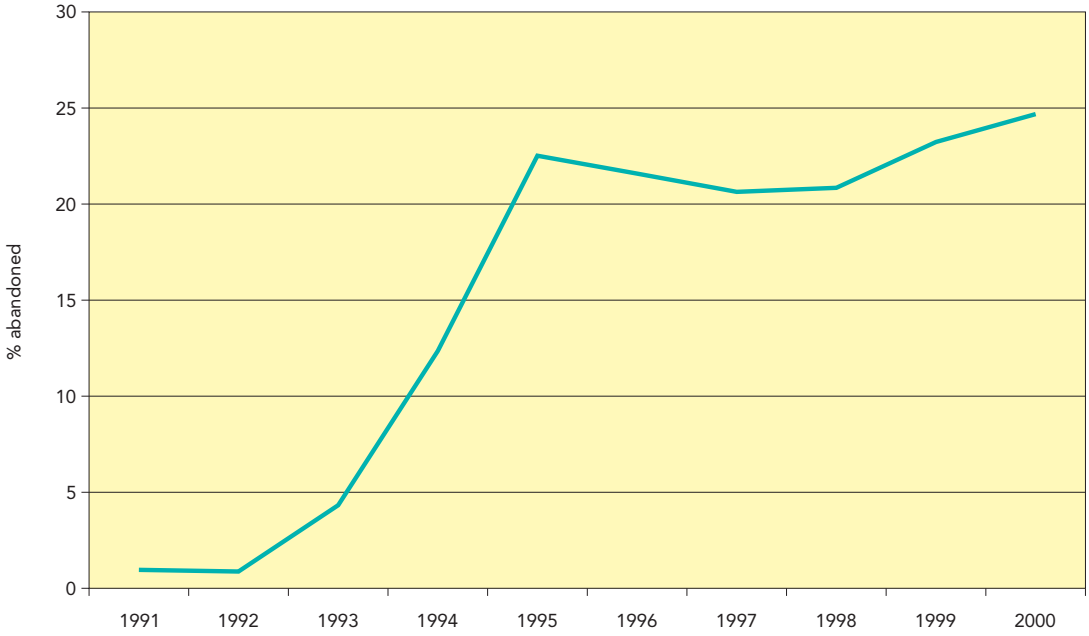
Additional studies demonstrate that the populations of forest and shrub generalist bird species are also increasing, associated with the increase of forest and shrub areas in Latvia due to overgrowing of abandoned lands (Aunins and Priednieks, 2001).

Plants, however, are more negatively affected by abandonment. Most rapidly decreasing are those grassland species which are dependent on regular grazing pressure. The marsh gentian (*Gentiana pneumonanthe*) is close to extinction, and other species in rapid decline are those characteristic of wet meadows and pastures, such as narrow-leaved marsh dandelion (*Taraxacum palustre*), alpine bistort (*Polyganum viviparum*) and birdseye primrose (Primula farinosa). Since the disappearance of livestock grazing on wetland areas, there arefew possibilities for managing these grasslands appropriately as modern machinery is too heavy to be used on wet soils. Coastal brackish grasslands and marshes near Riga, Jurmala and Liepaja are experiencing the most serious decline. With grazing reduction or cessation, species such as red bartsia (*Odontites littoralis*) appear to have disappeared, and sea plantain (*Plantago maritima*) and saltmarsh flat sedge (*Blysmus rufus*) are also in decline.

Source: Aunins and Priednieks, 2001, and Latvian Environment Data Centre, 2000.

Source: Statistical Office of Estonia, 1995, 1999 and 2001.

Figure 3.8 **Land abandonment on arable land in Estonia**



National reports from CEE-10 countries (the MED-3 appear hardly affected by the phenomenon) indicate that land abandonment is a large-scale phenomenon, but precise figures are lacking for many countries. Figure 3.8 shows the abandonment on arable land in Estonia. About 30 % of the 1.5 million hectares of Estonian farmland is abandoned at present. This proportion is even higher for permanent grasslands (56 %). Among semi-natural grasslands of medium or high nature value (37 000 ha), only 40 % is still under management (Mägi and Lutsar, 2001). The maintenance of the high nature value of these agricultural habitats depends on the continuation of appropriate grazing and mowing (Mikk, 2002). The fact that these areas are particularly affected by abandonment is therefore a major cause for concern.

Estonian Alvar in bloom. Insert: consequences of land abandonment.
Photos: Merit Mikk, Estonia.

In Slovakia, land abandonment and the changes in management practices such as reduced grazing intensity over the last decade have affected 21 (66 %) of the IBAs to a severe extent. 27 % of the grassland area in Slovakia is classified as being of high nature conservation value. Grassland habitats are among the most threatened in the country as a result of abandonment. Currently 74 % of grasslands are managed, 13 % are not managed and there are no data about the management of the remaining 13 %. Grassland specialists agree that a number of rare biotopes that are listed in the habitat directive (fen meadows, dry *Bromus* rasslands) are seriously threatened by abandonment in Slovakia (Šeffer *et al.*, 2002).

Intensification

Agricultural intensification before 1990 had significant negative impacts on biodiversity throughout central and eastern Europe but was concentrated in the lowlands in most CEE-10 countries. At higher elevations there was less collectivisation, more traditional management and a greater concentration of protected areas (see Box 3.4). The agricultural crisis accompanying the transition during the 1990s eased negative impacts from intensive agriculture due to the general decline in the use of agricultural inputs, such as fertilisers and pesticides. However, privatisation has emerged as a new factor that contributes to the conflict between intensive agriculture and biodiversity.

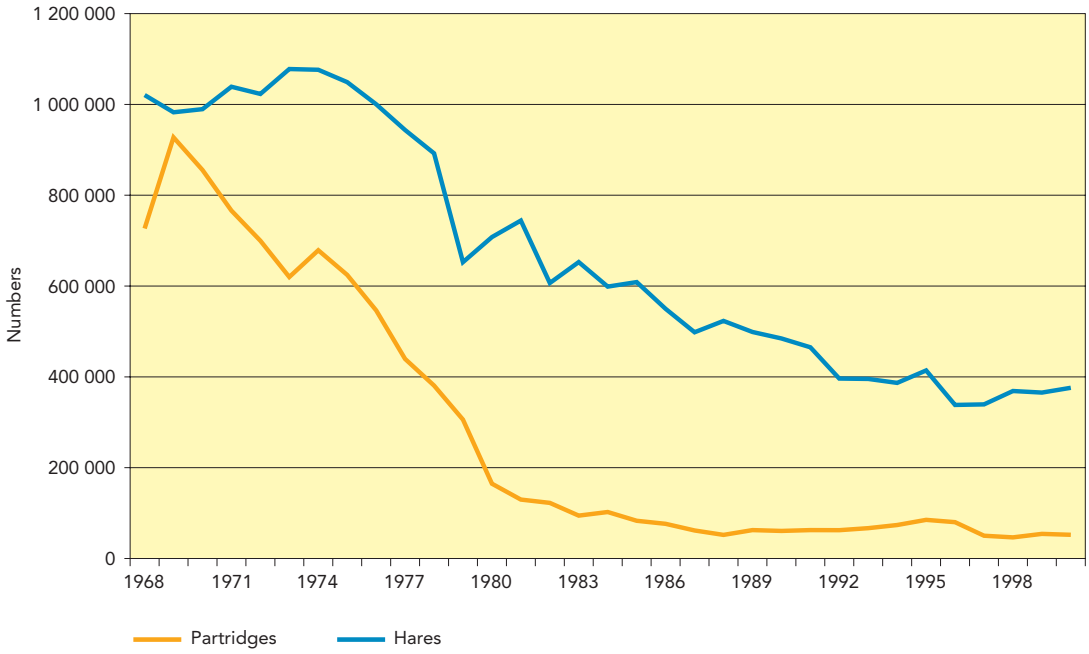
Livestock farming in Turkey has also led to regional overgrazing. As a result legislation was introduced in 1998 to restrict the stocking levels on state-owned grasslands.

Despite the low overall input use in the CEE-10 countries, some areas have experienced intensification, higher fertiliser and pesticide use, even grassland conversion to arable as new owners have pursued higher profits from cash-crop production. Such areas are suffering losses of biodiversity, especially where semi-natural grasslands have been converted to arable lands. In Hungary a return to private ownership and market pressures have provided an incentive to convert extensive semi-natural grassland ('puszta') areas to the production of cash crops, such as maize and sunflowers. A comparison of maps and satellite images for the area between the Danube and Tisza rivers (about one sixth of the country) showed that 44 000 ha of such grasslands were lost between the mid 1980s and 1998 (Molnár and Vajda, 2000). The conversion to arable is a continuing threat to the high ecological value of semi-natural grasslands in the country, which still harbours the Great Bustard (*Otis tarda)* and Imperial Eagle (*Aquila heliacea)*, among many other species.

It is impossible to provide figures on the area affected by intensification as no direct monitoring is conducted. Based on qualitative evaluation and indications from national experts, intensification is considered to be the most widespread in Slovakia, Hungary, the Czech Republic, Lithuania and Latvia. Data from the Czech Republic show a strong decline of both partridge and hare populations since 1970 (see Figure 3.9), generally linked to intensification of agriculture. Interestingly, these data do not show an increase of these species since 1990, just a stabilisation of populations at low level. However, agricultural support and production intensity continued to be relatively high in the Czech Republic during the 1990s compared to other CEE-10 countries.

Figure 3.9 **Development of numbers of partridges and hares in the Czech Republic**

Source: Prazan, 2002.



Data from the Czech Republic show a strong decline of both partridge and hare populations since 1970 (see Figure 3.9), generally linked to intensification of agriculture. Interestingly, these data do not show an increase of these species since 1990, just a stabilisation of populations at low level. However, agricultural support and production intensity continued to be relatively high in the Czech Republic during the 1990s compared to other CEE-10 countries.

Box 3.4: Biodiversity decline due to intensive farming in Slovakia
The development of agriculture since the 1940s has caused substantial damage to habitats and environmental resources in Slovakia. Traditional private land use was almost eliminated and replaced by co-operatives and state farms. During the socialist period, a high number of subsidies for ploughing and 'intensification' of grasslands destroyed species rich meadows throughout Slovakia's mountain and lowland areas. The use of hybrid seed mixtures, heavy application of fertilisers and pesticides, drainage of wetlands and intensive grazing resulted in habitat degradation and destruction. As a result, some vegetation types have almost disappeared and many plant and animal species have become rare or endangered. According to recent research only 300 000 ha out of 845 600 ha of grasslands are now considered to be of conservation value. The decline in biological diversity was strongest in lowland and hilly areas, whereas some valuable biotopes and landscape structures have been preserved in mountainous and sub-mountainous areas. This appears to be due to the maintenance of traditional farming systems and the protected areas network that is particularly dense in the Slovakian upland areas. Protected areas including buffer zones extend to approximately 1 200 000 ha and cover more than 22.8 % of Slovakia, but only 250 000 ha of this total are used for agriculture.
Source: Cierna, 2002.

3.5. Landscape

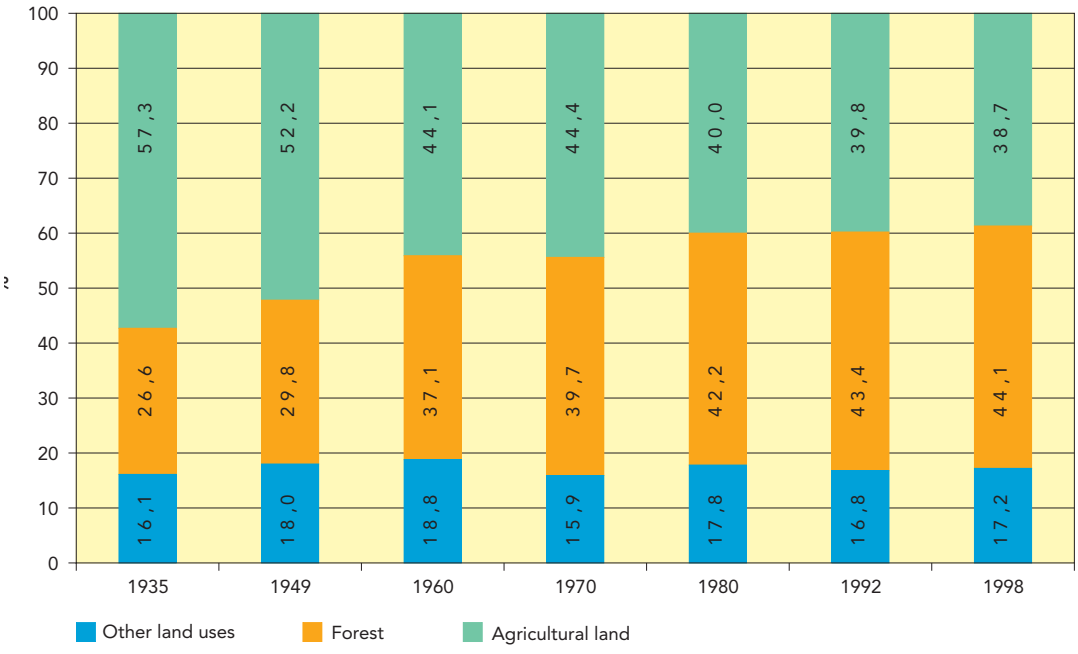
The characteristics of landscape change are particularly difficult to measure. This is acerbated by the general lack of monitoring data on landscape parameters. Nevertheless, considerable landscape changes and threats to landscape diversity are reported from Slovenia, Latvia, Hungary, Slovakia, the Czech Republic, Poland and Malta (IEEP, 2002). These include:

- removal of (linear) landscape elements due to field enlargement;
- overgrowing by shrubs, weeds and forests following land abandonment;
- simplification of cropping patterns, specialisation of farming, monocultures;
- drainage of wetlands, ploughing-up of grassland;
- dumping of domestic and agricultural waste on farmland;
- lack of maintenance of certain man-made landscape elements such as stone walls.

Collectivisation of agriculture and the industrialisation of society in most former socialist countries since 1950 have led to significant land use changes. In Latvia, a considerable part of the agricultural land was abandoned and/or reafforested (Figure 3.10). Many of the remaining agricultural areas were re-designed for large-scale mechanised farming. The combined effect was a loss of landscape diversity (Redman, 2002).

Source: Redman, 2002.

Figure 3.10 **Dynamics of land use in Latvia, 1935–1998**



In the past, spatial planning in several CEE-10 countries resulted in the deliberate exploitation of marshlands and flood plain areas for agriculture. Such large-scale development in rural areas is less common in recent years, but new infrastructure, urbanisation and tourism development continue to exert pressure on the remaining diverse agricultural landscapes (IEEP, 2002). It is important that present and future landscape change is monitored adequately to be able to assess its environmental implications more thoroughly than is possible now.

3.6. Review

Topsoil erosion by wind and water continues to be a problem in many countries. Investment in appropriate landscape planning, including windbreaks and other erosion mitigation features, is essential in combating this major agri-environmental issue in the accession countries.

Water pollution by agriculture, both of ground- and surface water, is a major environmental issue in many countries. Problems of water quality are exacerbated by water availability, and in some countries pollution and irrigation problems are closely linked. In Cyprus, growing demand for water has led farmers to use tainted water from disused mines for irrigation purposes, thereby causing boron contamination of the groundwater. In CEE-10, the use of irrigation (and the environmental problems associated with it) decreased markedly during the 1990s, but irrigation infrastructure is currently being restored in some areas. The challenge now is to ensure these irrigation systems are restored with adequate attention to environmental management. By contrast, in the MED-3 irrigation still increases with the associated environment impacts.

Emissions from agriculture to air in the form of ammonia (causing eutrophication and acidification) and the greenhouse gases nitrous oxide and methane have decreased significantly in most CEE countries between 1990 and 2000. This is due to lowered livestock levels and decreased inputs of nitrogenous fertilisers.

The impacts of agriculture on biodiversity vary greatly between regions. While land abandonment hardly occurs in important bird areas (IBAs) in Turkey, it is a dominant issue in Slovakian and Estonian IBAs. The effects of abandonment are not straightforward. In Latvia, some bird species appear to benefit from abandonment, while a number of grassland plant species are dwindling due to the cessation of grazing. Intensification is a more dominant problem in IBAs in the Czech Republic, Slovenia and Poland.

Land abandonment and agricultural intensification have a combined negative effect on local landscape diversity. Data from the Baltic States show the increasing dominance of forested areas instead of the previous mosaic-like mix of farmland and wooded areas.

With accession to the EU more resources for agri-environment and rural development measures will become available, coupled with a demand to meet common environmental standards, for example regarding nitrate in water. Existing problems, particularly those of local and regional nature, need to be identified properly. In this respect there is still a considerable lack of consistent and comparable data sets across the countries concerned. Environmental monitoring and reporting systems will have to be improved to enable appropriate action within the new policy context (see Chapter 4).

4. Enlargement and its consequences for the agri-environment

Previous chapters have reviewed the characteristics of farming in the accession countries, the big impact of political changes on input use and production levels in the CEE-10, as well as the environmental pressures and benefits linked to farming in the AC-13. This chapter connects these facts to the agricultural enlargement framework decided at the Copenhagen summit in December 2002 and the 2003 CAP reform decisions. However, one has to recognise that agriculture policy is only one of the factors that influence farming decisions. It must be seen alongside many others, including technical change, consumer demand and market opportunities, the security of land tenure, the availability of credit on reasonable terms, the extent of alternative employment options and social attitudes towards farming lifestyles. The national implementation of the evolving CAP policy framework will nevertheless have a strong influence on agriculture and the environment in the ten acceding countries[6].

4.1. Analytical approach

This chapter reviews the potential environmental implications of the 2002 enlargement decisions at the Copenhagen summit as well as the CAP mid-term reform decisions on 26 June 2003. The analysis focuses on the relationship between core CAP policy instruments and the key environmental issues described in Chapter 3 (soil erosion, water pollution, air emissions and loss of biodiversity).

The EU common agricultural policy (CAP) is divided into two main policy lines. The so-called first pillar combines traditional support instruments that are linked to agricultural production and currently takes up about 90 % of the total CAP budget. Since the Agenda 2000 CAP reform in 1999, most of the support under the first pillar is provided in the form of direct payments to farmers that are not directly linked to production quantity but to the areas sown with certain crops or numbers of livestock kept. The 2003 CAP reform decisions have further de-coupled such income payments from production and widened the number of agricultural crops included.

The 'second pillar' of the CAP was introduced with Agenda 2000 in the form of the Rural Development Regulation (1257/1999). This contains 22 different policy measures that the EU Member States need to combine in national rural development plans according to their specific needs. The EU Member States need to present their rural development plans for approval to the European Commission. In contrast to pillar 1 measures that are 100 % funded from the CAP budget, rural development spending is currently co-financed to 50 % from the EU budget (75 % in Objective 1 regions). Recent changes to pillar 2 policies are described in section 4.2.

Due to lack of data and the complex interactions between policy, farm management and the environment any assessment of the environmental impact of individual policy measures must currently remain qualitative. However, knowledge of current farming trends and model forecasts of agricultural production under different policy scenarios allow an assessment of the likely direction of environmental impacts from agriculture.

The assumptions concerning agricultural production that are used in this study derive principally from recent studies by DG Agriculture as they provide the most detailed analysis available regarding the accession countries. The most relevant study in this regard is an impact analysis of the mid-term

(6) Agriculture policy also covers issues such as food safety and hygiene standards, farm animal welfare and transport rules, as well as detailed quality specifications for some products. All these aspects of the CAP can be expected to affect the development of agriculture and ancillary economic activities in the accession countries over the next decade. Thus, the costs involved in meeting EU food hygiene standards could adversely affect the viability of small-scale local production, such as cheese making. For reasons of focus and lack of data this study does not attempt to include these issues into our analysis.

CAP reform proposals by the Commission (CEC, 2003). This study works with up-to-date market figures and takes account of the Copenhagen enlargement decisions. It compares two policy scenarios: continuation of the Agenda 2000 decisions, or adoption of the Commission mid-term reform proposals from January 2003. The study itself only provides aggregated figures for the enlarged EU of 25 Member States. However, DG Agriculture has made available underlying data for the acceding countries. For complementary information or comparison we also used two further studies: 'Analysis of the Impact on Agricultural Markets and Incomes of EU Enlargement to the CEECs' (CEC, 2002a), and 'Prospects for Agricultural Markets in the Candidate Countries of Central and Eastern Europe' (CEC, 2002b). As the focus of these studies is on the CEE accession countries our analysis is limited to central and eastern Europe.

The conclusions in this report are based on the following four analytical steps:

- For which sectors or crops is a production change expected?
- Is any projected production increase due to expansion of area / animal numbers or due to intensification?
- Will different production regions or individual types of farms (large/small, mixed/specialised) be affected differently?
- What are the potential mitigating factors (e.g. agri-environmental policy measures, technological changes, environmental regulation, training of farmers)?

4.2. Enlargement process and CAP reform

Copenhagen summit decisions

The European Council took the political decisions governing EU enlargement at the Copenhagen summit in December 2002, after intensive negotiations with all candidate countries. Ten countries of central and eastern Europe and the Mediterranean will join the European Union in May 2004[7], while the accession of Bulgaria and Romania is scheduled for 2007. Turkey still has to be given a date to begin negotiations for EU accession but has made progress in that direction.

In the area of agriculture the accession agreement largely follows original proposals by the European Commission (CEC, 2002d). In addition to adjustments to Structural Fund support, the Commission proposal was amended to give the candidate countries the possibility to convert rural development budget into direct aid payments to farmers, increase these with additional funds from the national budget, and to provide for some increases to the originally proposed milk and livestock production quotas.

The total agriculture budget available from EU funds to the ten acceding countries (ACC-10) between 2004 and 2006 (the current EU budgetary period) is structured as follows (in million euro):

Table 4. 1 **CAP budget for the ten acceding countries up to 2006 (in million euro)**

	2004	2005	2006
Commodity linked payments (pillar 1)	327	2 032	2 322
Rural development funding (pillar 2)	1 570	1 715	1 825
Total CAP spending in ACC-10	1 897	3 747	4 147

Source: Agra Europe 2002a, b.

The overall level of agricultural support per hectare is considerably lower than in the present EU countries. However, the share of foreseen rural development spending is far higher than under the general CAP budget (~ 50 % in the ten acceding countries against 10 % in the EU). The new Member States are initially eligible for a three-year rural development plan (RDP) for the period 2004–2006. A similar set of measures will apply as in the existing EU Rural Development Regulation but with the important addition of an entirely new scheme for semi-subsistence farms. In addition, the ceiling for CAP contributions is higher than usual (80 %). Table 4.2 shows the differences in CAP expenditure between the current EU Member States and the acceding countries (assuming no national transfer of funds from pillar 2 to pillar 1 pillar).

(7) Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia.

Source: Own calculations based on Agra Europe, 2002a, b and EEA, 2002a

Note: The rural development figures for the ACC-10 do not include EAGGF guidance funds for Objective 1 regions.

Table 4. 2 **Agriculture budget in the ACC-10 and the EU-15 countries**

	Utilised agricultural area (UAA) (million ha)	First pillar spending (million euro)	Rural development (RD) spending (million euro)	First pillar spending per ha UAA (euro)	RD spending per ha UAA (euro)
ACC10*	38.3	1 560.3	1 703.3	40.7	44.5
EU-15**	128.7	38 712.6	6 855.1	300.8	53.3

* Average figures 2004–2006
** Average figures 2000–2002

The CAP budget for the ten new Member States gives scope for considerably higher relative spending on agri-environmental measures and agricultural diversification than in the EU-15. However, it also increases the administrative complexity of agricultural policy. Given complicated EU procedures there is a risk that the new Member States would thus not be able to spend the total allocated EU budget. This reason and the desire of the accession countries to ensure a similar level of direct aid payments for their farmers under the first pillar of the CAP as provided to EU farmers led to a compromise on the use of rural development funds. Under certain constraints the new Member States can divert up to 20 % of their rural development allocation to increase direct payments under the first pillar. The effect of these arrangements on direct aid payments to farmers in the acceding countries is shown in Table 4.3.

Source: Agra Europe, 2002b.

Table 4. 3 **Phasing-in schedule for direct aid payments in new Member States**

Year	EU aid (% of full EU rate)	National top-up* (% of full EU rate)	Overall max. payment (% of full EU rate)
2004	25	30	55
2005	30	30	60
2006	35	30	65
2007	40	30	70
2008	50	30	80
2009	60	30	90
2010	70	30	100
2011	80	20	100
2012	90	10	100
2013	100	—	100

* to be financed from national budget and up to 20 % of EU rural development funds

CAP mid-term reform in 2003

Following the enlargement decisions, the CAP mid-term reform in 2003 changed the Agenda 2000 CAP framework substantially[8]. The full range of the mid-term reform decisions cannot be reviewed here but a number of important changes that appear particularly relevant from the perspective of the acceding countries are described below (refer to Appendix A for more detailed information).

During the period 2005–2007 Member States will introduce a single farm payment (SFP) that combines previous arable aid payments (cereals, oilseed and protein crops, set-aside, dried fodder, rice, durum wheat etc) and current beef, sheep and goat premia. Under a 'national envelope' Member States may use up to 10 % of all single farm payments for encouraging specific types of farming that are beneficial for the environment. With regard to SFP's Member States can also opt for 'regionalised implementation', for example to support economically marginal grassland systems.

The mid-term reform has made cross-compliance obligatory for Member States. Direct payments are to be cut or withheld if farmers do not comply with a total of 18 legal requirements in the areas of environment, animal welfare, animal diseases and public

(8) Regulation 1782/2003 and Regulation 1783/2003, OJ L270, 21.10.2003.

health from 2005–2007 onwards. Farmers are furthermore required to keep their land in good agricultural and environmental condition, for example by maintaining minimum livestock densities and landscape features. This is particularly relevant for maintenance of extensive grasslands, but the impact of this measure will depend on the precise implementation by the Members States and the national management standards to be set. The introduction of cross-compliance is likely to remain voluntary for the acceding countries until their CAP payment system has been aligned with that of the EU-15 countries (Marangoni, 2003).

As for market regimes, rye intervention will be abolished and energy crop payments will be introduced. Both measures are expected to have considerable impact in the accession countries. Rye is likely to be partially substituted by wheat and other cereals, especially in Poland and the Baltic States, where it is an important crop. It is not yet clear how large the entitlement area for energy crop payments will be in the ACC-10, but uptake is potentially high, since several countries have a substantial biofuel processing industry and economic yields of traditional crops are low compared to EU-15.

Finally, the 2003 mid-term reform has also introduced several changes to the rural development measures under the CAP. Most important from an environmental perspective is the introduction of a farm advisory system, voluntary for Member States until 2006, obligatory thereafter. This system will help farmers to comply with environment, food safety and animal welfare standards. Public farm advisory services in many ACC-10 countries have been strongly reduced during the last 10 years, despite the need of farmers for professional advice, particularly on environmental issues. This new incentive is therefore of great potential value.

Socio-economic changes

The exchange rate of the national currency influences agricultural income and production in the accession countries. Nearly without exception national currencies in the central and eastern European countries have appreciated continuously during the last years. This trend is expected to continue until acceding countries are eligible to join the eurozone — several years after accession. Stronger national currencies make internal production factors (land and labour) more expensive and imported production factors (chemical inputs and machinery) cheaper. This trend will thus favour intensification as farmers try to substitute labour with other inputs.

The CAP reform impact analysis by DG Agriculture (CEC, 2003) predicts a rise in real agricultural income in the acceding countries of up to 45 % by 2009, due to larger market returns, slowly rising direct payments and rural development support. Production capacity and intensity in the ACC-10 will to a considerable degree be determined by the question of how much of this additional income will be invested into modernisation and expansion of agricultural production. Many experts currently predict that on smaller farms most, or at least a large part, of this income will go into private consumption as agricultural income is currently very low (often at subsistence levels) and the agricultural workforce large compared to total production capacity (W. Münch, pers. comm., 2003). However, on farms with a commercial orientation (i.e. mainly those above 30 ha in the case of Poland) additional agricultural income is likely to be mainly used for farm modernisation and intensification (CEAS, 2003).

Semi-subsistence farming is particularly important in the dairy sector, with large numbers of small producers keeping between one and five cows, producing little for the commercial market. The future of these small farmers is frequently debated. Many observers expect them to become less competitive and to withdraw from farming in sizeable numbers. Such a trend could be accelerated by the application of EU health and hygiene standards and will also be influenced by the availability of alternative income opportunities.

4.3. Commodity linked payments — the 'first pillar'

Expected production trends

One tool for limiting agricultural expenditure and production in the EU are the so-called maximum base areas and headage numbers for which Member States can claim support payments. Thus, important constraints on agricultural output in the acceding countries are cereal base areas, livestock headage payment limits and milk

production quotas that were agreed in Copenhagen. Practically all are lower than had been requested by the accession countries. Table 4. 4 compares current production levels in eight central and eastern European countries with base area, headage payment and milk quota allocations according to the Copenhagen agreement.

Table 4. 4 **Arable base area and livestock production levels allocated to the acceding CEE countries in comparison to recent production levels**

	Czech Republic	Estonia	Hungary	Latvia	Lithuania	Poland	Slovakia	Slovenia
Current arable area (1 000 ha)	1 990	335	3 398	444	991	9 258	997	103
Base area: Arable land (1 000 ha)	2 254	363	3 488	444	1 147	9 455	1 004	125
Difference (%)	+ 13.2	+ 8.3	+ 2.6	0	+ 15.7	+ 2.1	+ 0.7	+ 21.2
Current milk production (1 000 t)*	2 794	613	2 104	849	1 677	11 565	1 119	661
Milk quota (1 000 t)	2 738	646	1 990	727	1 705	9 380	1 041	577
Difference (%)	- 2.0	+ 5.5	- 5.4	- 14.2	+ 1.7	- 18.9	- 7.0	- 12.8
Current cattle headage (Head of cattle going to slaughter x 1 000)	559	83	279	116	327	1 786	232	251
Allocated headage no.: Beef + suckler cow overall (1 000 head)	574	121	259	144	415	2 141	232	248
Difference (%)	+ 2.7	+ 46.9	- 7.4	+ 24	+ 26.8	+ 19.9	+ 0.2	- 1.3

* Average figures 2000–2002 in 1 000 t

Source: CEC, 2002b.

Notes: Head of cattle going to slaughter' is calculated by using the official beef and veal production figures (in 1 000 kg) divided by 210 kg (per carcass) to compute the recent total for beef animals. The categories used are not fully comparable but seem the best approximation possible.

The DG Agriculture impact study from March 2003 provides production forecasts for individual agricultural commodities by 2010 (see Table 4.5). The impact of the 2003 mid-term CAP reform decisions is likely be close to the projection made under Agenda 2000 scenario for most commodities (W. Münch, pers. comm., July 2003). Within this policy framework substantial increases are predicted for poultry production. Milk and beef production are expected to remain stable, with a small increase possible for beef. The total area of cereals is predicted to remain stable or increase slightly with differential trends between individual cereal types. Soft wheat will strongly increase its share among cereals, while barley and rye areas should decline significantly. In the light of the mid-term CAP reform decisions the area of oilseeds is likely to expand considerably, driven among other things by a new subsidy to energy crops[9].

DG Agriculture (CEC, 2002a) predicts an increase of about 3.7 to 3.9 million hectare of overall arable area by 2012 on the basis of CAP enlargement scenarios that are close to the present framework. Although this would be a significant increase (~ 8 % of total utilised agricultural area of the ACC-10) it is less than the 'land reserve' previously devoted to these crops but shifted to fodder production, pasture or fallow over the last decade or so. This 'reserve' is estimated as between 6.5 and 7.5 million hectares, unevenly distributed between

(9) The energy crop payment is likely to apply in the new Member States at the same rate as direct payments (starting at 25 % in 2004). The EU recently approved a new directive on the use of biofuels in transport (Directive 2003/30/EEC) that sets an indicative target of 5.75 % of all transport fuel to be derived from bioenergy by 2010. To reach this target without imports on the basis of agricultural biomass would mean that between 4 and 13 % of farmland in the EU-25 would have to be planted with biofuel crops (depending on the choice of crops and technological development) (Jensen, 2003). This is likely to have substantial consequences for overall land use intensity, minimising the area that is set-aside or currently abandoned and encouraging higher production intensity elsewhere.

Table 4. 5 **Expected impacts of enlargement on production (area planted for crops) in the ACC-10, period 2002–2010**

Sector	ACC-10*	Comments
Beef	↑ ↓	Strong link to dairy cow herd; suckler cow no's to increase, intensive beef production may increase in some areas.
Milk	↑ ↓	Quotas prevent production increase, but yield per cow to rise strongly.
Pigs	⇧	Strong consumer demand; increase facilitated by outside investment.
Poultry	⇧	Strong increase largely through outside investment.
Cereals	↑ ↓	Gains on feed potatoes and fodder crops, loss to oilseeds and set-aside (from 2007).
Wheat	⇧	Most productive cereal, best price in the market.
Barley	⇩	Small decrease as feed use declines, low yield per ha.
Maize	⇧	Some increase due to high market prices.
Rye	⇩	Strong decline due to abolition of rye intervention.
Oilseeds	⇧	Increase due to good market price and energy crop payment.
Fallow **	⇩	Better areas go into cereal and energy crops; poor land likely to be afforested.

* Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia.
** Trend predicted in previous CAP enlargement impact analysis (CEC, 2000a) and confirmed by CEAS study.

Source: DG Agriculture, 2003; CEAS, 2003; W. Münch, pers. comm., July 2003; P. Weingarten, pers. comm., September 2003.

Note: The policy framework is based on the 2002 Copenhagen enlargement decisions and the 2003 CAP reform agreement.

↑ ↓ ± 3 % change or stable

⇧ > 3 < 10 % increase

⇩ > 3 < 10 % decrease

⇧ > 10 % increase

⇩ > 10 % decrease

⇧ > 20 % increase

countries (CEC, 2002a). Poland and the Baltic States have a larger arable land 'reserve' than Hungary and Slovenia, for example.

Sheep (and goats) are particularly important livestock for the management of extensive, high-nature-value grazing systems in mountain, steppe or coastal areas. Numbers of both have fallen spectacularly from the pre-transition period. A sizeable gap existed between the Commission proposals (CEC, 2002d) and candidate country demands for the number of sheep eligible for annual premium. The candidate countries were requesting a level for sheep and goats of about 1.4 million more than the Commission was offering (Baldock & Tar, 2002). As the Copenhagen agreement is largely based on the original Commission proposals the numbers of sheep (and goats) must be expected to remain at their current low levels, or to decline even further.

Production intensity

Arable production intensity is likely to go up, leading to higher yields per hectare and increased use of fertilisers and pesticides. The figures presented in the DG Agriculture impact study (CEC, 2003) lead to a productivity increase of about 1.6 % per year, which is about 0.6 % more than the EU average (W. Münch, pers. comm., July 2003). This trend is the response to a more stable agro-economic environment, the availability of slowly increasing direct payments and investment support, and the gradual introduction of modern technology and machinery. Nevertheless, intensification starts from a low level and in most regions it seems unlikely to reach the levels found in the EU. This is due to lower land and labour prices, limited availability of credit and farmer attitudes shaped in a very unstable agro-economic framework during the 1990s. Average cereal production per ha in the EU presently stands at about 6 tons/ha whereas productivity in the ACC-10 is expected to reach only 3.8 tons/ha by 2009. However, this does not preclude strong increases in production intensity in the more fertile areas where the economic gain from outside inputs and high-yielding varieties is greatest.

Most pigs and poultry in the ACC-10 are currently still raised in ex-collective farm buildings (except on Cyprus and Malta), using somewhat outdated feed mixtures and approaches. Competition and modernisation of the sector in the enlarged EU should lead to considerable productivity increases in this sector (as is already evident for poultry). The practice of fattening pigs on feed potatoes, which is still common in central and eastern Europe, will decline over time due to its high labour costs and changing consumer preferences. Some productivity increases should also occur in the beef sector although more difficult to predict as a large part of the beef cattle population is located on small to very small farms. Considerable yield increases are likely in the dairy sector where average milk production per cow is predicted to increase from currently about 4 200 litre/year to 4 950 litre/year by 2009 under a continuation of national policies (CEC, 2002b). A similar productivity increase can be expected under EU enlargement conditions.

Farm specialisation

In regions suitable for intensive cereal production further specialisation is expected, as larger holdings shed excess labour and unprofitable farm operations, such as livestock production in many cases (Pouliquin, 2001). Thus, specialised arable farms could become more dominant in certain areas. Conversely, mixed cropping and cereal output on farms that are small or lie in marginal areas may be maintained due to the area payments available under the CAP. Rye production, now found very commonly on small farms in Poland and adjacent countries, is expected to decline strongly when rye intervention is stopped as decided in the 2003 CAP reform agreement.

Pig and poultry production in the ACC-10 are already dominated by specialised producers in most countries. Modernisation and concentration are not expected to change this picture substantially (except for countries such as Poland where smaller farms still have a considerable share of total pig production). Milk quota allocation to countries is based on the assumption that the importance of (semi-) subsistence producers will decrease over time (about 11 % by 2010 according to DG Agriculture — CEC, 2003). This part of milk production should migrate to larger and more specialised dairy farms.

Mitigating factors

Several policy measures have been introduced into the CAP during the last ten

years that can help to minimise the negative environmental impacts of agriculture. They include various instruments that fall under rural development policy, such as environmental investment, less favoured area measures or agri-environment schemes. The Agenda 2000 CAP framework requires Member States to take appropriate environmental measures for agricultural production that is supported under pillar 1 of the CAP[10]. Three different policy instruments are available in this context: agri-environment schemes, codes of Good Farming Practice and environmental cross-compliance. This has been complemented by new measures under the 2003 mid-term reform.

National standards of good farming practice have to be developed by all EU Member States according to Regulation 1257/1999. Adherence to good farming practice (GFP) is a precondition for participation of farmers in agri-environment and less favoured area (LFA) schemes. GFP has to include verifiable legal standards in the countries concerned. As most acceding countries have a very comprehensive environmental legislation with regard to agriculture (Bennett, 2003) there seems to be a good legal basis for ensuring observance of environmental farm management principles after EU accession. However, the key to the success of the above legal standards is their enforcement through monitoring and control mechanisms. For LFA and agri-environment schemes a minimum control of five percent of all participating farms is demanded by EU rules. For standards contained in environmental legislation countries are likely to continue current enforcement practices that are strongly hampered by lack of resources.

The 2003 CAP reform has introduced mandatory cross-compliance linked to existing EU environmental, animal welfare and other legislation, to be implemented in stages from 2005 onwards by all Member States. The latter have to define verifiable standards arising from this legislation and from the requirement for farmers to maintain their land in good agricultural and environmental condition. The cross-compliance rules of the 2003 reform will be optional for the acceding countries for several years (Marangoni, 2003). When introduced they should in principle strengthen the implementation of GFP and related environmental standards in the acceding countries as most of these standards are linked and the cross-compliance measure introduces obligatory control and enforcement measures.

Another element of first pillar policies that provides potential environmental benefit is voluntary and obligatory set-aside, which can create more habitat diversity in intensive arable regions. Obligatory set-aside at a rate of ten percent arable area on medium to large farms remains a feature of the CAP after the mid-term reform. However, due to a special subsidy disbursement regime designed for the acceding countries (the 'simplified scheme') set-aside is likely not to be obligatory for farmers in these countries until 2007–2009. Even when it is introduced large number of farmers would be too small to be affected by set aside, potentially over 50 % in Poland, Hungary and Slovenia. Nevertheless, it could still become significant in several regions, particularly in the Czech and Slovak Republics and those parts of Hungary and Poland with larger-scale, more specialised farming. On implementation of the 2003 CAP reform voluntary set-aside is expected to grow considerably in the EU-15 (CEC, 2003). A similar effect could occur in the acceding countries that might affect particularly less productive arable regions, such as in the Baltic States.

4.4. Rural development — the 'second pillar'

Challenges and options

Rural development measures under the CAP are largely directed at the agricultural population in rural areas. They are meant to help farmers diversify their holdings, exploit new income sources, better market their products etc. They provide some direct support to farmers in 'less favoured areas', contain measures for professional and environmental training, and include social elements, such as support for 'basic rural services' or setting-up of farm relief services. They also contain important measures of environmental relevance, such as training, afforestation and agri-environment schemes. The latter are the only obligatory measure and take up about 50 % of rural development spending in EU Member States.

(10) Article 3 of Regulation 1259/1999.

All these measures are very relevant to rural development in the CEE-10 countries too, although central and eastern Europe faces far deeper socio-economic problems than most regions in the EU. It is estimated that 'hidden' agricultural unemployment in the CEE-10 is very widespread, affecting at least half of those in agricultural employment — about 5 million people. With high levels of agricultural employment in many countries, particularly in Poland, Romania, Bulgaria, Latvia and Lithuania, the alleviation of rural unemployment and hidden agricultural unemployment is a central challenge for rural development policy. Given the scale of the problems, it may be difficult to absorb more than a small fraction of this 'excess labour' through new jobs linked to the farm sector. There are, nevertheless, opportunities in diversification into new farm products or rural tourism, or increased demand for environmental services of farmers rewarded via agri-environment schemes.

The acceding countries have already developed draft national rural development plans under the pillar 2 of the CAP, covering a relatively short programming period of three years (2004–2006). Many countries can thus be expected to try to build on the experience gained implementing SAPARD (the pre-accession fund for rural development). The very short programming period will be a challenge and could reduce the scope for an ambitious build up of measures, in particular for agri-environment schemes because of the time required to establish and implement schemes that involve contracts with individual farmers. In spite of recent progress under SAPARD this programme has shown the considerable resources that are required to implement agri-environment schemes, in particular, under EU rules. Thus, there is still clearly a need for more support and national effort to build relevant administrative capacity in rural development.

The rural development pillar of the CAP is a key tool for achieving the integration of environmental objectives into agriculture policy. Several EU Member States provide examples for how EU rural development policy can be used to the benefit of the environment (Dwyer *et al.*, 2002). In the context of central and eastern Europe such an approach should include the following measures:

- targeted application of agri-environmental schemes on the basis of clear environmental objectives;
- increased use of aid for Less Favoured Areas (LFAs), with appropriate minimum environmental standards/requirements;
- considered application of the semi-subsistence farm scheme with suitable conditions;
- use of raising standards and farm advisory schemes;
- complementary application of certain rural development measures (structural adjustments, processing and marketing, training, etc.) to promote more environmentally sensitive sustainable agricultural and rural development.

The potential for some of these measures is explored below.

Agri-environment

It is widely accepted that agri-environment measures are instruments of central importance in integrating environmental and sustainable development objectives into the CAP. They are the only obligatory measure for all Member States under the rural development regulation and cover about 20 % of agricultural area in the EU-15. First phase or pilot agri-environment schemes have been proposed in all central and eastern European accession countries, either nationally or in the SAPARD framework. Three schemes are already in operation in Slovenia, Estonia and Hungary. Table 4.6 shows the state of development of agri-environment schemes in the CEE-10 countries.

Table 4. 6 **State of agri-environment scheme development in CEE-10 on 30 April 2003**

	SAPARD-funded scheme	% total SAPARD funding (indicative)	National scheme (2002 data)
Bulgaria	* * *	2	
Czech Republic	* * *	3	
Estonia	* *	1	70 000 ha
Hungary	* *	4	47 000 ha
Latvia	* * *	5	
Lithuania	* *	1	
Poland	* *	2	
Romania	*	3	
Slovakia	* *	4	
Slovenia	*	0	90 000 ha

* =No draft received by the Commission, or to be financed from national funds.
* * =Draft received.
* * * =Adopted in EU STAR Committee.

Source: pers. comm. SAPARD Unit, DG Agriculture, Ministries of Agriculture in Estonia, Hungary and Slovenia.

Although they require substantial administrative resources to be successful, agri-environment schemes have considerable potential to address the issues identified earlier in this paper. This includes increased pressures from intensification, the management of marginal and abandoned land and the maintenance of high nature value farming systems. A large number of different measures already have been identified as relevant to conditions in acceding countries, as demonstrated by the ambitious scheme now operational in Slovenia (see Box 4.1).

Box 4.1: Agri-environment scheme of Slovenia
The implementation of the Slovene Agri-Environmental Programme (SAEP) began in 2001 following its adoption as part of the Programme of Agricultural Policy Reform. The policy reform programme embraces several other measures concerned with food production labelling and marketing, focussing on quality, geographical origin, traditional reputation, organic and integrated production etc. The SAEP comprises 22 measures, of which 10 were implemented in 2001 on a pilot basis, and an additional twelve added in 2002. In 2001 11 400 farms accounting for 90 000 ha received subsidies. The budget currently available for agri-environmental measures in 2002 is 10.4 million EUR and the programme runs to 2004. The SAEP measures are summarised below:
Group I: Reducing negative impacts of agriculture on the environment
This includes reductions in livestock density, preventing soil erosion in orchards and vineyards, crop rotation measures, green cover on arable land, organic farming and integrated production of fruit, vegetables and vines.
Group II: Preservation of nature, biodiversity, soil fertility and traditional cultural landscapes
This includes the grazing of mountain pastures, mowing of steep slopes and hill meadows, protecting orchards and rare breeds and plant varieties and maintenance of extensive grassland.
Group III: Maintenance of protected areas
This covers the maintenance of cultural landscapes, measures regarding large carnivores and the habitats of protected birds and the establishment of green cover, for example in groundwater protection zones.
Group IV: Education and promotion
This includes training programmes and promotion of the scheme.
Agri-environment measures are recognised as the first priority of rural development in Slovenia for the period 2004–2006 and are included in the draft rural development plan that is being discussed with the European Commission.
Source: Cierna, 2002.

Some of the most important opportunities linked to the implementation of agri-environment schemes in the acceding countries include:

- safeguarding valuable habitats under agricultural management, such as the estimated 7 million hectares of semi-natural grassland in ten countries referred to in Chapter 2;
- maintaining traditional systems noted for their contribution to cultural landscapes, such as orchards and small scale dairy farming;
- bringing land that is partly or wholly abandoned into appropriate management;
- building up a thriving organic and low impact farming sector to take advantage of the scope for improved environmental management, market opportunities and

the current low level of fertiliser and agro-chemical use;

- establishing integrated management systems and good soil management, not least in areas subject to intensification and under risk of soil erosion.

The list above shows some similarities to agri-environment schemes and policy models in current EU countries, but also highlights distinctive agri-environment features in central and eastern Europe. The issue of land abandonment and under-grazing because of the decline of former pastoral systems is far more significant in the CEE-10 than in the EU. Agri-environment schemes need to have a stronger emphasis on the re-introduction of livestock and positive management than is usual in the EU. Because farming is scarcely financially viable in many areas of nature conservation value, incentives for reviving traditional management methods are required. An ambitious approach of this kind would also justify a flow of payments at a sufficient level to attract farmers to participate. If agri-environment schemes offer only low levels of compensation, reflecting minor management changes in relatively low income farming systems, payment levels will be too small to be of interest to most farmers.

A new strategic vision is required to deploy agri-environment as a central tool of environmental management and rural development in ACC-10. Despite the scale of opportunity, there is a clear danger that the projected budget for agri-environment schemes will be rather limited, endangering ambitious policy plans for some of the acceding countries. As the different rural development measures will 'compete' for the limited funding, there is a risk that agri-environment measures will receive a smaller percentage of the total than required, in particular if governments give priority to other potentially expensive measures, such as LFA payments or semi-subsistence aid. Box 4.2 reviews budgetary options for the implementation of agri-environment schemes in the acceding countries.

Box 4.2 Scenarios for agri-environment schemes in the acceding countries (ACC-10)

Section 4.2 shows that the total rural development budget for the ACC-10 will be about 1.3 billion euro per year (excluding 20 % that can be transferred to the pillar 1 policies). Some general assumptions lead to two scenarios for future agri-environment scheme coverage.

Scenario 1 assumes that 10 % of the total rural development budget in the acceding countries would be spent on agri-environment schemes (about three times as much as foreseen under SAPARD). This sum would be 130 million euro per year, equivalent to 1.3 million ha, about 3 % of utilised agricultural area (UAA).

Scenario 2 foresees a similar share of agri-environment scheme spending under the rural development budget in the acceding countries as in the present EU-15 (ca 50 % of the total). Agri-environment scheme spending would then be 650 million euro per year, covering about 6.5 million ha or approx. 16 % of total UAA in the acceding countries.

The financial analysis above shows that the considerable share of rural development funding in the CAP budgets allocated to the new Member States would permit a substantial expansion of agri-environment programmes. However, further factors need to be considered in this context. Firstly, the administrative resources and costs that the countries need to bear themselves for a large-scale implementation of agri-environment schemes are likely to be considerable in comparison to current administrative spending. A proper analysis of this question is important in assessing the potential for agri-environment schemes in these countries. Secondly, agricultural policy makers and society in many ACC-10 countries do not currently show a particular interest in agri-environment issues. This coincides with the low awareness among the farming community of the nature and possibility of agri-environment schemes. Lastly, the importance of further administrative capacity building and training to ensure successful implementation of this policy measure should also not be underestimated. Thus, several obstacles need to be tackled for agri-environment schemes become important and well-endowed policy instruments in most acceding countries. It should be remembered, however, that agri-environment schemes in the EU also grew from a slow start to a now very significant policy instrument in most countries.

Source: Petersen and Feehan, 2003.

Less favoured areas

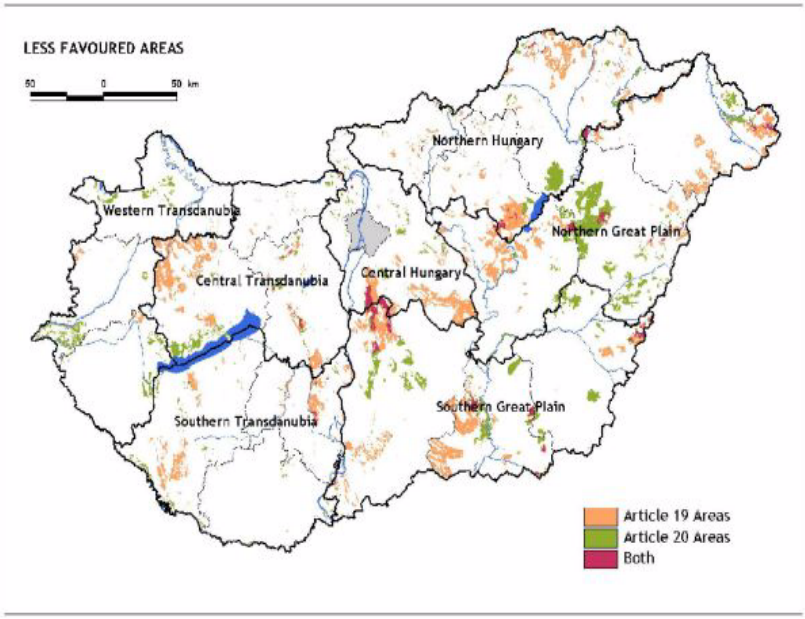
Several acceding countries already have some support measures for farms in 'Less Favoured Areas' (LFAs), including hilly and mountainous land. All will be able to apply EU LFA payments following implementation of the 'second pillar' of the CAP. This will require identification of the relevant areas and their agreement by the European Commission, followed by the introduction of a support scheme, payable on an area basis. Negotiations over extent, location and categories of LFAs are very advanced. In Hungary, for example, originally more than 2 million ha of farmland were proposed as LFAs, including about 140 000 ha semi-natural habitats (see Figure 4.1 for an indication of the likely future LFA area).

Studies in the EU have shown that a high proportion of all high nature value farmland is found within LFAs. Consequently, there is a

potentially positive role for supporting such farming systems via LFA schemes, provided that this does not lead to inappropriate intensification. At this stage it seems quite likely that about 25–60 % of the agricultural area of CEE-10 countries could fall in the LFA category. Since LFA payments are relatively simple for farmers to apply for, and for public agencies to administer, they can be an effective mechanism for supporting extensive farming systems and thereby maintaining cultural landscapes and biodiversity.

There is also scope for continuing to shift the focus of the LFA support system such that it takes on the characteristics of basic agri-environment support schemes, with a reduced emphasis on compensation for disadvantageous agronomic conditions. Within this framework new Member States could vary payment levels depending on the geographical conditions and require compliance with appropriate stocking densities. The area basis for payments to livestock producers forms a more appropriate foundation for the attachment of relatively simple environmental conditions than the previous headage based system. However, there would remain a distinctive role for agri-environment schemes providing additional assistance for more tailored and demanding management agreements.

Figure 4.1 **Less favoured areas in Hungary**



Source: Ministry of Agriculture and Rural Development, Hungary.

Semi-subsistence farm scheme

In its January issues paper (SEC (2002) 95 final), the Commission proposed an additional measure under rural development to help ease rural transition problems with a so-called 'semi-subsistence farm scheme'. The scheme allows the new Member States to provide a 1 000 euro flat rate aid for small, semi-subsistence farms, conditional on submitting a business plan demonstrating the future economic viability of the enterprise.

Although the aid proposed is very limited, it could have a significant environmental impact. The quest for improved viability could lead to the adoption of more commercial, modern practices, such as switching from multipurpose to specialist dairy cattle. This could lead to a loss of environmental diversity on small farms and accelerated merging of holdings with the same consequences. On the other hand, it could also allow more of the smaller holdings to survive a period of restructuring than otherwise would be possible, thus preserving a smaller scale habitat mosaic and landscape elements.

Some environmental conditions would be appropriate in a scheme designed to trigger modernisation and structural change, but no details have been announced by the Commission. Whether this scheme will absorb a sizeable share of the 'second pillar' budget, as appears possible given the large

number of such farms in some countries, remains to be seen. If this occurs, it could affect the support available for agri-environment and other measures.

Raising standards measure and farm advisory services

The accession agreements provide for a support measure in the new Member States that helps farmers to adapt to EU standards in the fields of environment, public, animal and plant health, animal welfare and occupational safety. To receive this support farmers have to submit a plan with relevant measures and demonstrate the economic viability of their holding. Support can be paid for a period of up to five years, up to 200 euro per ha in the first year, declining in equal steps to zero during the following years. A similar measure has also been introduced for the EU-15 under the mid-term reform of the CAP. Such support for environmental investment can be very important for raising farm management standards, in particular among farmers in the ACC-10 who generally suffer from a lack of capital. This positive impact could be limited to medium to large-scale farms, however, given the support conditions for the measure.

The introduction of farm advisory systems will be obligatory for Member States from 2007 onwards. This system will provide farm audits to help farmers ensure that their holding is complying with environment, food safety and animal welfare standards. Participation for farmers is voluntary but encouraged through co-financing of the audit costs as well as necessary investments via the 'raising standards' and other measures. This new rural development measure could help to reverse the decline farm advisory services that many ACC-10 countries have experienced in the last ten years. Given its voluntary nature, however, the positive impact of this scheme may be limited to the more active and larger farmers.

Other important rural development measures

There is further scope in other rural development measures to enhance the positive environmental impacts of the CAP after accession (e.g. Baldock *et al.*, 2001). In particular, these include:

- increased use of farm investment aids to promote restructuring of enterprises towards more sustainable systems;
- use of training aids to provide farmers and foresters with environmental management knowledge and practical skills;
- use of aids under Article 33 (concerned with rural development) to promote investment in protection of the environment as well as sustainable water management and environmentally sensitive re-parcelling (which could create opportunities for habitat creation and the restoration of landscape features);
- use of Article 33 aids or processing and marketing aids as well as use of labelling specifically to promote and increase the viability of high quality regional products produced to specified environmental standards;
- employ Article 33f to promote integrated rural development strategies in pilot territories via the creation of local action groups, similar to the LEADER approach.

In conclusion, the 'second pillar' measures offer a means of addressing many of the key environmental concerns identified in Chapter 3. They will be particularly important given the potential scale of change likely to be triggered by implementation of pillar 1 measures. It is essential that adequate funding is available for these measures and that priority is given to supporting acceding countries who wish to take them forward but may be inhibited by the administrative complexity and resource requirements of implementing EU rural development policy.

4.5. Consequences for the environment

General observations

Model and expert forecasts show that the implementation of the CAP in the acceding countries will lead to a moderate increase in agricultural production. This will become manifest in an expansion of individual sectors (in particular poultry, oilseeds and possibly cereals), and coincide with a modernisation and intensification of farm management practices. The expanding combined cereal and oilseed area will probably displace some current crops, such as feed potatoes for pig production. It may, however, also absorb part of the presently abandoned arable land as well as areas of fertile soil that have been converted into

grass in response to low arable prices. It could even lead to the ploughing up of some permanent grasslands of high nature conservation value, as has already occurred in Hungary. Low input livestock systems, responsible for creating and maintaining these species-rich grassland habitats, will not benefit sufficiently from the first pillar proposals to expand from their present low production levels.

The negative effects of these production trends on the environment will only be compensated to a certain degree by the measures under the second pillar. Nevertheless, implementation of the reformed CAP will not lead back to the production levels and intensity seen in the CEE-10 countries at the end of the 1980s. Thus, some environmentally beneficial changes that occurred in CEE-10 agriculture during the last ten years will be maintained. In most areas extensive cattle and sheep grazing systems will not recover, however, to the detriment of valuable semi-natural grassland habitats.

It should be born in mind that apart from the environmental measures under the CAP the EU relies on specific policy instruments for ensuring environmental protection and biodiversity conservation. Most relevant for the agri-environment aspects are the nitrate directive, the water framework directive as well as the birds and habitats directives. These cannot be dealt with in this report, but provide additional legal safeguards for maintaining environmental quality, *inter alia* as legal baseline for cross-compliance measures and agri-environment schemes.

Soil erosion

Section 3.1 has shown that there are considerable soil erosion problems in central and eastern Europe. The extent of soil erosion on farmland depends partly on natural factors, such as soil type and character of the terrain, and partly on agricultural management of the land. The signalled conversion of grassland, multi-annual fodder crops or long-term fallow to arable cultivation will increase soil erosion risk, in particular if this would occur on erosion prone soils, such as on slopes. Arable crops could expand to take up about 50 % of the current land reserve. Most of this increase will be on areas that are best suited to crop production, i.e. not on steep slopes or light sandy land. It is not possible to predict how much erosion prone land may be taken into cultivation again as baseline data on the location of this land is not available and the management decisions of farmers at field or village level cannot be derived from present models. The anticipated rise in the area of maize and oilseeds (sunflowers) could lead to increased soil erosion depending on the precise location of fields and the farm practices employed.

As no increase in the numbers of grazing livestock is expected, soil erosion due to trampling on steep slopes or overgrazing should be of local importance only.

Potential mitigating factors to prevent soil erosion include the introduction of relevant standards of good farming practice, reinforced by use of cross-compliance as well as appropriate farmer training and advice. Agri-environment schemes can also help to counter soil erosion, for example by encouraging planting of shelter belts and wind breaks. However, soil erosion on arable land is likely to remain an environmental concern that needs to be adequately monitored and minimised via appropriate farm management.

Water pollution

As shown in Chapter 3, water pollution from agriculture is most strongly driven by livestock densities and manure management. Following the foreseen increase of production levels in parts of the livestock sector environmental pressure could rise again. Since most additional production capacity in the pig and poultry sectors is likely to be established on new or modernised production facilities manure management is likely to be better than in the past. Current manure management practices on small and medium sized farms are often also inadequate. The raising standards' measure will have an important role to play in improving manure management on these and other farms. Relevant environmental training and advice for farmers, enforcement of cross-compliance and good farming practice is necessary to minimise potential concerns.

Some increase of water pollution problems as a result of the predicted arable intensification is to be expected, given the low input levels prevalent in nearly all accession countries. Pesticide drift into

watercourses due to inappropriate application may occur, as well as nutrient and sediment inflow to water bodies due to soil erosion. Both problems can be reduced by encouragement and enforcement of correct farm management practices (see above).

Air pollution

As indicated in Chapter 3 air pollution arising from agriculture in Europe has diminished during the 1990s. In CEE-10 the relatively low emission levels are the result of the drop in agricultural intensity after the political reforms. Particularly beneficial is the fact that ammonia emissions have almost halved, reducing eutrophication and acidification considerably. Apart from poultry and probably pigs the forecasts do not predict an increase in livestock numbers. In addition, targeted measures under the second pillar to improve housing, manure storage and application techniques can help to reduce ammonia emissions. Overall, this source of pollution will remain relatively stable and may even decline if appropriate management techniques are adopted. The ammonia emission target for 2010 under the CLRTAP Gothenburg protocol is therefore likely to be reached.

Agriculture accounts for roughly 10 % of greenhouse gas emissions. The big drop in methane emissions in the 1990s is not likely to be reversed. Cattle herds (combining the beef and dairy sector) are not expected to increase overall. Nitrous oxide emissions, however, are likely to go up as arable production intensifies and returns to higher nitrogen fertiliser inputs. However, total productivity will not reach pre-1990 levels and will remain well below EU-15 level. Overall, the long-term trend in greenhouse gas emissions from agriculture does not give cause for concern. Under the UN Kyoto protocol, the EU has accepted an overall reduction target of 8 % for greenhouse gases in the period 1990–2012. The targets for accession countries vary from 6 % (Hungary and Poland) to 8 % (Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Romania, Slovakia and Slovenia). Agriculture will be able to make a significant contribution to the necessary reductions, in particular for methane.

Biodiversity

In productive regions agricultural intensification is likely to take place, associated with biodiversity decline as previously seen in the EU. The less productive regions are often characterised by extensive farming systems that struggle for survival. The persistence of low-density grazing in these areas is very important for the management of semi-natural grasslands and pastoral systems. The strong decline of both cattle and sheep numbers since 1990 has already led to widespread abandonment of valuable grasslands throughout the region (see Chapter 3). The CAP regime will allow some increase in the livestock sector but will not result in a significant recovery of low-input grazing systems (particularly concerning goats and sheep). CAP support payments will at best help to maintain these extensive systems at the present sub-optimal level. Box 4.3 illustrates these issues in the case of Estonia.

In addition to CAP measures, the birds and habitats directives will be important for safeguarding the agricultural areas of highest biodiversity value.

Box 4.3: Livestock payments and grassland management in Estonia
Estonia still possesses considerable areas of biodiversity-rich semi-natural grasslands (Mägi and Lutsar, 2001). Only 40 % of these are under management, the rest are losing their ecological quality due to land abandonment. The same phenomenon affects 56 % of all permanent grassland in Estonia which gives an abandoned area equivalent to 156 000 ha. The Copenhagen accession agreement provided Estonia with extra milk quota and cattle headage payments for about 47 000 heads of cattle beyond current production levels. If one makes the favourable assumption that these extra cattle would be spread over the country at a rate of 0.5 animals per hectare then about 94 000 ha of abandoned grassland can be taken under management again. However, farmers would begin cattle grazing on the more productive fields, not on the low-yielding semi-natural grasslands. Thus, grassland abandonment will remain a nature conservation problem in Estonia for the foreseeable future in spite of a limited production increase and potential tools under the CAP, such as agri-environment schemes. This has considerable implications for nature conservation strategy. Under CAP (and also world market) conditions a return to grassland management on the basis of extensive cattle farming is unlikely. Instead the most valuable grassland systems might have to be managed on the basis of large herbivore communities (consisting of deer, free-ranging cattle and horses), as is already happening in the Netherlands and elsewhere. The use of biomass for bio-energy generation could also become an alternative option for the use of such grasslands.
Source: M. Mikk, pers. comm., November 2002.

4.6. Review

In summary, the CAP appears likely to have differential impacts according to the sector concerned, as well as the individual country. The DG Agriculture predictions cast doubt on the common assumption that there will be an explosive increase in output in the acceding countries following enlargement. Some intensification will occur, particularly in the most favoured production areas, leading to growing environmental pressures of the kind familiar in the EU. Overall, however, agricultural intensity is likely to remain considerably below the levels experienced in the EU.

The current arable area will expand and could increase by up to three million hectares of cropland. However, some land is very likely to remain abandoned, both in arable areas and on formerly grazed land. Livestock numbers will remain well below levels of the late 1980s, resulting in under-grazing in several areas but also reduced pressure in some former hot spots such as large-scale dairy farms. As in the EU, the future of more traditional practices and systems is open to question, as a result of social and economic changes and the expected decline of semi-subsistence production.

The agriculture policy support envisaged under the accession agreement and the CAP 2003 reform will be one of the factors that speed up agricultural intensification after enlargement. On the other hand, the same de-coupled payments in support of farm incomes are likely to slow down structural change and maintain extensive farming systems in more marginal agricultural areas.

Measures under both pillars one and two of the CAP are potentially significant drivers of land management in the new Member States. The two pillars can be considered separately but do interact to influence farm decision-making. Their combined effect is important from an environmental perspective. This effect will be different depending on the characteristics of the regions and farming systems concerned.

Environmental instruments under both pillar 1 and pillar 2 of the CAP need to be used in the right combination for ensuring an appropriate environmental management of agricultural land. However, the national implementation of rural development measures in particular will determine whether agri-environmental instruments under the CAP are employed successfully in preserving the environmental values of farmland in the new Member States. This needs adequate administrative capacity for using available CAP options for the benefit of the environment in the future.

5. References

Agra Europe (2002a). *Copenhagen summit reaches historic deal on enlargement.* Agra Europe weekly, 20 December 2002. Tunbridge Wells, Kent.

Agra Europe (2002b). *Special budget deal wins Polish agreement.* Agra Europe weekly, 20 December 2002. Tunbridge Wells, Kent.

Aunins, A. & Priednieks, J. (in press, 2001). *Bird population changes in Latvian farmland 1995–2000: responses to different scenarios of rural development.* Proceedings of the 15th International Conference of the EBCC, Nyíregyhaza, Hungary.

Baldock, D., Dwyer, J., Lowe, P., Petersen, J-E. & Ward, N. (2001). *The Nature of Rural Development: Towards a Sustainable Integrated Rural Policy in Europe.* Synthesis report. IEEP, London. http://www.ieep.org.uk

Baldock, D & Tar, F. (2002). *Potential consequences of EU enlargement on agriculture and environment in the accession countries.* Discussion paper. IEEP, London. http://www.ieep.org.uk

Baris, Y. (1991). *Conservation problems of steppic avifauna in Turkey.* In P.D. Goriup *et al.* The conservation of lowland dry grassland birds in Europe 91–96, Proceedings of an international seminar, 20–22 March 1991. Reading, UK.

Bennett, H. (2003). *Good Farming Practice in Central and Eastern European Countries.* Seminar report. IEEP, London. http://www.ieep.org.uk

BirdLife International (2002). *Important Bird Areas in Europe.* Birdlife International.

Brouwer, F., Baldock, D. & la Chapelle, C. (2001). *Agriculture and nature conservation in the candidate countries: perspectives in interaction.* High-level Conference on Enlargement, Wassenaar, 22–24 January, 2001.

Byfield, A. (1998). *The important Plant Areas of Turkey: A Progress Report.* In: Synge, H. & Akeroyd, J. (eds). Planta Europa, Proceedings of the Second European Conference on the Conservation of Wild Plants, 9–14 June 1998, Uppsala, pp 66–71.

CEAS (2003). *Unpublished report for the RSPB.* BirdLife UK. Sandy, UK.

CEC (1998*). Agricultural situation and prospects in the Central and Eastern European Countries.* Ten volumes. Commission of the European Communities, Brussels.

CEC (2000). *The environmental impacts of irrigation in the European Union.* A report to the Environment Directorate of the European Commission by the Institute for European Environmental Policy, London in association with the Polytechnical University of Madrid and the University of Athens. Commission of the European Communities, Brussels.

CEC (2002a). *Analysis of the Impact on Agricultural Markets and Incomes of EU Enlargement to the CEECs.* Commission of the European Communities, Brussels. http://europa.eu.int/comm/agriculture/publi/reports/ceecimpact/index_en.htm

CEC (2002b). *Prospects for agricultural markets in the Candidate Countries from Central and Eastern Europe.* In: 'Prospects for agricultural markets 2002–2009'. Commission of the European Communities, Brussels. http://europa.eu.int/comm/agriculture/publi/caprep/prospects2002/ch2.pdf

CEC (2002c). *Agricultural situation in the Candidate Countries.Country reports.* Commission of the European Communities, Brussels. http://europa.eu.int/comm/agriculture/external/enlarge/publi/index_en.htm

CEC (2002d). *Enlargement and Agriculture: Successfully integrating the new Member States into the CAP* SEC (2002) 95 final. Commission of the European Communities, Brussels. http://europa.eu.int/comm/agriculture/publi/newsletter/42/42_en.pdf

CEC (2003). *Reform of the Common Agricultural Policy: A long-term perspective for sustainable agriculture. Impact analysis.* March 2003. Commission of the European Communities, Brussels. http://europa.eu.int/comm/agriculture/publi/reports/reformimpact/rep_en.pdf

Cierna, M. (2002). *Agriculture and Environment in Slovakia*. National report. IEEP, London. http://www.ieep.org.uk

Dwyer, J., Baldock, D., Beaufoy, G., Bennett, H., Lowe, P. & Ward, N. (2002). *Europe's Rural Futures — The Nature of Rural Development II*. Report for the land use Policy Group, UK, and WWF Europe. IEEP, London. http://www.ieep.org.uk

EEA (2002a). *Environmental signals 2002 — Benchmarking the Millennium*. Environmental assessment report No. 9. EEA, Copenhagen. http://www.eea.eu.int/

EEA (2002b). *Greenhouse gas emissions trends and projections in Europe*. Environmental issue report No. 33. EEA, Copenhagen. http://www.eea.eu.int/

EEA (2003). *Europe's environment: the third assessment*. Environmental assessment report No. 10. EEA, Copenhagen. http://www.eea.eu.int/

EEA / UNEP (2000). *Down to earth: Soil degradation and sustainable development in Europe. A challenge for the 21st century*. European Environment Agency / UNEP Regional Office for Europe, Copenhagen / Geneva.

EEA (2004, forthcoming). *Fact sheet AP3a — EEA31 NH3 emissions*. Data sheet name: AC ap3a-2003 NH3 13-11-03.xls. http://www.eea.eu.int/

Eurostat (2003). *New Cronos Database*. Eurostat, Luxembourg.

FAOSTAT (2000). *Land and Water Digital Media Series no. 10. Biodiversity*. FAO, Rome.

FAOSTAT (2002). *Database of the UN Food and Agriculture Organization*. FAO, Rome.

FAOSTAT (2003). *Database of the UN Food and Agriculture Organization*. FAO, Rome.

Farmer (2002). *Agriculture and Environment in Cyprus*. National report. IEEP, London. http://www.ieep.org.uk

Fritzsch, J., Weingarten, P. & Hockmann, H. (2003). *Entwicklung des Agrarsektors in Mittel- und Südosteuropa*. IAMO, Halle.

Heath, M.F. & Evans, M.I. (eds.) (2000). *Important Bird Areas in Europe*. Birdlife Conservation Series No. 8. Birdlife International, Cambridge.

IEEP (2002). *Agriculture and environment in the Accession Countries*. National reports. IEEP, London. http://www.ieep.org.uk

Jensen, P. (2003). *Scenario analysis of Consequence of Renewable Energy Policies for Land Area Requirements for Biomass productionStudy for DG JRC/IPTS*. Internal discussion document. Commission of the European Communities, Brussels.

Konishev, P.P. *et al.*(1999). *Soil Cover, Land Use and Soil Degradation in Bulgaria*. In: Bulgaria's Biological Diversity: Conservation Status and Needs Assessment, pp 631–639. Biodiversity Support Program, Washington DC.

Latvian Environment Data Centre (2000). *Latvian State of the Environment Report 1998*. Riga. http://www.vdc.lv/soe/soe_mllnm/texts/nature/ntr_intr.htm

Latvian Ornithological Society (1998). *Report on the White Stork (Ciconia ciconia)*. Riga. http://www.lob.lv/uk/

Marangoni, L. (2003). *Towards sustainable agriculture: the role of CAP reform*. Paper at the conference on EU accession and agriculture — making CAP work for people and the environment. Krakow, Poland. http://www.foeeurope.org/events/krakow/home.htm

Mägi, M. & Lutsar, L. (2001). *Inventory of semi-natural grasslands in Estonia, 1999–2001*. Estonian Fund for Nature and Royal Dutch Society for Nature Conservation, 2001.

Mikk, M. (2002). *Agriculture and Environment in Estonia*. National report. IEEP, London. http://www.ieep.org.uk

Molnár, Zs. & Vajda, Z. (2000). *Actual habitat mapping of the Duna-Tisza köze*. Kecskemét-Vácrátót. Report for the Ministry of Environment, Budapest.

OECD (2000). *Environmental Performance Review Turkey*. Organisation for Economic Cooperation and Development (OECD), Research Centre of the Environmental Protection, Paris.

OECD (2001). *Environmental Indicators for Agriculture,*Volume 3, Methods and Results. Organisation for Economic Cooperation and

Development (OECD), Research Centre of the Environmental Protection, Paris.

Pain, D.J. & Pienkowski, M. (1997). *Farming and Birds in Europe: The Common Agricultural Policy and its Implications for Bird Conservation.* Academic Press Limited, London.

Petersen, J.-E. & Feehan, J. (2003). *Agri-environmental Programmes and the Accession countries.* In: Proceedings of the international conference 'EU: CAP and Enlargement — An Opportunity for Nature and Environment?' Ecologic, Berlin.

Pienkowski, M. & Jones, L. (eds.) (1998). *Managing High Nature Value Farmland: Policies, processes and practices.* European Forum on Nature Conservation and Pastoralism, 1999.

Pouliquen, A. (2001). *Competitiveness and farm incomes in the CEEC agri-food sector (Implications before and after accession for EU markets and policies).* Report to DG Agriculture, Brussels.

Prazan, J. (2002). *Agriculture and Environment in the Czech Republic.* National report. IEEP, London. http://www.ieep.org.uk

Redman, M. (2002). *Agriculture and Environment in Malta, Latvia and Lithuania.* National report. IEEP, London. http://www.ieep.org.uk

Šeffer, J., Lasák, R., Galvánek, D. & Stanová, V. (2002). *Grasslands of Slovakia. Final report on National Grassland Inventory 1998–2002.* Institute of Applied Ecology, Bratislava.

Stefanova, V. (2002). *Agriculture and Environment in Bulgaria.* National report. IEEP, London. http://www.ieep.org.uk

Statistical Office of Estonia (2001). *Agriculture 2000.* Tallinn.

Tucker, G.M. & Evans, M.I. (eds.) (1997). *Habitats for Birds in Europe. A conservation Strategy for the wider Environment.* Birdlife Conservation Series No. 6. Birdlife International, Cambridge.

Veen, P.H., Molnar, Z., Pärtel, M., & Nagy; S. (2000). *Linkages between agriculture, nature and environment.* Background report for Wassenaar Conference on EU enlargement, agriculture and environment.

Veen, P.H. & Seffer, J. (eds.) (1999). *Proceedings of the Workshop National Grassland Inventory.* NNV/Daphne, Bratislava, Slovakia.

6. Appendix A

6.1. Policy changes arising from the CAP mid-term reform in 2003

During summer and autumn 2003 the CAP mid-term reform introduced substantial changes in the Agenda 2000 CAP framework[11]. The full range of the mid-term reform decisions cannot be reviewed here but a number of important changes that appear particularly relevant from the perspective of the acceding countries are discussed below (see also Figure 4.1).

Single farm payment (SFP)

During the period 2005–2007 Member States will introduce a single farm payment (SFP) that combines previous arable aid payments (cereals, oilseed and protein crops, set-aside, dried fodder, rice, durum wheat etc.) and current beef, sheep and goat premia.

The key feature of the single farm payment is that it is not linked to specific areas of individual arable crops or to numbers of livestock on a given farm (although Member States can retain such links for parts of the present support payments). The SFP leaves the farmer free to plant any crops and keep any livestock that appear most suitable from an economic and farm management perspective. To receive the SFP the farmer is only required to keep all land on the farm in 'good agricultural and environmental condition' and observe specified environmental legislation ('cross-compliance', see below).

Under the accession agreement the acceding countries already have the possibility to pay direct income payments that their farmers are entitled to in one payment per farm. Most of the ACC-10 countries are currently expected to choose this so-called 'simplified scheme'. Thus, the introduction of the single farm payment may not be a big change for the acceding countries.

Member States can choose to skim off up to 10 % of all single farm payments for use in targeted farm support measures under a 'national envelope'. Payments from this envelope are restricted to encouraging specific types of farming 'which are important for the protection or enhancement of the environment or for improving the quality and marketing of agricultural products'. This measure can in principle be used to focus agricultural support on farming systems or regions that have a close link to special agricultural landscapes or species and habitats. For example, national envelope money could be used for specific support payments to farms that are based on extensive grassland systems in coastal or mountain areas.

With regard to the SFP Member States can use a clause on 'regionalised implementation' for making flat rate payments per hectare on either a national or regional basis. These flat rate payments can be differentiated between arable fields and grassland. This approach can be used for supporting economically marginal grassland systems, but could also take a different focus.

Modulation

In the existing Member States modulation of the SFP will provide additional money for rural development measures. Modulation is the system of retaining a certain percentage of support (3 % in 2005, 5 % from 2007 onwards) from all farms that receive more than 5 000 euro direct payments per year. However, modulation will only apply in the acceding countries once they have reached the same level of direct payments as their EU-15 counterparts, i.e. in 2013. No direct impact of modulation in the ACC-10 is therefore expected for the foreseeable future.

Cross-compliance

Two important environmental measures of the mid-term reform are to make the use of cross-compliance obligatory for Member States and the obligation on farmers to keep all their land in 'good agricultural and environmental condition'. Cross-compliance stands for the principle of cutting or completely withholding direct payments to farmers if they do not comply with a total of 18 legal requirements in the areas of environment, animal welfare, animal diseases

(11) Regulation 1782/2003 and Regulation 1783/2003, OJ L270, 21.10.2003.

and public health from (2005 to) 2007 onwards. The strength of this measure will largely depend on the speed and depth of its implementation by the new and old Member States. However, the introduction of cross-compliance is likely to remain voluntary for the acceding countries until their CAP payment system has been aligned with that of the EU-15 countries (Marangoni, 2003).

The requirement for farmers to keep their land in good agricultural and environmental conditionbliges farmers to follow agricultural practices that limit soil erosion, maintain organic matter content and ensure a good soil structure. Good environmental condition has to be ensured by minimum livestock stocking rates, protection of permanent pastures, retention of landscape features and avoiding the encroachment of unwanted vegetation (such as invasive species or scrub). Member States shall define relevant agricultural and environmental standards. However, this clause could potentially be important for the maintenance of under-managed or abandoned grasslands in the ACC-10, at least in combination with flat-rate area payments, and if cross-compliance is introduced on a voluntary basis.

Market intervention

Two measures among the adjustments to the market regimes have big potential impacts on the acceding countries — the abolition of rye intervention and the introduction of an energy crop payment. Rye is a particularly important arable crop in Poland and the Baltic States that is used as animal feed and for bread making. The abolition of market support for rye is likely to lead to a partial substitution of rye by wheat and other cereals.

The 2003 CAP reform has introduced a payment of 45 euro per ha for energy crops on a total of 1.5 million ha in the EU-15 where the farmer has a contract with a processing plant. It is not yet clear how large the entitlement area for energy crop payments will be in the ACC-10, although the support rate will be equivalent to that of direct payments (starting at 25 % of EU-15 level in 2004). However, as several ACC-10 countries have a substantial biofuel processing industry and economic yields are generally lower in the acceding countries than in the EU, the energy crop payment could have considerable uptake in the ACC-10 when introduced.

Rural development measures

The 2003 reform has introduced several changes to the rural development measures under the CAP. The measure that seems most relevant to environmental farm management in the ACC-10 is the introduction of a farm advisory system, voluntary for Member States until 2006, obligatory thereafter. This system will provide farm audits to help farmers ensure that their holding is complying with environment, food safety and animal welfare standards. Participation for farmers is voluntary but encouraged through co-financing of the audit costs as well as necessary investments via new rural development measures. Public farm advisory services in many ACC-10 countries have been strongly reduced during the last 10 years, despite the need of farmers for professional advice, particularly on environmental issues. Thus, this new measure could have a very positive impact in the ACC-10 if implemented in a substantive way.

The mid-term reform also raised the co-financing rate for agri-environment schemes to 60 % (85 % in Objective 1 areas). Nearly all regions in the ACC-10 will gain Objective 1 status on accession. However, the rural development co-financing rate agreed at the Copenhagen European Council already lies at 80 % for the new Member States. It remains to be seen, therefore, whether the 5 % advantage of agri-environment schemes compared to other rural development measures will have a significant impact on their attractiveness for ACC-10 governments.

Lastly, new measures that are optional for Member States have been introduced for raising animal welfare standards as well as for farm quality production and assurance schemes. Their uptake will depend on ACC-10 governments. In any case, these measures are not expected to be important for the environmental impact of agriculture.