

3.13. Rural areas - our link to the land

Rural areas in the EU (80% of the territory and approximately 25% of the population) have undergone and are undergoing major adjustments. These changes are partly the result of agricultural policies, but there are other driving forces (spatial and sectoral) which affect rural areas – in this context EU and national policies for regional development, tourism, forestry and transport are particularly important. Additionally, rural areas close to major urban centres are still showing progressive urbanisation trends (Map 3.12.3, Chapter 3.12). The environmental impact of these different policies and trends is expressed in terms of land use and landscape changes, environmental pollution, changing demographics, reduction in agricultural employment, biodiversity loss, and diversification of the rural economy.

To many observers it is now clear that the long-term viability of rural areas and the rural environment can no longer be achieved simply by support for agricultural production or through compensatory measures alone. Rural policies need to take a multi-sectoral approach within a territorial or spatial framework and to pay attention to other internal and external trends which interact in a dynamic way.

1. The changing nature of the rural world

1.1. What is 'rural'?

A number of principle features generally associated with each type of rural area can be identified, derived from Europe 2000+ (European Commission, 1994) and the OECD classification (OECD, 1994a) (Table 3.13.1) (see Box 3.13.1).

An important factor in defining 'what is rural' is the importance of small and medium-sized towns as factors within the rural economy. The interplay between these smaller urban centres and their rural hinterland is vital for both, yet there is still a tendency to treat them as discrete homogeneous units within a territorial space.

There are various definitions and classifications of rural areas but no agreed EU categorisation; most Member States use classifications based on socio-economic criteria.

1.2. What drives the changes?

Rural areas are extremely diverse in nature and character – for example with respect to land use and economic development – and are subject to a variety of different pressures and societal trends, although public policies do not always acknowledge this (Sallard, 1998). The impact of highly centralised sectoral policies in this context varies widely as do the environmental consequences, and analysis of these trends in rural areas to date has tended to be contained within global discussions on the impact of agricultural policies and practices or the effects of urbanisation, forestry, tourism and economic development. This has ignored the underlying territorial dimension of such trends and impacts.

Their effects on rural areas cannot be uniformly characterised nor can they be examined in isolation as they invariably interact with each other, the impact of which can only be observed at a regional or local level.

The impacts of agricultural policies on farming practices are manifested in changing demographics, economic activities and land use (section 2.1 below), or in terms of impacts on environmental media such as soils and water (section 2.3 below), and nature/biodiversity (see also Chapters 3.5, 3.6 and 3.11).

Principal features generally associated with rural areas based on spatial and functional issues

Table 3.13.1

Predominantly rural regions	Significantly rural regions	Predominantly urban regions
high relative importance of agriculture	agriculture is the main form of land use	intensive agriculture
low productivity	variable productivity	high productivity
high biodiversity	fragmented habitats	urbanisation
shifts in land-use to forestry, tourism and non-farm activities	diversification away from farming	recreation
remote in time or space	stable/variable population	growth in traffic flows
decreasing and ageing population		increasing/stable population

Source: after European Commission, 1994 (Europe 2000+); OECD, 1994a; and Hengsdijk, 1990

Box 3.13.1 Defining 'Rural'

The European Commission regards 'rural areas' as a spatial phenomenon that extends across regions, landscapes, natural areas, agricultural land, villages and other larger urban centres, pockets of industrialisation and regional centres. It encompasses a diverse and complex economic and social fabric. It is the home of a great wealth of natural and cultural resources and traditions. It is becoming more important as a place for relaxation and leisure activities. This definition illustrates the breadth of the issue, but is not useful from an analytical point of view.

Both the OECD and EUROSTAT define rural areas in terms of population density. For the OECD, rural areas are those with less than 150 inhabitants/sq. km while EUROSTAT uses a figure of 100 inhabitants/sq. km.

In its report *Europe 2000: Co-operation for European Territorial Development (1994)*, the European Commission attempted to describe changes and trends in rural areas on the basis of dominant activities or characteristic spatial features:

Rural areas close to highly urbanised areas – characterised by:

- residential, recreational, industrial overspill
- growth in population
- intensive agriculture
- growth in traffic flows.

Rural areas used for tourism – characterised by:

- predominantly coastal and mountain areas often equipped for mass tourism
- reduction of agricultural activity
- development of agglomerations
- fragmentation of habitats.

Rural areas with diverse activities – characterised by:

- continuing highly dependence on agriculture
- development of complimentary activities.

Rural areas that are predominantly agricultural – characterised by:

- agriculture either highly productive or efficient
- traditional or weak with low productivity.

Rural areas where access is difficult – characterised by:

- areas of mountains, islands, forests
- high out-migration
- inward migration of retirees/second homes.

While providing a trends-oriented characterisation of rural areas, it does not provide a specific spatially referenced context for analysing trends in economic, social and environmental issues in rural areas.

To try to address this, the OECD has developed a classification of rural areas based on the **percentage of the population of a country living in rural communities**. Essentially, three broad classes of rural areas or regions have been distinguished. Predominantly rural (>50% of the population living in rural communities), significantly rural (15% – 50% of the population living in rural communities) and predominantly urban (<15% of the population living in rural communities). This classification can be spatially referenced with a reasonable degree of accuracy throughout the European Union and has been used to analyse a variety of socio-economic trends.

EU Regional policies including Less Favoured Areas (LFAs – see box 3.13.2)) payments, are focused on promoting economic and social cohesion and reducing regional disparities in terms of specific economic and physical indicators such as water supply, transport and telecommunications.

Rural areas and rural development are also an important part of the EU's regional policy instruments, the Structural Funds, and are included in specific, territorially defined regional objectives (Map 3.13.1). Altogether these objectives cover nearly 75% of the

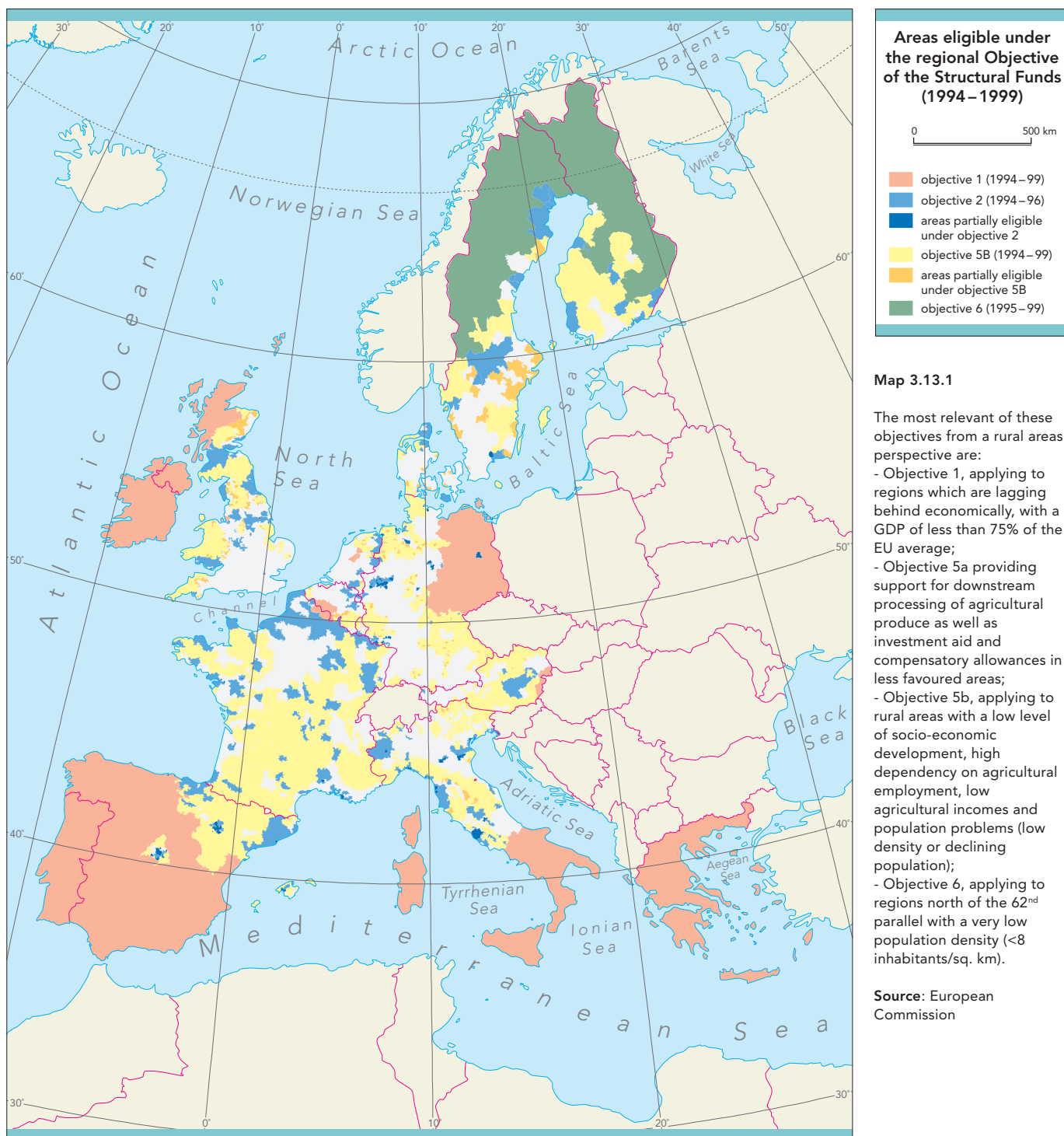
territory of the EU and almost 35% of the population (European Commission, 1997a).

EU transport policies including the Trans-European Networks (TENs) have the potential to affect rural areas in both socio-economic and environmental terms. By creating or improving linkages between major urban or economic centres and dynamic regions, these networks could encourage the 'emptying' of the countryside. Conversely, they could increase trends in commuting and actual migration of population into rural areas. Both of these trends have environmental consequences.

EU environmental policies are becoming more important in rural areas particularly with respect to the protection of important biodiversity resources and water resources management. For example, the designation of protected areas – such special protection areas (SPAs) under the Birds Directive (79/409/EEC) and special areas of conservation (SACs) under the Habitats Directive 92/43/EEC) are designed to protect and

Box: 3.13.2 Less Favoured Areas – a definition

Set up in 1975, the Less Favoured Areas (LFAs) schemes provide 'compensatory allowances' to farmers in mountainous areas or in other areas where the physical landscape results in higher costs. In future, LFA schemes will also cover areas subject to specific environmental constraints, ensure greater coherence with environmental needs and contribute to enhancing biodiversity.

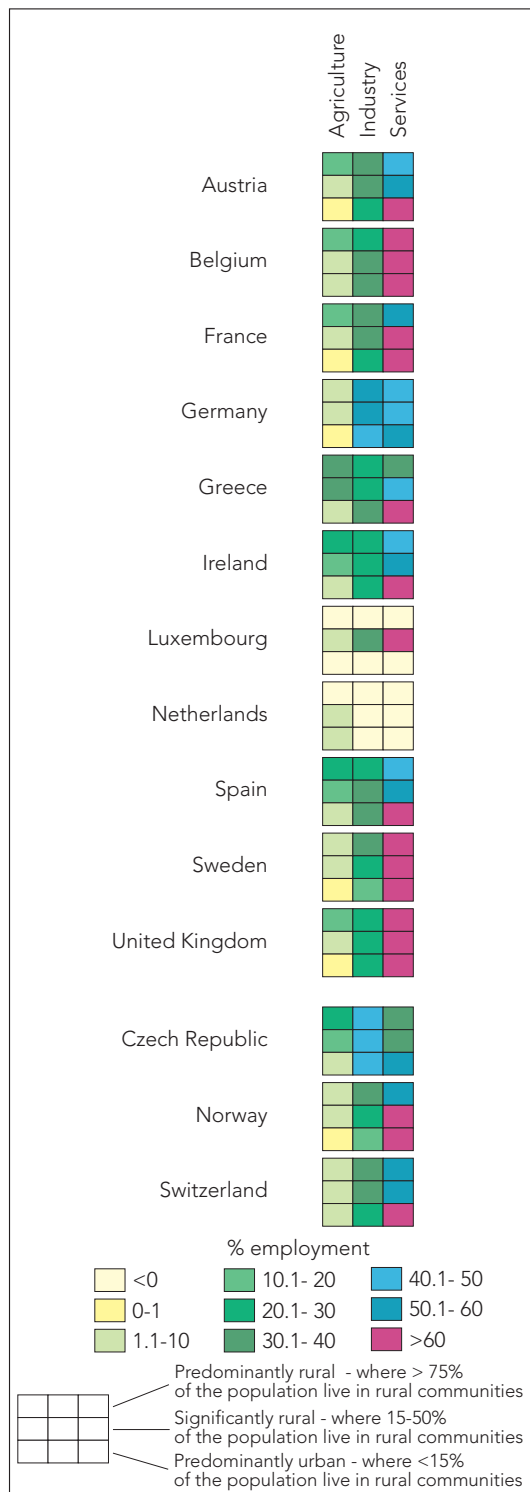


conserve important areas of biological diversity that are either greatly reduced or are under threat from human activities. These policy instruments can have significant implications for agricultural and forestry practices. However, it is possible to view them positively within a broader multi-functional approach to agriculture. For instance, while being less specific than the Directives mentioned, agri-environmental measures (see section 3 below) and measures in LFAs contribute on a broader scale to the preservation of landscapes and semi-natural habitats.

The full implementation of such measures will mean that large areas of the territory of the European Union (and ultimately the prospective Accession Countries) are influenced by specific environmental or agri-environmental policies. The implications of this is variously seen as being a constraint and an opportunity for rural areas within the Member States, depending on their agricultural situation and existing land use policies.

Figure 3.13.1 Employment structure in European rural areas

Source: OECD, 1996



than 16% of the EU territory. In recent years there has been a continuing decline in the population of predominantly rural areas, while in predominantly urban areas and some intermediate areas population levels have been generally stable (European Commission, 1997a).

The proportion of the population living in rural communities varies from less than 10% in the Netherlands and Belgium to over 50% in Sweden and Finland. Some countries – notably Spain, France and Italy – have large populations categorised as ‘significantly rural’, or – especially in Ireland, Portugal and Greece – a population distribution which displays a strong urban/rural dichotomy (OECD, 1996).

These differences in population trends are closely related to the changing nature of rural economy and the changing nature of the rural-urban interface. Enhanced mobility is the key factor with regard to the latter in significantly rural and predominantly urban regions (see Table 3.13.1).

In areas with rising populations and rapid economic growth, increased pressure on environmental resources is observed in the form of waste generation, increased water and energy consumption and declines in air quality largely from growing traffic movements. In declining areas it may result in abandonment of land, shifts in land use (e.g. towards forestry) and possible loss of traditional landscape management practices with consequences for the cultural and natural heritage.

2.1.2. Economic activities

Being ‘rural’ is not synonymous with economic decline. Rural development paths can take many forms and that the dynamics of rural areas are more complex than would first appear. While some rural areas still struggle with agricultural restructuring and population decline, others have been more successful in re-organising agricultural production or have continued to develop their agri-foodstuffs sector. Other areas are benefiting from the re-location of enterprises and population away from congested urban areas to rural areas (Sallard, 1998).

The agri-foodstuffs industry is an important employer in rural areas of the EU (and in the EFTA and Accession Countries), accounting for 7.9% of the jobs in industry and over 2.3% of the total level of employment within the EU in 1996 (EUROSTAT, 1997).

2. The effects on the rural environment

2.1. The regional diversity of Rural areas

2.1.1. Population

Nearly 17.5% of the EU’s working population live in rural communities, of which about 10% live and work in pre-dominantly rural areas while about 60% live in pre-dominantly urban areas which represent less

This industry is particularly important in the UK, France, Greece, the Netherlands, Denmark and Ireland and its continued development will promote agricultural activity and rural employment.

The rural economy is increasingly concerned with non-agricultural sectors (industry and services) which are experiencing strong employment growth. Agriculture now accounts for only 5% of employment in the EU (EUROSTAT, 1998), although the proportion is much higher in predominantly rural areas in Spain, Ireland, Greece, Portugal and Italy (OECD, 1996). There has been a net increase in employment in all non-metropolitan regions with the exception of Greece and Finland where employment growth is still strongest in metropolitan areas. These trends in employment are closely correlated with changing demographic trends. Fig 3.13.1 shows the situation in predominantly rural areas where at least every second job is in the service sector (OECD, 1996).

Tourism is emerging as the new 'cash crop' for rural areas, and as an alternative to farming employment (as for example in the Alpujarras region of Spain – Sharpley & Sharpley, 1996). Such trends could have implications for continued traditional farming practices related to nature conservation and landscape management.

2.1.3. Land use

Agriculture accounts for over 40% of the total land area within the EU. Forestry accounts for a further 36%. Despite being a minority activity, agriculture still retains a dominant role in relation to land use and the appearance of the countryside. However, over the past 20 years, the area of land in productive agriculture fell by 5% while at the same time there has been a small increase in forested land. Much of the land lost to agriculture has been through urbanisation and – in marginal areas – by abandonment of land (Chapter 2.3).

Over the years, trends related to agricultural policy – intensification, marginalisation, specialisation and concentration – have resulted in an increasing spatial differentiation of rural areas in terms of economic, social and environmental outcomes.

In terms of concentration and intensification, the most striking spatial feature is the fact that 80% of the EU's intensive agricultural production occurs in coastal areas of the North Sea and the English Channel, in a

corridor stretching from Brest to Copenhagen and around Rouen and Rotterdam (IEEP, 1998). Why has this happened? A combination of physical, biogeographic and economic factors have essentially conferred a substantial competitive advantage on these regions from an agricultural point of view. This combination has also had environmental consequences in terms of water, soils and biodiversity.

Marginalisation is another consequence of current and expected agricultural developments. This has spatial consequences inasmuch as the most vulnerable areas are regions with extensive agricultural systems such as the *dehesas* and *montados* in Spain and Portugal, as well as regions with a pre-dominance of small-scale farm holdings such as Western Ireland, Scotland and Wales (Baldock *et al.*, 1996). In some predominantly rural areas, the problem is further compounded by out-migration to urban centres, often permanently. This has consequences for the remaining population (usually the aged), the maintenance of essential social services and environmental and landscape management. These phenomena frequently occur in mountain areas (Chapter 3.15).

In the future, climate change could further distort the impact of agricultural practices on rural areas. Extension of growing seasons, climate variability and changes in productivity are all predicted to affect agriculture (EEA, 1998) with consequent effects on the nature and shape of rural areas.

Alongside the changes in agricultural practices which have affected agricultural land use, urban growth and afforestation are contributing to the shifting land-use pattern in rural areas in most EU Member States.

The EU forest area is currently stable or even increasing in some countries (for example in Ireland, the forest cover is now almost 9% – up from 1% at the turn of the century). Much of the forest area is managed as exploitable forest (wood and non-wood products and services). The accession of Austria, Finland and Sweden has made the EU the world's second-largest paper and sawn-wood producer and the third-largest exporter of forest products.

2.2. Opportunities and threats

2.2.1. Rural-urban interface

Urbanisation, with increases in built-up area/capita (see Chapter 3.12), has various

causes and impacts. Employment has increasingly concentrated in towns, with centralisation of services to the rural hinterland, thus contributing to increased urbanisation. The changing population patterns (reflecting the changing economic situation in rural areas) and the changing nature of the rural-urban interface are leading to enhanced mobility and differential development whereby some urban settlements in rural areas are doing well but others are doing very badly (Bryden, 1996).

Mobility has become a key factor: commuting enables workers in cities to derive the perceived benefits of living in the 'unspoilt' countryside. However, migration to rural areas extends urbanisation, leading to fragmentation of open areas and loss of typical rural functions dependent on a high degree of continuous open countryside, such as extensive agriculture or nature conservation. Furthermore, the associated infrastructure requirements generate environmental impacts including air pollution, fragmentation of habitats and greenhouse-gas emissions.

In areas remote from large urban centres, mobility is also a factor – but not just for work. Public transport provision in such areas tends to be much more limited than in urban areas and has resulted in car ownership increasing in rural areas. The car is thus important for access to work, shopping, services and communication in these areas.

The advent of 'teleworking', and its active promotion, may act as a countervailing trend to increased commuting but is unlikely to lead to significant reductions in car use or the need to travel (see Chapter 3.12).

2.2.2. *Tourism and recreation*

Rural areas are increasingly the playground for a growing urbanised population, providing a stress-relieving setting for tourism, recreation and leisure pursuits.

Rural tourism in the 1990s is very different from its romantic 19th-century past when writers such as Wordsworth and Schiller captured the rural scene. Far larger numbers of people are involved, and their penetration into the countryside is far greater. The spread of car ownership, and the improvement of road networks, have been important (OECD, 1994b).

Rural areas can benefit from tourism as an alternative income source and a means of

maintaining population and labour. However tourism and recreation also require provision of infrastructure (such as roads and water supplies) which comes at a high cost due to excess capacity for the large part of the year outside the holiday season. Furthermore, as the trend towards activity holidays increases, environmental impacts are unavoidable in some rural areas as tourists tend to scatter over larger and often sensitive areas. These are particular concerns in mountain and coastal areas (see Chapters 3.14 and 3.15) where tourist and recreation activities tend to be more concentrated.

2.2.3. *Energy and rural areas*

The European Commission's policy objectives include an increase in the share of energy from renewable sources, which should account for 12% of EU energy supply by the year 2010 (European Commission, 1996a). Agriculture and forestry will make an increasing contribution, especially through the use of energy crops for biofuels such as oil-seed rape. The estimated requirement of such biofuels would be 18 Mtoe, to be grown on some 11.5 million hectares of land. This could present a promising opportunity for rural areas in terms of agricultural activity and other economic activities related to energy production, although a substantial increase in energy prices would be needed if bio-energy is to be seriously competitive with fossil fuel energy.

At present, an estimated 60% of energy crops are being grown on set-aside land as non-food crops. These crops include oil-seed rape, sugar/starch crops and woody stemmed crops such as willow and poplar. With the Council conclusion (March 1999) to place the set-aside rate at zero from 2002/2003 onwards and given the present uncompetitiveness of bio-energy, developing the non-food sector would need to be combined with appropriate fiscal measures. The value added for rural areas is not simply in terms of the production of raw material but also in terms of processing and energy production either as electricity or as steam/heat for local or district heating. This will also have a positive employment benefit for rural areas.

Energy is also produced from the digestion of farm slurries (26 Ktoe in 1996) and from agri-food industry effluents (103.2 Ktoe in 1996). In rural areas where intensive live-stock rearing is practised and where available land for disposal of animal manure is limited, this alternative form of disposal and

production of energy has potential to generate revenues and reduce environmental impacts.

Fuelwood production within the EU is increasing steadily (16% between 1991 and 1995), and forests have potential as a source of energy, either by short rotation plantations or by the use of forest residues and available low-quality wood (European Commission, 1995). Higher prices of energy from fossil sources and technological advances may make it more possible for rural communities to set up and run their own power generation companies based on renewable energies or waste to energy (this has been the subject of pilot projects supported by the LEADER II programme – see section 3 below).

Any increased use of biomass and fuelwood will tend to reduce carbon dioxide emissions. However, it will be important to avoid any negative environmental impacts that could result from restructuring of rural land holdings or conversion from agricultural land that may be required to facilitate increased biomass or fuelwood production.

Localised generation from renewable sources may reduce requirements for energy transmission infrastructure, thereby benefiting the rural environment. High-tension power lines and their support pylons often detract from the landscape value of sensitive areas, and are also a hazard for bird life especially where they cross migratory routes. It has been estimated that up to 15 birds per pylon per year are killed by power lines (IFEN, 1994).

2.3. What is the environmental situation in rural areas?

The environmental characteristics of rural areas vary across Europe, although regions do share broad biogeographical characteristics which determine the nature of their response to environmental pressures and impacts (the subject of environmental and sustainable development indicators for rural areas being developed at EU and OECD level).

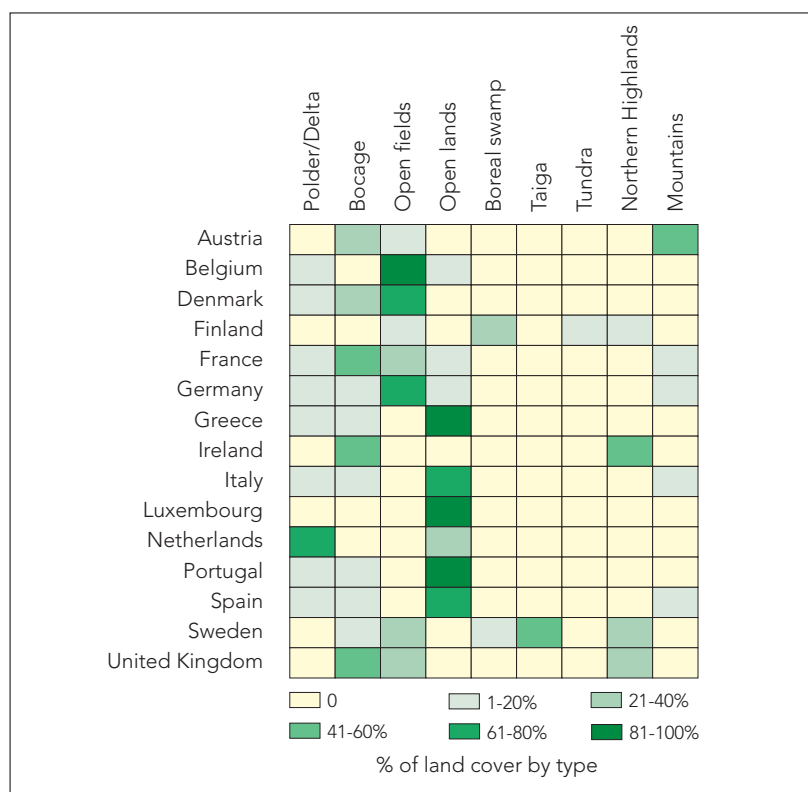
2.3.1. Landscapes

Rural areas in Europe provide a rich diversity of landscapes whose primary characteristics have been shaped over time by geomorphological, climatic and biological processes, and influenced by human activities since the Neolithic Period, when the first farmers started cultivating and opened the first clearings in the great forests. Beginning early

in southern Europe and spreading over several thousand years towards the north and north west, this resulted over time in the wide range of landscape types (Figure 3.13.2) which we live in today, from the distinct open-field landscapes of France, Spain, Ireland, UK and northwest Europe to the Taiga and Boreal Swamp landscapes of Finland and the highly composite dry Mediterranean or forest-dominated central European landscapes (Map 3.13.2). Only very few of these landscape – the most remote – are still in a near-natural state. For the vast majority, cultivation, urbanisation and big infrastructure have moulded today’s landscapes over the geomorphological forms, based on the possibilities set by soil, climate and natural biodiversity. In rural areas the cultivation pattern developed over centuries, with extensive cultivation as the basis for the present variety of biodiversity and scenic features, which in many ways grow to be richer and more varied than their totally natural state (ECNC, 1998). But the relatively high nature value of many cultivated landscapes has been under severe pressure for several decades, developing in general towards more uniform, less complex and composite landscapes (Box 3.13.3 & 3.13.4). Present pressures are even more dynamic, but now the intensification of landscapes in many

Dominant landscape types within EU rural areas

Figure 3.13.2



Source: EEA



areas is accompanied or substituted by land abandonment and afforestation (see also Chapters 2.3 and 3.11).

Traditional agricultural systems call for a considerable input of skilled work, to manage grazing systems and maintain features such as stone walls and hedgerows. With the decline in traditional farmland management, the shift towards mechanisation and more intensive production systems, coupled with a decline in the numbers of those working the land, many of these 'cultural' landscape features are being lost.

Agriculture and forestry are the main caretakers of rural landscapes. Its continued usage in a well-adjusted way is a pre-requisite for maintaining its environmental worth (European Commission, 1997b).

2.3.2. Forests in the rural landscape

Forests are an important part of the European landscape of rural areas in their own right as they fulfil multiple roles in terms of timber production, recreation, hunting and as an important reservoir for wildlife (Box 3.13.5). Forest cover varies considerably between EU Member States, ranging from

9% in Ireland to 71.3% in Finland (Map 3.13.3). Those Member States with a large percentage of forest cover (Finland, Sweden, Germany and France) have tended to develop multiple-use approaches to the forest resource and to see forests in the wider context of landscape and biodiversity. Other Member States (Ireland and Spain), in seeking to extend their forest cover rapidly for either commercial or watershed-management purposes, have often run into conflicts over the landscape impact largely related to the loss of open field or moorland landscapes and the planting of monocultures of coniferous trees. Denmark is looking towards doubling its present 12% forest area to around 25% by mid-2000.

Box 3.13.3 Main threats to European landscapes (see also Chapter 3.6)

According to Luginbuhl (1998), landscapes are undergoing radical transformation as a result of six main trends:

- the intensification of agricultural landscapes in which the quest for greater agricultural productivity continues with ever larger property structures and increasing mechanisation;
- the reforestation or fallowing of rural land gradually abandoned by agriculture, the continuation of a centuries-old transformation;
- the increasing fragmentation habitats, in particular in large alluvial valleys or on coastlines;
- the extension of the urban peripheries of big cities until they form metropolises;
- the spread of public-transport infrastructure, motorways, high-speed rail tracks and power lines;
- the expansion of tourist facilities in mountain regions or on coastlines with an increasingly marked propensity to engage in large cultural marketing campaigns at important historic or natural sites.

Box 3.13.4 Why landscapes matter to people

Landscapes provide the setting for our lives, today and into the distant future. The quality of that setting affects the quality of our lives, whether we live in a city, a town or in the countryside. Every landscape has importance for the people who live in it.

Our concern, therefore, is with all landscapes, the whole territory of Europe, including cultivated or natural areas, and the urban and peri-urban landscape. This dual view is necessary because most Europeans live in towns and cities and because rural landscapes occupy an important place in European consciousness.

Within this broad view, it must be recognised that landscapes vary in their character and quality. Some landscapes are so rich in natural and man-made beauty or cultural interest to justify concern at more than local level. Many landscapes are recognised as regional or national parks or by other designations. Some landscapes have such outstanding and universal qualities that they may merit recognition at the European or global scale.

Examples of such landscapes might include the *puszta* of the Hungarian plains, the hills of Umbria and Tuscany, the valleys of the Tarn and Dordogne, or the Lake District of Northern England. Such areas have inspired artists, drawn travellers and achieved fame beyond the immediate locality.

If the conservation of Venice, Granada or Prague is of European concern, so too should be that of Europe's important landscapes. To this end, the Council of Europe is working on the drafting of a pan-European Landscape Convention in association with the Congress of Local and Regional Authorities of Europe (CLRAE). It is expected that this convention will strengthen existing efforts to protect Europe's landscapes under the 1995 Pan-European Biological and Landscape Diversity Strategy.

After Dower, M. *Towards Landscape Policies*. Naturopa, Vol. 86. 1998.

Figure 3.13.3

A rural landscape over 1910-1994;
Top: Loèche Plan (Switzerland) 1910

Bottom: 1994

Source: N. Crispini



Box 3.13.5 The role of forests in rural areas

In 1998, the European Commission produced 'a *Forestry Strategy for the European Union*' (COM (98) 649 final). The strategy recognises the diversity of Europe's forests, their multi-functional role and the need for ecological, economic and social sustainability. Forests in Rural Areas fulfil a number of functions including:

- viable timber production
- wood-based industries
- rural employment
- landscape and biodiversity
- watershed management and water filtration
- soil conservation
- recreation
- carbon sequestration.

Forests within the EU are under threat from a number of factors, in particular air pollution, forest fires (destroying around 350 000 to 500 000 ha of forests annually), pests, diseases, reduced species diversity and in some cases an over-emphasis on timber production. The multiplicity of uses and abuses of forest resources highlights the need for observance of Sustainable Forest Management (SFM) principles. These have been defined as the 'stewardship and use of forests in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economical and social functions, at local, national and global levels, and that does not cause damage to other ecosystems' (Resolution H1, Ministerial Conference on the protection of Forests in Europe, Helsinki, 1993). These principles were formally adopted in Lisbon in 1998 by the Ministers responsible for Forests within the UNECE Region (UNECE, 1998).

2.3.3. Water stress in rural areas: a spatial challenge

The rural areas of Europe generally have access to water resources which they avail of for a variety of purposes including domestic, agricultural and industrial use. Generally, northern European Member States and Accession Countries have a surplus of water supply, while their southern counterparts have areas of water stress due to low rainfall, but also an excess of abstraction (see Chapter 3.5 for a more detailed discussion of this problem) raising the issue of an integrated land planning of catchments areas.

Rural areas probably have poorer water quality per capita than urban areas. Water-quality reports for some pre-dominantly rural areas in Ireland reveal deficient water quality mainly due to a combination of contamination of groundwater by agricul-

tural and domestic waste – including pesticides – as well as poor water-supply infrastructure (EPA, 1996). This arises from the preponderance of small privately managed group supplies which do not receive the degree of treatment given to small public supplies in rural areas.

In terms of river quality, phosphorus and organic matter concentrations have decreased markedly over the past 20 years. Nitrate concentrations have been stable over the same period. Available data, however, does not allow differentiation of these trends for different catchment types including predominantly rural catchments (see Chapter 3.5).

2.3.4. Soils in rural areas

Erosion is a major cause of degradation and the effects are increasing. All European countries are affected to some extent: about 12% of the land area of Europe, mainly rural, is affected by water erosion and 4% by wind erosion (see Chapter 3.6). The actual magnitude of erosion, and consequent nutrient loss, is determined by a variety of factors: climate, soil type, topography and human activities. As a result, soil and nutrient loss will vary greatly between different rural areas. Within the EU, agricultural intensification and marginalisation have contributed substantially to these problems, through, on the one hand, increased mechanisation, the cultivation of steep slopes, changes in crop rotation practices, over-grazing, land drainage, and the loss of hedges and field walls, and on the other, the abandonment of traditional forms of land use. Much of the eroded soil and nutrients end up in surface waters thereby contributing to solids and nutrient loadings.

Modern intensive agricultural practices of specialising in either arable or livestock farming has resulted in declining organic content of soils in some rural areas due to the rupture of traditional organic and nutrient cycling associated with mixed farming systems (IEEP, 1998). Although trends in artificial fertiliser use within the EU show a decline overall, there are still pockets of excessive use which are spatially defined (see Chapter 3.6).

2.3.5. Rural areas – Europe's biodiversity reservoir

Rural areas within the EU contain the vast bulk of its conservation and biodiversity assets. They also show great spatial variation across the EU. However they are increasingly under pressure from a variety of land uses and other pressures, as stated and assessed in Chapter 3.11.



It is generally reported that the threat to Europe's wild species is severe and growing. In many countries up to half of the known vertebrate species is under threat, and over a third of bird species are declining, rare or vulnerable. Birds are excellent indicators of broader environmental quality. The main causes are the abandonment of traditional forms of agricultural land use which alone accounts for over 40% of Europe's declining bird species (Chandler & Faulks, 1997), inappropriate forestry, infrastructure development (transport networks can fragment

wildlife habitats), water abstraction (drying up of wetlands) and pollution. Detailed information on variation in biodiversity assets within different rural regions in the EU is not available, but generally the highest biological diversity is to be found in predominantly rural areas, mountain areas and in areas where extensive or traditional agricultural practices are to be found. Indeed, there appears to be a high correlation between the EU's biodiversity resources and rural areas designated as Less Favoured Areas (European Commission, 1997a).

3. What future for rural areas?

Responses to environmental pressures in rural areas can be seen in current EU policies concerning agriculture, environment and regional policy (Box 3.13.6). Generally, the measures being implemented can and are achieving some measure of success. The responses to environmental problems in rural areas have traditionally tended to be of a prescriptive nature often in the form of horizontal regulatory instruments which did not or do not have regard to the differing spatial contexts of rural areas within the EU. However, targeted agri-environmental measures implemented by zonal programmes have been introduced following the 1992 reform of the Common Agricultural Policy.

Responsibility for implementation of many of the regulatory instruments designed to respond to rural issues (including environment) is in the hands of individual Member States on the basis of the Principle of Subsidiarity. This can lead to wide differences in approaches to dealing with environmental problems.

3.1. Protecting important assets in rural areas

EU environmental policies and instruments responding to specific issues within rural areas centre mainly around the protection of important bird and habitat areas as well as the protection of vulnerable water resources from nitrates pollution. Three Directives are important in this regard, the Birds Directive (79/409/EEC), the Habitats Directive (92/43/EEC) and the Nitrate

Directive (91/676/EEC). Effectively, they all require the identification and designation of nature conservation areas or vulnerable zones within which development or land-use practices have to or will have to be adapted, in compliance with good agricultural practices or action programmes as defined by the national or regional authorities.

For instance, the Nitrate Directive will restrict, in vulnerable zones, the application to the soil of livestock manure to 170 kg N/hectare by the year 2003. On a regional basis, the quantity of livestock manure produced by current livestock numbers already exceeds the absorption capacity of the agricultural areas in large parts of predominantly urban Netherlands, Belgian Flanders and significantly rural areas of Brittany and Lombardia. To comply with the Directive could therefore mean, in some situations, an effective reduction in the numbers of livestock (European Commission, 1997a).

3.2. Integrating the environmental dimension into public policy in rural areas

3.2.1. Regional and rural policies

The European Agricultural Guarantee and Guidance Fund (EAGGF), the European Regional Development Fund (ERDF) and the European Social Fund (ESF) provide assistance for a range of eligible investment measures within Objectives 1, 5a, 5b and 6 according to specific regulatory provisions and on the basis of multi-annual regional development programmes. Besides a requirement to undertake an environmental

Box 3.13.6 Current policy responses to environmental issues in rural areas

Policy	Measures
Environmental policy	Sustainable development: Integration of environment within agricultural practices Habitats Directive Birds Directive Nitrate Directive
Regional policy	Objectives 1, 5b & 6: Diversification of rural economies Reform of farm structures Environmental protection linked to economic development (eco-tourism)
Agricultural policy	Promotion of environmentally friendly forms of agriculture or changes in practices/land use: Agri-Environment Measures (Regulation 2078/92) and Forestry Measures (Regulation 2080/92)

appraisal of the development priorities concerned with respect to their likely environmental impact, the programmes often include specific environmental investment priorities which are geared to providing basic environmental infrastructure (e.g. water supply, waste recycling) as well as measures linked to nature conservation or landscape management. The Community initiative LEADER II is assisting many rural communities using a 'bottom-up approach' which not only empowers rural communities, but also contributes to environmental integration at the local level.

On a broader scale, agri-environmental measures provide an important contribution to the integration of the environment in a land use context. It is still too early to assess the actual impact of both Structural Funds programmes and Community initiatives in rural areas in either positive or negative terms. Most of the current programmes are running until the end of 1999 and even at that point, it would be some time after before it would be possible to gauge their effectiveness (IEEP, 1998).

Despite improved integration in the definition and implementation of regional development programmes, there is still a need to more closely integrate these measures and other public policy measures such as transport within national or regional planning frameworks in order to avoid potential resource or land-use conflicts.

3.2.2. LEADER II – a means to facilitate environmental integration

Besides the mainstream Structural Funds programmes mentioned above, the European Union co-finances a number of initiatives of Community interest. The most important of these for rural areas in the LEADER initiative. The current LEADER II initiative has a budget of approximately 1.8 billion euros (1996 prices) and supports rural development investments that have been designed and are managed by local partnerships (the so-called 'bottom-up approach'). The focus of LEADER programmes is on innovative approaches to rural development which add value and are transferable. All individual projects co-financed through LEADER programmes should be consistent with local development strategies and plans. The LEADER initiative applies to rural areas covered by Objectives 1, 5b and 6 with over 1 billion euros earmarked for Objective 1 and 6 regions. The projects receiving assistance are varied and include environmental actions

such as development of renewable energy sources and waste recycling.

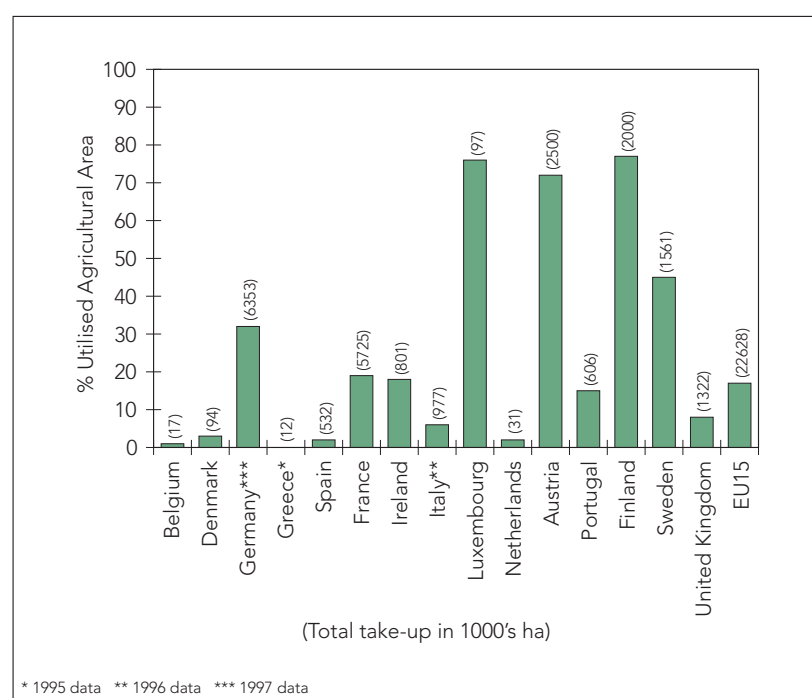
3.2.3. Agri-environment measures

Member States put forward programmes based on Council Regulation (EEC) No. 2078/92 to the Commission based on the priorities and conditions in the regions concerned (see Box 3.13.7). Agreements covering 22.3 million hectares (Figure 3.13.4), or 20% of the utilised agricultural area of the EU are now in place (European Commission, 1997b). While some countries have made very substantial use of the opportunities (over 70% of utilised agricultural area in Austria, Luxembourg and Finland), others have not (eg 1% in Belgium.): there is also variation within Member States in the degree of uptake (Figure Map 3.13.4).

The single objective of these schemes during the first implementation period is the continuation of relatively low input farming systems associated with sensitive areas followed by reduction of water pollution from nutrients. The former systems are generally characteristic of predominantly rural areas and extensive landscapes such as the *dehesas* in Spain. The latter tends to be in more specialised and intensive rural areas.

Current take-up of agri-environment measures in EU countries

Figure 3.13.4



Source: European Commission, 1997

Box 3.13.7 Protecting areas of special biodiversity/nature interest in rural areas under Regulation 2078/92

- Agri-environmental programmes in France**
 Many of the targeted measures of the local operations within the French agri-environmental programmes implemented under Regulation 2078/92 have a strong ecological dimension. A large proportion of the 270 local operations implemented so far are in designated environmentally sensitive zones (including SPAs; SACs; *Zones nationales d'intérêt écologique, floristique et faunistique* and natural parks). For this reason, nature protection relative to the NATURA 2000 exercise forms a substantial part of implementing the agri-environmental programme.

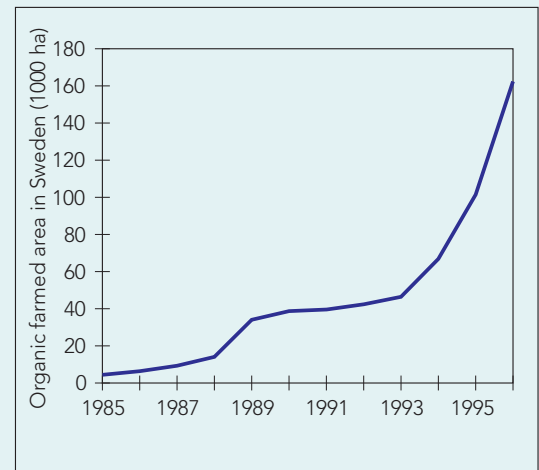
Significant examples of measures that target sensitive biotopes are the 'coastal marshes' comprising 20 local operations mainly in Pays de la Loire and Charentes, but also in Province Alpes Cotes d'Azur and Languedoc-Roussillon. The coastal marsh measures have been developed following a significant amount of preparatory work, based on analysis of the state of the environment, a high level of technical expertise, and awareness-raising and promotion amongst farmers. This resulted in a high uptake and significant reduction in environmental impacts of agricultural activities (including prevention of degradation, recovery of pastures, reconstitution of the hydraulic infrastructure, reduced fertilisation and stocking rates and changes to mowing and grazing regimes). In one particular situation in the *Marais salants de Guérande et du Mes* in Pays de la Loire, farmers rediscovered extensive grazing systems which had formally disappeared.

Despite some continuing problems in relation to water management, the overall impact of the programmes in the areas concerned has been successful with improvement in the management of natural pastures (which were previously threatened) to the benefit of marshland biodiversity, in particular the general habitat type.

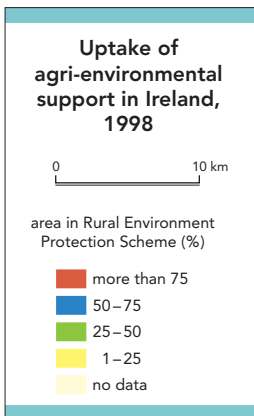
The French example highlights the benefit of good planning and targeting in the use of the agri-environment Regulation and the need to prepare the ground well with those whom one wants to influence – namely the farmers.

- Organic farming continues to grow**
 In 1996, organic farming accounted for some 1.3% of the total utilised agricultural area (UAA) and 1% of the agricultural holdings within the EU. Despite this apparent marginal slice of the total UAA, between 1985 and 1986, the organic UAA has increased tenfold and the number of farm holdings fivefold. Moreover, for Sweden (see Figure 3.13.5), Finland and Austria, growth in organic UAA has surged from 13 000 to 660 000 ha over the same period.

Fig. 3.13.5
Organic farmed areas in Sweden 1985-96

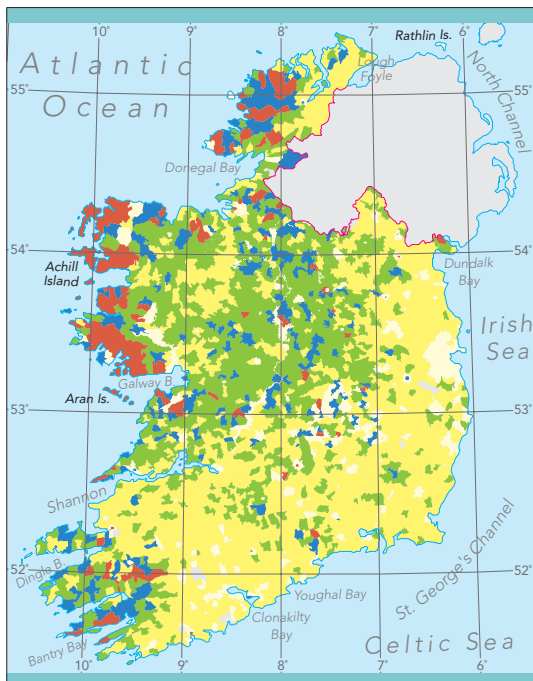


Source: Eurostat, 1998



Map 3.13.4

Source: Department of Agriculture and Food, Ireland (1998)



The measures adopted by farmers within the programmes can be categorised into four different types:

- environmentally beneficial productive farming, encompassing organic farming, non-organic farming with environmental improvements and maintenance of existing low-intensity systems;
- non-productive land management, comprising the maintenance of abandoned land, environmental set-aside, protection of landscape features and public-access measures;
- training and demonstration projects;
- integrated and whole-farm plans.

A recent report to the Council and the European Parliament (European Commission, 1997b) stated that in general the first of these types of measures show positive impacts on soil and water quality and on

biodiversity and landscape protection, although in some cases monitoring the impact on water quality is problematical. Non-productive land management measures also show positive impacts, for example in soil-erosion control and landscape conservation, however the take-up of the schemes has been mixed, particularly regarding set-aside of land, and consequently the benefits are viewed as being fewer than is possible.

Despite the high take-up rate in those countries making substantial use of this measure, it is still too early in the implementation of the scheme to undertake a detailed appraisal of its environmental impacts. The shortage of empirical studies and difficulties in obtaining reliable data on implementation are problematic in this regard (IEEP, 1998). A formal requirement for Member States to undertake monitoring of the impact of these schemes is now in place. This will assist in the impact assessment of the schemes provided a proper baseline assessment of environmental conditions prior to their introduction was undertaken. First results have already been submitted to the European Commission which presented a synthesis report to the Member States in 1998 (European Commission, 1998a).

3.2.4. Forestry measures (Regulation 2080/92)
Another of the flanking measures adopted to accompany CAP reform was Council Regulation (EEC) No 2080/92 instituting a Community aid scheme for forestry measures in agriculture. The aim of this instrument is to promote afforestation as an alternative use of agricultural land and the development of forestry activities on farms.

A 1997 report (European Commission, 1997c) showed that just over 500 000 hectares of land was afforested under Regulation 2080/92; almost half of this was in Spain, with the United Kingdom, Ireland and Portugal accounting for most of the remainder.

About 40% of the afforested areas in the EU consist of coniferous species, and 60% are broadleaves or mixed plantations, however this varies widely (Table 3.13.2), with the proportion of conifer afforestation from below 10% in the Netherlands, Greece and Germany to about 80% in Ireland.

Most of the land (61%) which has been afforested under the Regulation was previously permanent grassland and pasture, while another third (36%) was arable land. A small proportion was converted from perma-

Percentage of conifers and broadleaves in woodland afforested under Regulation 2080/92

Table 3.13.2

Country	Conifers	Broadleaves and Mixed Plantations
Denmark	27	73
Germany	9	91
Greece	6	94
Spain	44	56
France	48	52
Ireland	79	21
Italy	6	94
Netherlands	5	95
Austria	11	89
Portugal	21	79
Finland	32	68
UK	33	67
Total	40	60

Source: European Commission, 1997c

nent crops, such as vines and fruit trees. Afforestation rates are fairly low on land where the farm value added is high, for example in arable crop areas and intensive livestock farming areas; woodlands are established preferably on permanent grassland in less profitable livestock areas, or on unproductive arable land (Table 3.13.3).

It would appear, though, that afforestation of agricultural land has had only a small impact on reducing surplus agricultural production, with marginal decreases in the utilised agricultural area in most Member States (the largest reported decreases are in Ireland, Portugal and Spain, at 1.35%, 1.25% and 0.95% respectively), although it nevertheless plays a part in diversification and rural development (European Commission, 1997c).

This finding tends to suggest that afforestation measures generally have no effect on agricultural practices in rural areas where they are more specialised and intensive in character. Afforestation may play an important part in environmental protection and may generate a number of positive external effects, for example curbing erosion, preventing desertification, encouraging biodiversity and regulating the hydrological regime. However, where the aim is principally to create economically viable wood-based industries, tensions can exist between the need to maximise the economic return

Table 3.13.3 Area of land afforested in the EU, by land type

Country	Area afforested (ha)	% from grassland or pasture	% from arable land	% from permanent crops
Denmark	3703	1	99	0
Germany	18611	36	63	0
Greece	6234	12	84	4
Spain	238112	64	32	4
France	28900	80	20	0
Ireland	60477	95	5	0
Italy	32301	17	82	0
Netherlands	6499	0	100	0
Austria	331	100	0	0
Portugal	50035	17	76	7
Finland	177	47	53	0
UK	61597	88	12	0
Total	506978	61	36	3

Source: European Commission, 1997c

and the protection of important environmental assets in different rural areas – in particular landscape, biodiversity and water resources (ERM, 1997).

3.3. Towards integrated rural development

There is evidence of a gradual evolution of rural policies from policies based largely on agricultural production to policies based on broader sustainable rural development incorporating environmental issues. However, responses to environmental issues and problems have been fragmented and insufficient. Rural policies, and notably agri-environmental policies, have a great potential for environmental integration in a spatial context or framework within which it is possible to discern the actual impact of the shifts in policy response.

A significant step in this direction is Agenda 2000 which introduces rural policies, including agri-environmental policies, and investment in environmentally sound techniques, as a second pillar of the CAP. As a general rule, the application of rural development measures would have to respect minimum environmental standards. Additionally, Member States would be obliged to undertake appropriate environmental measures, by means of agri-environmental measures, environmental legislation, or specific conditions for direct payments. For the latter two options, Member States would

be able to reduce direct payments to farmers in the event of non-compliance.

Despite the fact that land-use planning is not a European Community competence, the recognition of the need for a spatial development dimension to European Union policies in recent years has led to the development of the European Spatial Development Perspective (ESDP) – a set of guidelines or orientations designed to ensure greater coherence of Community policies in their interaction with the EU's diverse territorial characteristics (European Commission, 1997d).

From a rural areas perspective, the ESDP is highly significant. It notes the shifting economic structures of rural areas and recognises that as agricultural employment and activity continue to decline in some rural areas or become more specialised in others, rural areas will continue to become even more diverse than before. It acknowledges that the way to address this challenge is through spatially differentiated rural development within which coherence of Community and Member State sectoral policies (including environmental policies) can be better integrated.

The value-added dimension of a spatial development approach to rural areas can also be seen in terms of the potential to co-ordinate sustainable development actions

within rural areas by means of integrated, multi-sectoral development strategies that promote co-operation amongst a spectrum of local actors (Sallard, 1998).

The European Commission's Agenda 2000 proposals for the future of rural development policy within the EU respond to the need for a spatial dimension to rural development and the need to make rural development measures applicable in all areas. They imply a broader context than a purely sectoral approach dominated by CAP measures (market supports, income supports, accompanying measures, etc.) towards one which makes rural development measures (rural tourism, on-farm diversification, rural SMEs, etc.) an integral part of the CAP. This 'marrying' of existing policy instruments is to be achieved by adopting a targeted approach to rural development in the future. The key to implementing this will be through the development of *integrated rural development plans* by Member States at an appropriate geographical level.

From an environmental and sustainable development viewpoint, this approach will also be useful in helping to balance competing land-uses that can and will arise in different rural areas, enabling the best economic, social and environmental use of land resources. This is consistent with

Community environmental policy (European Commission, 1996b) and will also be vital in order to maintain a critical level of occupation and functioning of rural areas (Bauer & Mickan, 1998). However the success of the proposals may depend on policies for environmentally sustainable agriculture and development initiatives being implemented across the whole countryside, not simply in selected or marginal areas.

It will also be important to ensure that adequate mechanisms are in place for monitoring the impact of rural development and agri-environmental measures given the paucity of data relating to the impact of current measures (IEEP, 1998). The development of a set of regionally orientated rural development indicators would be most helpful in this regard. This set of indicators should include environmental and sustainable development indicators as advocated by the OECD (1996), and more recently by the European Council at Cardiff, June 1998.

3.4. Perspectives on rural areas in Accession Countries

Rural areas within the Accession Countries show considerable variation in land use (Table 3.13.4). Forested land varies from 50% of the surface area in Slovenia to 30% in Romania. Generally, though, forest cover is

Overview of rural areas in Accession Countries

Table 3.13.4

Country	Population (millions)	% Rural Population	% Employed in Agriculture	Agricultural Production (% GDP)	Agro-Food Trade (% of total exports)	% Agricultural Land	% Forested Land
Estonia	1.5	30.6	8.1	8.0	15.7	25.0	45.0
Slovenia	1.99	75.0	6.0	4.4	6.3	38.0	50.0
Lithuania	3.77	32.0	24.0	10.2	13.1	50.0	30.0
Latvia	2.46	30.0	17.0	7.6	16.8	39.0	44.0
Czech Rep.	7.9	25.0	5.0	2.9	5.7	55.0	30.0
Romania	22.6	45.0	37.3	19.0	8.8	60.0	28.0
Poland	38.6	38.0	26.7	5.5	11.3	59.1	28.2
Slovakia	5.34	48.0	5.8	4.6	5.4	50.0	41.0
Bulgaria	8.28	32.0	24.3	12.8	18.8	55.0	28.2
Hungary	10.1	37.1	8.2	5.8	17.5	66.5	19.0
AC10	102.4	40.0	22.5	6.8	11.9	55.9	34.3
EU15	372.1	25.0	5.0	1.7	7.4	40.0	36.0

Source: Agricultural Situation and Prospects in the Central and Eastern European Countries, Summary report, DG VI Working Document, 1998.

somewhat higher than the EU average. Agricultural land accounts for around 60% of land area in Romania while it is only 30% in the Czech Republic. The percentage of population employed in agriculture is generally much higher than within the EU. It ranges from 37.3% in Romania to around 5% in the Czech Republic. In Romania, the percentage of agricultural employment actually rose in the past five years and is partly helping to maintain overall employment in the face of declines in other industrial sectors (European Commission, 1998b). The global picture of the agricultural situation in the Accession Countries highlights the relatively higher importance of agriculture to the economies of the Accession Countries compared with the EU Member States.

Agricultural production in the Accession Countries has been through periods of intensification of agriculture similar to that experienced in the EU. Hungary, for instance became one of the most efficient co-operative and state farming systems in Eastern Europe. About 500 000 people moved off the land in the 1960s to make way for the establishment of large-scale farming systems and the introduction of intensive production techniques (Fesus & Lanszki, 1994) leading to the same environmental impacts and problems as in the EU. Intensive pig and poultry rearing was a feature of the Estonian rural economy up to the collapse of the Soviet state. This did have some environmental impacts. For instance, in the 1980s, 76% of the nitrate load and 20% of the phosphorous load to water bodies originated from agriculture. However, pig production has contracted by around 60% since independence (European Commission, 1998b) and this may help reduce further emissions to the aquatic environment.

Another environmental problem common to rural areas of a number of the Accession Countries is erosion of soil. It is estimated that this affects 20% of agricultural land in Lithuania, and 30% in the Czech Republic (European Commission, 1998b). In addition, there are hot spots of eutrophication or acidification which have been detected by 'critical loads mapping' in rural regions of Romania, Bulgaria and Hungary (Posch, *et al.*, 1997).

However, large areas of traditionally farmed, extensive land still survives. For example, looking at the Wielopolska region of Poland there is evidence of a long tradition of landscape management going back to the 1820s which has helped to reduce soil

erosion and nutrient emissions to water courses while at the same time enriching the biodiversity of the area (see Box: 3.13.8). This multiple use of the land provides employment for rural people and contributes in a significant way to the national economy. It contrasts with much of the EU where biological and landscape diversity has declined and agricultural employment has fallen significantly.

The recent Aarhus Declaration by Ministers of Environment within the UNECE region in June, 1998, noted the importance of the biological and landscape diversity of the Central and East European Countries as an asset in their own right. They concluded that the best way to ensure that these assets could be protected and enhanced was through an integrated rural development approach. In general, the formulation of rural development policies is in an early stage within the Accession Countries focusing on agriculture and basic infrastructure. However, a number of Accession Countries (e.g. Lithuania, the Czech Republic, Slovenia and Hungary) have also adopted agri-environmental measures (OECD, 1997).

As part of the Agenda 2000 package for the Accession Countries a specific rural development regulation has been proposed by the European Commission (1998c). It will promote the development of integrated rural development plans in these countries along similar lines to that proposed for the existing Member States. The Accession Countries will have to ensure that the environmental and sustainable development dimension is incorporated into the development and implementation of these plans.

However, the success of this approach is not automatically assured given the dynamic nature of the economic, political, institutional and cultural changes that are underway. In addition, the task of 'setting the baseline' or environmental benchmark for many development initiatives and plans within rural areas of the Accession Countries relies on the availability of adequate and reliable regional environmental statistics and indicators. Given that such statistics and indicators are still in the developmental stages within the EU, it would seem logical that the Accession Countries should also be included in the development of rural environmental indicators as a matter of priority.

Box 3.13.8 Landscape-friendly farming – shelter-belts in Poland

The tradition of landscape management aimed at the integration of agriculture with landscape and nature protection has a long history in Wielkopolska, the bread-basket of Poland. In the 1820s, General Dezydery Chlapowski, promoting advanced agriculture, introduced in his Turew estate the practice of planting mid-field shelter-belts on an area of 10 000 ha in order to modify micro-meteorological conditions, as well as to provide refuges for wildlife survival. Shelter-belts thus became elements of everyday life for farmers in the region.

During the past 40 years, the Polish research Centre for Agriculture and Forest Environment has been studying these systems and has published the results of its work. The work reveals the importance of so-called biogeochemical barriers composed of shelter-belts, meadow strips, mid-field water ponds or patches of swampy vegetation for the control of ground water pollution.

For example, very high concentrations of nitrates in the groundwater in some cultivated fields of up to 50 mg N-NO₃ per litre could be detected, while in the stream draining the Turew watershed, the average concentration of N-NO₃ over a period of many years was only 1.5 mg N-NO₃ per litre.

Shelter-belts are also extremely important for biodiversity. In the Turew landscape more than 40 species of birds were found during the breeding

season and their nesting density was up to 140 pairs per sq. km. The shelter-belts are also home to mammals including wild boar, deer, badgers and foxes, and act as corridors facilitating movement of animals between different wooded areas.

The diversity of insect fauna is also 20 – 50% higher in the Turew mosaic landscape than in more uniform cultivated fields. Plant species diversity is also high with more than 800 vascular plants including 21 rare or protected species.

In 1992, the Research Centre, a number of local administrations and farmers in the region came together and set up an Agro-Ecological Landscape Park. The purpose of the park is to demonstrate the benefits of agricultural landscape management techniques and practices. In the past four years, a total of 26 km of new shelter-belts were planted traversing both large and small farm holdings. Around 8 km of these shelter-belts were composed of 7-11 rows of trees designed to act as links between larger wooded areas.

The Turew Landscape Park is playing an important role as a regional model for maintaining agricultural and landscape management practices which benefit rural areas and provide a working model of sustainable agricultural practices.

Adapted from Ryszkowski, R (1998). *Nature-Friendly Farming – Shelter-Belts in Poland*. *Naturupa*, Vol. 86, 1998.

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