UNITED
NATIONS

E

Economic and Social
Council

Distr.
GENERAL

CEP/AC.10/2002/27
25 June 2002

ORIGINAL: ENGLISH

ECONOMIC COMMISSION FOR EUROPE
COMMITTEE ON ENVIRONMENTAL POLICY

Ad Hoc Working Group on Environmental Monitoring
(Third session, 29-30 August 2002)
(Item 3 (b) of the provisional agenda)

KIEV ASSESSMENT: DRAFT CHAPTER ON AGRICULTURE

Submitted by the European Environment Agency (EEA)

Summary

European agriculture is extremely diverse, ranging from large, highly intensive and specialized holdings run as businesses to subsistence farming using traditional or extensive agricultural practices. Consequently, pressures on the environment vary in scale and intensity and may be positive or negative. There is a significant environmental legacy associated with agriculture in the countries of Central and Eastern Europe and the newly independent States (NIS), where exploitation of resources (such as freshwater for irrigation) was excessive. The dramatic decline in resource use in these countries, largely due to economic restructuring rather than policy, consumer or technological developments, has eased many environmental pressures. However, land abandonment, undergrazing and lack of capital to maintain or improve farm structures are creating new environmental problems.

The Common Agricultural Policy (CAP) has been a significant driver of farm intensification in the European Union (EU), although there has been substantial progress to introduce opportunities, via agri-environment schemes for example, for farmers to reduce the pressure on the environment. For the Central and East European countries and NIS the window of opportunity to ensure reduced environmental pressure from agriculture is closing. There is concern that agriculture will intensify for Central and East European countries when they join the EU and have access to CAP, although there is an evolving agri-environmental policy framework and limited financial opportunities under the Special Accession Programme for Agriculture and Rural Development (SAPARD) to address this risk. There is little or no agri-environmental policy framework in NIS and few opportunities for farmers to address current agricultural pressures on the environment.

1. The development of agriculture during the 1990s was influenced by continued technical change, the rationalization of agricultural structures, evolving market demand and a number of shifts in policy.

2. For EU countries, influenced by a number of factors including CAP, the specialization and intensification of farming practices have resulted in a decrease in the number of farm holdings and farm employees. The intensive use of land, dependency on fertilizers and pesticides, and demand for energy are a result of the desire to maximize outputs, often encouraged by yield-based payments under CAP. Reforms of CAP and public concerns about production methods are providing new opportunities for financing agri-environment schemes as part of rural development programmes.

3. The rural sector, and specifically agriculture, plays an important role in the economies of Central and Eastern Europe and NIS. Their share of agriculture in employment and national income is far greater than the average in EU countries. While the regional proportion of the agricultural population was 17% in 1997, it contributed 9% to the region's GDP compared to less than 3% in Western Europe (Norsworthy, 2000). During the socialist era, government planning, without regard to efficiency or comparative advantage, determined agriculture and food production. In 1990, the average farm size in Central and Eastern Europe and NIS was about 15 300 ha for State farms and 5 900 ha for collective farms, of which there were generally more. The early 1990s were a watershed in most Central and East European countries and NIS, which experienced dramatic changes in landownership and farm structures as well as rapid changes in market conditions and a lower overall rate of support. Reforms of the agricultural sector have been much faster in Central and Eastern Europe than in NIS and recovery noticeably quicker.

4. During the early 1990s a significant overall decline in production occurred in Central and Eastern Europe and NIS, with some recovery apparent at the end of the decade. Between 1990 and 1996 agricultural production was an estimated 50% below the 1988-90 level. However, regional differences are now more apparent with the rapid decline in production halted in 1993-94 and modest increases in outputs now evident in Central and Eastern Europe. Agricultural production has started to grow in few NIS, notably in the Caucasus region.

5. Different conditions and trends exist in the Mediterranean accession countries. The extent of agriculture varies widely. For instance in Turkey 25% of the labour force is employed in agriculture and 14% of the GDP can be attributed to agriculture, whereas in Cyprus and Malta agriculture accounts for 4% and 2% of GDP respectively. The types of agriculture also differ in these countries. Unlike the Central and East Europe countries and NIS, which faced major reductions in the use of inputs, one of the main issues for Cyprus, Malta and Turkey is the prevention or control of the detrimental effects on the environment of future agricultural development. In the Mediterranean countries intensification has taken place and, in Turkey for instance, the area of steppe grassland was reduced from 59.8% to 31.1% of the total agricultural landscape between 1950 and 1984. No agri-environment initiatives have been established in these countries. This is partly because they have not been eligible for funds to develop agricultural methods that protect the environment.

6. Throughout Central and Eastern Europe and NIS an increased environmental awareness and recognition of the complexity of rural socio-economic problems is apparent. However, there are significant regional disparities with accession to the EU being a major driving force in influencing agricultural policy and activities in Central and Eastern Europe, Turkey, Malta and Cyprus. Pre-accession instruments, notably SAPARD, are assisting this process, although most of these grants are oriented towards improving the competitiveness of the agri-food sector rather than agri-environment measures and are only available to Central and Eastern European countries. The obligation to implement EU legislation such as the Water Framework Directive, Nitrates, Birds and Habitats Directives after accession is, however, providing a powerful incentive to integrate environmental considerations into agriculture.

7. For NIS, it has been market reforms, rather than agri-environmental policy or the integration of environmental actions into the agricultural sector, which have been the principal drivers of change. Many of the international financing institutions (IFIs) cooperate with NIS in providing grants and loans to develop strategies and actions to mitigate the impact of agriculture on the environment.

I. TRENDS IN EUROPEAN AGRICULTURE

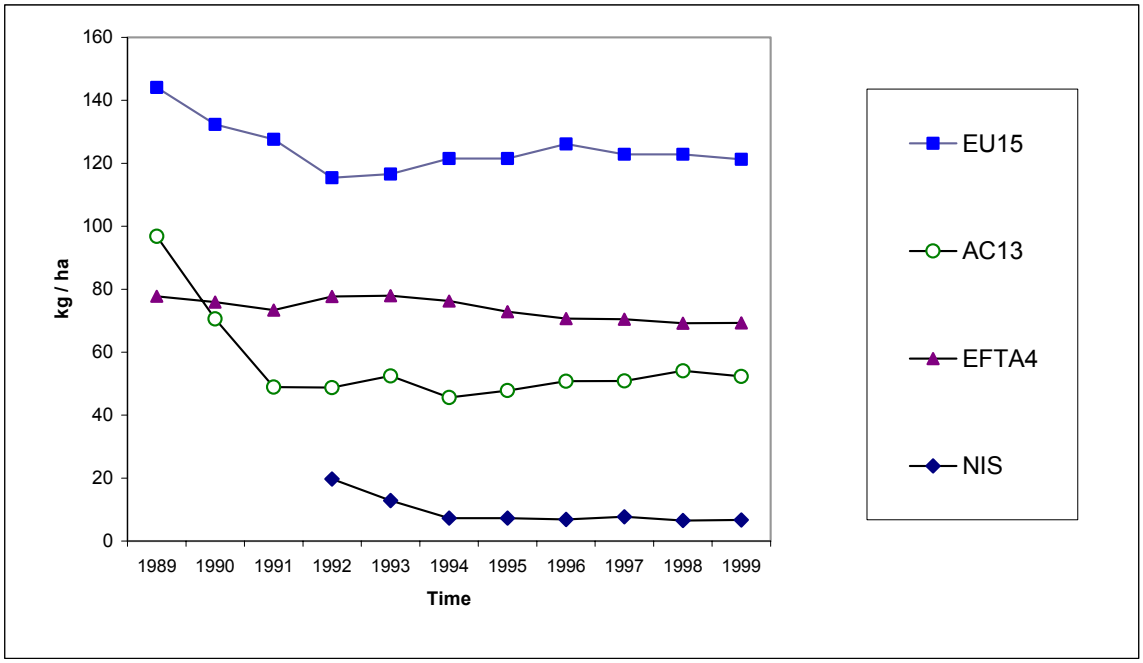
8. The extent and causes of environmental impacts of agricultural practices vary significantly across Europe, particularly by farm and crop type. As a result of the continued search for efficiency, lower costs and increased scale of production, pressure is applied on the different environmental media, landscapes and biodiversity, particularly in the most intensively farmed areas. At the same time, agriculture remains essential to the maintenance of many cultural landscapes. This dual role is found throughout Europe, with high-nature-value farming systems most prevalent in areas with more traditional low-input systems.

9. In Western Europe, intensification of agriculture encouraged by CAP has occurred, taking various forms, including intensive sustained use of chemical inputs, increasing field sizes, high stocking densities, discontinuation of crop rotations and leaving land fallow, and increased use of zero grazing and maize as a fodder crop. In Central and Eastern Europe and NIS, central planning without due regard for the environment and giving farmers no control over land or water was the principal reason for the many negative impacts of agriculture on the environment and biodiversity.

10. Technological developments have been facilitated by continued research and investment in agriculture. These result both in greater mechanization combined with the abandonment of traditional practices and improvements in efficiency. Some of the latter, such as the development of less toxic pesticides, can be environmentally beneficial.

A. Fertilizer consumption

Figure I: Mean fertilizer (N, P, K) consumption per area of agricultural land



Note: For thirteen accession countries (AC13) data were not available for Estonia, Latvia and Lithuania until 1993, for Slovakia and the Czech Republic until 1992 and Slovenia until 1990. The graph expresses mean fertilizer consumption (N, P and K) per mean hectare of agricultural land (a complete time series of used agricultural area was not available) for all countries where data were available.
Source: Food and Agriculture Organization of the United Nations (FAO).

11. Inorganic fertilizer consumption in the EU is higher than in Central and Eastern Europe and NIS, although overall there has been a decline in consumption, most notably in Central and Eastern Europe and NIS (figure I). There has been a significant increase in the use of nitrogen fertilizers in Ireland, Spain and the United Kingdom. The European Fertilizer Manufacturers Association (EFMA) predicts that nitrogen use will decline by 6% between 2001 and 2011, potassium by 12% and phosphorous by 14% as a result of improved farming efficiency, mechanization and the use of high-yielding varieties. Legislation such as the Nitrates Directive (EC 91/676) seeks to limit nutrient losses from farming to freshwater bodies. However, agriculture continues to be the main source of nitrate pollution in Europe since remedial measures can be more readily targeted on diffuse point source inputs, such as sewage and industrial effluent.

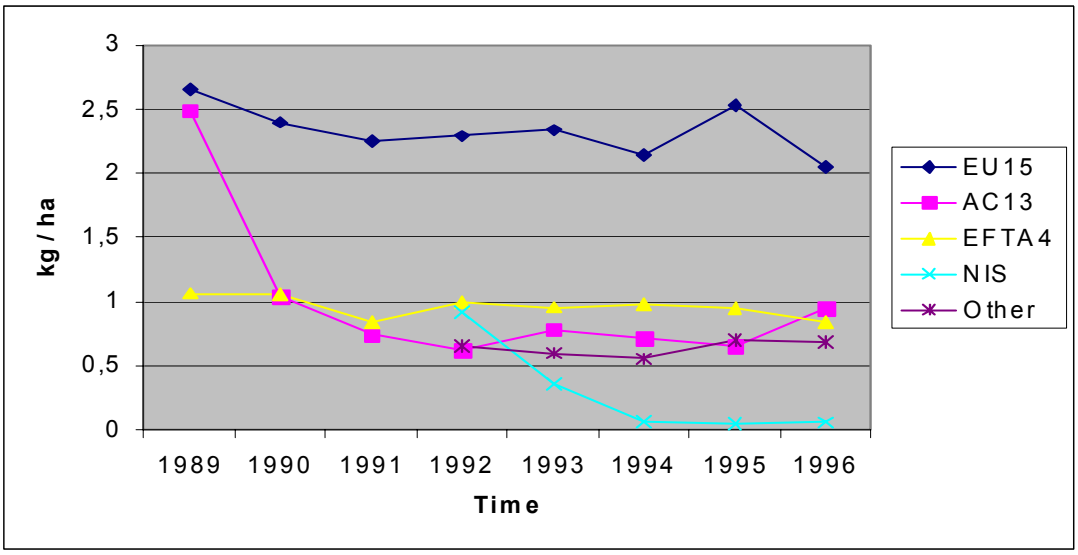
12. Between 1987 and 1998 there has been a 84% decline in average fertilizer consumption in Central and Eastern Europe and NIS due to reduced market opportunities, declining profitability, reduced State support and the widespread reorganization of farming in the region. In countries such as Hungary, Croatia and the Czech Republic, arable support payments have been conditional on the use of arable fertilizers. However, consumption is expected to increase in accession countries as they adjust to new conditions and integrate CAP (EFMA, 2001).

13. Despite reductions in fertilizer consumption, N and P enrichment of waters across Europe is widespread. More than half of all nutrient loads into the Danube River originate from agriculture (Haskoning, 1994), with similar contributions into the Baltic Sea from the nine bordering countries. For the Danube basin, fertilizer inputs will have to be maintained at approximately 50% of their 1991 levels in Bulgaria, Romania and Hungary to prevent further eutrophication of the Black Sea (WWF, 2000).

😐	Fertilizer consumption has declined overall, although for the 13 accession countries that trend appears recently to have been reversed.

B. Pesticide indicator

Figure II: Total pesticide (active ingredient) consumption per area of agricultural land



Note: The pesticide data set had an incomplete time series for Germany, Greece, Ireland, Netherlands, Portugal, Belgium-Luxembourg, Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Malta, Slovakia and Slovenia. Many of the data for NIS were missing. The graph expresses mean consumption of pesticides (active ingredients classed as insecticides, herbicides, fungicides and others) as a percentage of mean area of agricultural land (a complete time series of used agricultural area was not available) for all countries where data are available.
Source: FAO.

14. Across Europe there is a general trend towards reduced pesticide consumption as measured by the mass of active ingredients applied, although this is not necessarily a good guide to the environmental burden imposed. This rather depends on the pollution risk at the time of application: a function of soil conditions, slope, weather and proximity to watercourses. In Central and Eastern Europe and NIS there has been a significant decline in consumption compared to the EU, where overall consumption is much greater (figure II).

15. Pesticide pollution in drinking water, surface water and groundwater is considered the major environmental problem associated with pesticides. Many groundwater supplies are exceeding the EC maximum of 0.5 ug/l. In addition to water quality problems, pesticides have also been linked to habitat damage and biodiversity loss (box 1). Integrated crop management

(ICM), although only representing about 3% of the used agricultural area in EU encourages better-targeted use and a reduction in the application rates of pesticides (box 1).

16. For many of the Central and East European countries and NIS localized hot spots of pesticide contamination are common and associated with a surplus of pesticides. The estimated total obsolete stocks of pesticides amount to 60 000 tons in Poland, 20 000 tons in the Russian Federation and 20 000 tons in Ukraine (Jensen, 2000).

Box 1

Changes in pesticide use – Central Asia

The use of pesticides in Kazakhstan has been an important component of agricultural production. The government financed pest control campaigns against exotic insects such as locusts and the Colorado beetle. However, since 1992 farmers have had to finance the purchase of pesticides themselves. Due to economic circumstances this has resulted in a dramatic reduction in pesticide consumption. Between 1985 and 1997 the pesticide load decreased from 0.57 kg/ha of active ingredient to 0.13 kg/ha. Despite the reduced pressure from pesticides, a legacy still exists with many watercourses, including the Syr-Darya, heavily polluted with DDT, DDD and DDE. The same is also true for large expanses of soil contaminated with organo-chlorine pesticides.

Source: L. Pak, Proceedings of regional awareness raising workshop on POPs, UNEP-Chem (1998).

…and Europe

The adoption of the concept of ICM is slowly gaining acceptance in the EU countries (about 3% of used agricultural area. Evidence suggests that practising ICM can lead to a reduction in pesticide leaching and, through general reductions in the application of pesticides, can lead to a reduction in the risk of pesticide residues building up in the soil. Since ICM systems promote the reduction of pesticides and fertilizers, there are also likely to be positive benefits for biodiversity.

Source: ICM systems in the EU – amended final report for EC DG Environment (2002).

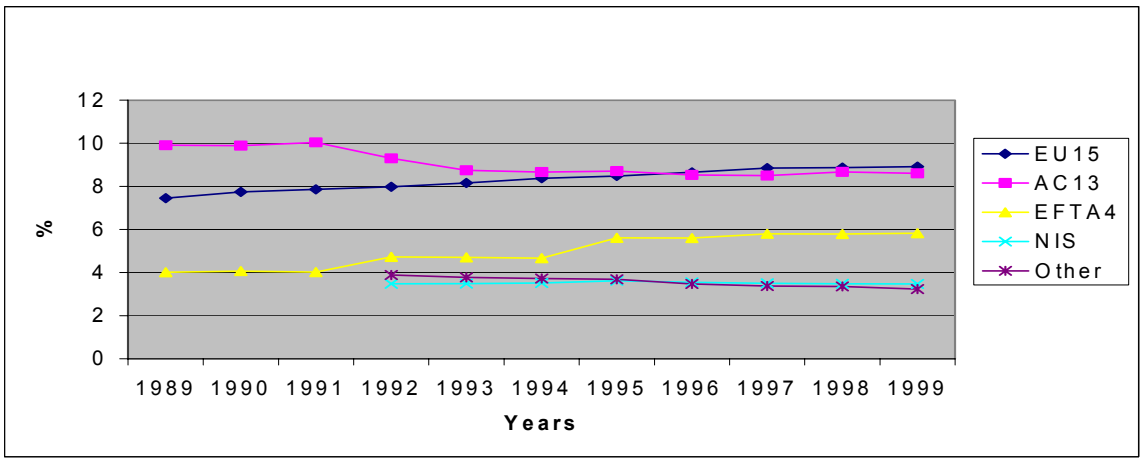
😐 Although pesticide consumption has declined overall, crop production continues to rely heavily on chemical treatments. Crops such as cotton grown in NIS receive heavy pesticide doses that, coupled with poor pesticide management, give rise to localized hot spots.

C. Irrigated area

17. The scale and importance of irrigation are significantly greater in Southern Europe but irrigation is also used in most northern countries. Irrigated area has increased in the EU notably in France, Greece and Italy whilst in Central and Eastern Europe and NIS there has been an overall decrease (figure III). The intensity of irrigation varies between countries and depends on climate, crops grown and farming practices. In Southern Europe and Central Asia irrigation is essential in providing economic yields and results in high water demands, while in Central and Western Europe irrigation is used to ensure yields in dry summers. Irrigated area is greatest in Central and Eastern Europe and NIS, particularly in the Russian Federation, Kazakhstan, Ukraine, Uzbekistan, Romania, and Turkey.

18. Many heavily irrigated regions of the Central and Eastern Europe and NIS and Southern Europe are characterized by lowering water tables, land degradation and desertification, salinization and destruction or degradation of wetlands and aquifers (box 2).

Figure III: Average irrigated land area as per cent of agricultural land area



Note: Irrigated area data were not available for Estonia, Latvia, Lithuania and Slovenia until 1992; the Czech Republic and Slovakia until 1993; for NIS until 1992; for Bosnia and Herzegovina, Yugoslavia, the former Yugoslav Republic of Macedonia, Croatia and NIS until 1992. Albania was not included in the other grouping since it significantly skewed the graph, however the irrigated area accounted for about 30% of the agricultural area in 1990, a decline of 6% since 1986. The group of four countries of the European Free Trade Association (EFTA4) includes Switzerland and Norway only. The graph expresses mean irrigated area as a percentage of mean area of agricultural land (a complete time series of used agricultural area was not available) for all countries where data are available. No distinction was made between total irrigation areas and actual irrigation volumes.
Source: FAO.

Box 2

Southern Europe

In Spain, arable production has become more intensive through the expansion of irrigated crops, resulting in a loss of steppe habitats and traditional non-irrigated crops, and the loss of breeding areas for birds such as the great bustard (*Otis tarda*). The surrounding area of Las Tablas de Daimiel has been intensely irrigated. The wetland, which is a specially protected area and a Ramsar site, has shrunk by 60% as a result of the exhaustion of the aquifer that feeds the La Mancha wetlands. Salinization of the groundwater and contamination and eutrophication of the surface water has also occurred, in addition to a reduction in nesting areas due to changes in vegetation, peat fires and land subsidence.
Sources: Baldock et al (2000) and WWF (2000).

Central Asia

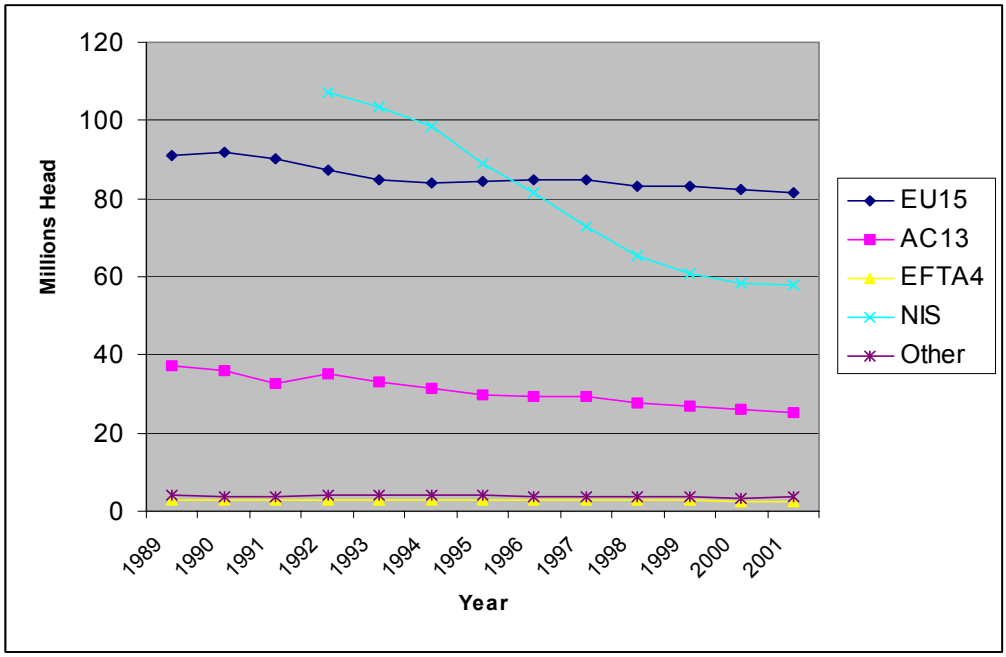
Central Asia, in the former USSR, was allocated the role of raw material supplier, principally cotton. To ensure competitive yields, an extensive irrigation scheme encompassing the Amu-Darya and Syr-Darya river catchments was undertaken. Between 1960 and 1995 the irrigated area increased from 4.5 million ha to 8 million ha. Per kilogram of product, cotton is the most intensive freshwater crop and in Uzbekistan freshwater consumption by agriculture amounted to 84% in 1989. To avoid waterlogging and salinity of soils, drainage systems are used and the fields irrigated with additional freshwater to remove salts from the soil. The returned salt-contaminated drainage water contains pesticide residues and fertilizer and has a severe impact on the rivers and wetlands. The traditional ecosystem of the two deltas of the Amu-Darya and Syr-Darya has perished and due to excessive water demands the Aral Sea is drying up.
Sources: http://www.fao.org/ag/AGL/aglw/aquastat/regions/fussr/index.htm and WWF (1999).

☹ Irrigated area is increasing in the EU and despite the fall in Central and Eastern

Europe and NIS large areas are still irrigated and there is a recent reversal in the downward trend. Turkey, Cyprus and Malta have significantly increased their irrigated area. In many irrigated areas excessive water use is common and agricultural practices are more intensive, causing an increased burden on the environment.

D. Livestock numbers

Figure IV: Cattle numbers



Note: Data were not available for Bosnia and Herzegovina, Estonia, Latvia and Lithuania until 1992 and Slovakia until 1993. For NIS a complete time series is available from 1992. Similar trends in livestock numbers for the country groups are seen for sheep, pigs and goats for the 13 accession countries and NIS, whilst in the EU there has been an increase in pig and sheep numbers.
Source: FAO.

19. Overall numbers of cattle, pigs, sheep and goats have decreased in Central and Eastern Europe and NIS, but in the EU there has been an increase in pig and sheep numbers (figure IV). In the EU this has been coupled with a decrease in total agricultural area used by these types of farms, reflecting the trend towards specialization and intensification. High livestock population densities are associated with excessive concentrations of manure - leading to an increased risk of water pollution. Poor or non-existent containment measures in Central and East European countries such as Poland and Romania are giving rise to localized hot spots of nutrient loading (JRC, 2000) and this is also the case in NIS. The contribution of livestock to gaseous emissions is also significant - approximately 80-90% of total EU ammonia emissions (from animal housing) and 30% of total methane emissions arise from animal husbandry.

20. Overstocking in the EU can partly be attributed to the provision of production incentives, including headage payments under the CAP, although socio-economic drivers have also encouraged some regionalization of livestock production and localized overgrazing. The loss of traditional extensive livestock grazing systems and a decline in pastoralism have had particularly negative effects on biodiversity. Overgrazing in vulnerable environments (such as uplands and heather moorlands) can also negatively impact biodiversity.

E. Biodiversity and semi-natural grasslands

21. Much of the biodiversity in Europe is found on, or adjacent to, farmland and is therefore considerably affected by agricultural management practices. Overall, for example, agricultural habitats support the largest number of bird species of any broad habitat category in Europe, including the greatest number of threatened species (Heath and Tucker, 1994).

22. In Central and Eastern Europe and NIS the status of biodiversity is better than in the EU, although a problem is emerging with land abandonment and undergrazing. This is resulting in succession and the overgrowth of grassland areas, and a consequent loss in biodiversity.

23. Due to the relatively small area of undisturbed natural habitat that remains in Europe, semi-natural habitats are particularly important for nature conservation. Extensive grasslands are a key semi-natural habitat with high biodiversity. Some Central and East European countries have a relatively high proportion of semi-natural grassland, amounting to more than 50% of the used agricultural area in Slovenia (Veen, 2001). However, if agriculture intensifies such habitats will come under considerable pressure from agricultural activities (box 3), giving rise to significant biodiversity loss (Donald et al, 2001). On the other hand, land abandonment is a bigger problem at present. In Estonia, for example, about 30% of the 1.5 million hectares of farmland is abandoned (source: Estonian Ministry of Agriculture). This proportion is even higher for permanent grasslands (56%). Of the semi-natural grasslands of medium or high nature value (37,000 ha), only 40% is still under management (Mägi & Lutsar, 2001). In general, it may be assumed that extensive farmland, important to biodiversity, is more severely affected by land abandonment than the overall land abandonment figures suggest.

Box 3

Central and Eastern Europe

Extensive semi-natural grassland in Hungary (Hortobagy-Puszta) has provided a valuable habitat for many grassland species, such as the great bustard (*Otis tarda*), black-tailed godwit (*Limosa limosa*), roller (*Coracias garullus*) and imperial eagle (*Aquila heliaca*). Re-privatization processes and market pressures have, however, led to a shift to cash-crop production, and the conversion of grassland to maize and sunflower production. Approximately 75,000 ha of semi-natural grassland was lost between 1987 and 1994, and conversion to arable remains a continued threat to the high ecological value of semi-natural grassland of the region.

II. OUTLOOK

24. EU agriculture is likely to continue to specialize and CAP reforms should seek to further mainstream environmental measures into agricultural policy. Current low-input agriculture and extensive agriculture in the 13 accession countries provide a window of opportunity for creating an environmentally sustainable agriculture. Future EU membership could result in a return to more intensive agricultural practices unless agricultural policies are adapted to allow the mutual coexistence of farming with biodiversity, such as the adoption of agri-environment schemes under pre-accession programmes. There is a large untapped agricultural potential in the NIS that may give rise to agricultural intensification as the economies of these countries strengthen. For both the 13 accession countries and NIS continued support is required to mainstream the environment into the agricultural sector. This would help to develop an agri-environmental policy framework; strengthen the extension services particularly in the provision of agri-environmental advice and training materials; and the provision of grants to improve or construct animal waste storage units. Improved monitoring and data are required to enable a more detailed assessment of the impact of agriculture on the

environment. For the EU and the accession countries such developments are in hand but, through cooperation, they should be extended to include NIS.

References [to be completed]

Mägi, Matis and Lutsar, Lauri, 2001. Inventory of semi-natural grasslands in Estonia 1999-2001. Estonian Fund for Nature & Royal Dutch Society for Nature Conservation, 2001.