

# Impact of Agriculture Schemes and Payments on Aspects of Ireland's Heritage

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## Foreword

One of the priority actions identified by the Heritage Council is to provide advice on the impact of current land uses on Ireland's heritage. To enable the Council to propose policies to government in line with its statutory responsibilities under Section (6) of the Heritage Act, 1995, the Council commissioned a study reviewing the current situation regarding agricultural premia schemes and their impact on heritage. The commissioning of this report was overseen by a small steering committee, comprised of Emer Collieran, Micheline Sheehy Skeffington, and Anne Farrell, from the Heritage Council, John Murphy of BirdWatch Ireland and Shay Fogarty of the Department of Agriculture and Food, with Liam Lysaght the Wildlife Officer with the Heritage Council in attendance. The Heritage Council thanks those involved in overseeing the production of this report for their time and support. The Heritage Council hopes the publication of this report, and the implementation of the recommendation contained in Council's Policy Paper on Agriculture and the National Heritage will lead to a real benefit to Ireland's heritage.

**Freda Rountree**  
Chairperson

**Heritage Council**  
June 1999

## List of Abbreviations

<b>AFF</b> An Forás Forbatha	<b>IOFGA</b> Irish Organic Farmers and Growers Association
<b>AWU</b> Annual Work Units	<b>IPCL</b> Integrated Pollution Control Licence
<b>CAP</b> Common Agricultural Policy	<b>IWC</b> Irish Wildbird Conservancy (since 1996 called Bird Watch Ireland)
<b>CFP</b> Control of Farmyard Pollution	<b>LFA</b> Less Favoured Area
<b>CSO</b> Central Statistics Office	<b>LU</b> Livestock Unit
<b>CSF</b> Community Support Framework	<b>MAFF</b> Ministry for Agriculture, Fisheries and Food (UK)
<b>CSS</b> Countryside Stewardship Scheme (UK)	<b>NGO</b> Non Governmental Organisation
<b>DA</b> Disadvantaged Area	<b>NHA</b> Natural Heritage Area
<b>DAF</b> Dept. of Agriculture and Food	<b>NPWS</b> National Parks and Wildlife Service (Since 1997 called Dúchas)
<b>DANI</b> Dept. of Agriculture (NI)	<b>OGA</b> Other Gainful Activities
<b>ECU</b> European Currency Unit (now the euro)	<b>OPARDF</b> Operational Plan for Agriculture, Rural Development and Forestry
<b>EIA</b> Environmental Impact Assessment	<b>P</b> Phosphorous
<b>EPA</b> Environmental Protection Agency	<b>REPS</b> Rural Environmental Protection Scheme
<b>ERS</b> Early Retirement Scheme	<b>SAC</b> Special Area of Conservation
<b>ESA</b> Environmentally Sensitive Area (NI)	<b>SGM</b> Standard Gross Margins
<b>ESRI</b> Economic and Social Research Institute	<b>SM</b> Supplementary Measure
<b>ESU</b> European Size Units	
<b>FDS</b> Farm Development Service (Dept. of Agriculture and Food)	

<b>FIP</b> Farm Improvement Programme	(refers to the REPS)
<b>FMS</b> Farm Modernisation Scheme	<b>STP</b> Soil Test Phosphorous
<b>GATT</b> General Agreement on Tariffs and Trade	<b>SPA</b> Special
<b>GIS</b> Geographic Information System	
<b>ha</b> hectare	
<b>IAE</b> Intensive Agricultural Enterprise	
<b>IFA</b> Irish Farmers Association	

## Introduction and Summary of Recommendations

### Introduction

This report is based on a study which was commissioned by the Heritage Council and carried out from November 1997 to February 1998. The study brief was to examine the impact of agriculture schemes and payments on aspects of Ireland's heritage, with the emphasis on the natural environment. The study examined the environmental impacts of all the relevant current agriculture schemes and payments, and anticipated the effects that future schemes and payments may have. The draft report was completed in February 1998, prior to the announcement of the detailed agenda 2000 proposals for further reform of the Common Agricultural Policy (CAP) and proposed planned rural development measures (announced in March 1998). In May 1998, the Heritage Council requested the consultants to update the final report in light of the Agenda 2000 detailed proposals.

In carrying out the survey, the consultants bore in mind the importance of agriculture to the rural economy, its role in maintaining rural populations, and its historical importance in shaping the natural environment. The maintenance of farmers on the land is recognised as a prerequisite for the maintenance of agricultural ecosystems and landscapes. For this reason, the consultants bore in mind the socio-economic role that schemes and payments play in rural areas.

Readers may note the absence of a detailed analysis of the impact of forestry schemes and payments. This is because the Heritage Council commissioned a separate report 'The Impact of Current Forestry Policy on Aspects of Ireland's Heritage' (finalised in May 1998). Nevertheless, the consultants have emphasised that forestry schemes and payments have had, and continue to have, a considerable impact on the natural environment (see Chapter 8.1.8). The report is restricted to the examination of current agriculture schemes and payments, but reference is made to wider agricultural policy where necessary.

The report is divided into ten chapters. Chapter 1 sets out the overall policy framework within which schemes and payments operate, while chapter 2 describes these schemes and payments. Chapter 3 outlines the state of agriculture, and Chapter 4 reviews the current information on the impacts of agriculture on biodiversity. Chapter 5 summarises seven cases studies illustrating the impact of agriculture on the environment, with emphasis on the part played by agriculture schemes and payments. Chapter 6 looks at examples of agri-environmental initiatives in other European countries, as a benchmark against which the performance of Irish agri-environmental schemes might be assessed. Chapter 7 reviews some relevant socio-economic information and summarises the results of a specially commissioned study by the Economic and Social Research Institute. Chapter 8 evaluates the impact of selected agriculture schemes and payments on the natural environment. Chapter 9 anticipates the impacts that the next round of CAP reforms may have on farming and the environment. Lastly, Chapter 10 sets out the recommendations made by the consultants.

### Summary of Recommendations

#### General measures to harmonise agriculture schemes and payments with the natural environment

- We suggest that decoupling all CAP compensatory payments partially or wholly from production should become a general principle. However, a move to area-based payments should not be regarded as a panacea.
- Related to the above, the best way of ensuring that payments do not encourage environmental damage is by giving positive incentives to farmers to manage their land in line with environmental objectives and phasing out incentives that encourage damage.

Sheep payments

- The environmental cross-compliance measures for degraded commonages should be extended to include sand dune systems and machairs currently threatened by overgrazing.

### **Beef payments**

- The rules governing the calculation of forage area need to be tightened, and expected area payments under Agenda 2000 could be focussed on low intensity farming systems such as the Burren, Shannon callows and coastal grasslands.

### **Arable payments**

- Environmental standards should be introduced for tillage farmers through the introduction of a mandatory code of good environmental practice.
- Existing unimproved grassland and other areas of conservation value should be excluded from eligibility for cereal aid payments.

### **Rural Environmental Protection Scheme (REPS)**

- REPS planners should be required to identify the habitat value of all areas on the farm.
- REPS planners should be required to mark all habitats on a field-by-field basis on the farm map which should be entered on a computerised database.
- Nominated environmentalists should have a greater involvement in the REPS planning process.
- REPS should have a larger section for habitat management.
- Ecological experts should be employed by the Department of Agriculture and Food to monitor the environmental quality of REPS planning and offer advice to REPS planners.
- Ecological monitoring of a representative number of REPS farms should be undertaken to assess the effectiveness of the scheme. There should be regular evaluation to ensure that any weaknesses are identified and addressed.
- The new round of REPS must begin with a baseline study of each farm, on a field-by-field basis, to be undertaken when each farm first enters the scheme.
- The new round of REPS should include measures to encourage the cultivation of threatened native crop varieties and landraces .
- The new REPS should have provision for environmental enhancement measures as well as maintenance.
- The entry conditions of the new REPS should not be relaxed for more intensive farmers.
- The focus of the REPS on less intensive, small and medium farmers should remain.

### **Early Retirement from Farming Scheme (ERS)**

- There should be an incentive built into the ERS for environmental enhancement, which should benefit the transferee.

### **Afforestation and Premium Scheme**

- Habitat surveys undertaken by qualified ecologists should be a requirement for land released from a REPS plan to forestry under the Afforestation and Premium Scheme.

### **A proposed new Farm Habitat Management Scheme**

- We recommend that a new scheme - the Farm Habitat Management Scheme should be introduced to provide an incentive for management, restoration and creation of habitats on those farms which are unsuited to participation in the REPS, or where farmers do not wish to join the REPS.
- Each farm applying to join the scheme would have a habitat survey, and only those farms which have the most to offer in terms of existing habitats and potential for habitat restoration and creation would be eligible.
- Nutrient management planning and adherence to a Code of Good Agricultural Practice on the whole farm would be required.
- Environmental experts play a central role in the operation of the proposed scheme to ensure appropriate environmental management is followed.
- The proposed scheme could be part-funded by the EU Structural Funds and national funds.

## Measures to reduce water pollution from agriculture

- Nutrient management planning should apply to all farms.
- The Department of Environment and Local Government should issue planning guidelines to local authorities for intensive agricultural enterprises.
- Pig numbers should be capped, and preferably reduced, in catchments already suffering from eutrophication. A similar approach should be made for the mushroom and poultry sector in affected water catchments.
- A centralised waste processing facility, which was already proposed for Monaghan, should now be put in place in Cavan and Monaghan to avoid further environmental damage.
- Pollution risk assessments should be carried out for all intensive farms, including the larger dairy farms, as in Northern Ireland.
- A catchment management planning approach, such as in Lough Ree and Lough Derg, should become accepted practice throughout the country.
- If the Control of Farmyard Pollution Scheme is to be re-introduced, it must be strongly linked with Nutrient Management Planning and whole farm management.

## The Burren

- Co-operation between government departments as well as an open information policy are of utmost importance in ensuring the success of agri-environmental schemes in the Burren.
- A menu-type approach to the supplementary measures of the REPS may ensure a wider range of objectives to be achieved.
- Co-operation of agriculturalists and environmentalists in the drawing up of agri-environmental plans should be enforced.
- The decoupling of compensatory payments from production could have a positive influence in the environmental quality in the region.

## Erne Catchment Management Scheme

- Farms in sensitive catchments should be subject to comprehensive pollution risk assessments. Farmers could also be required to undertake Nutrient Management Planning (NMP) in sensitive catchments as part of a strategy to improve water quality.

## Corncrake Conservation Scheme

- The Corncrake Conservation Scheme should continue until there is confidence that the REPS can achieve the same results.

## Proposed changes under Agenda 2000

- The Irish government will be required to link direct payments to environmental conditions. The Heritage Council has the opportunity to make an input into the negotiations currently taking place on CAP reform under Agenda 2000 on the specific environmental conditions for each agriculture payment scheme.

# 1. Outline of the Policy Framework

**Chapter 1.1.** consists of a list of significant legislation, policy developments and publications concerning agriculture schemes and payments, dates of introduction, and brief background information, since Ireland's accession to the EEC in 1973.

**Chapter 1.2.** is a commentary on the most significant policy developments concerning agriculture schemes and payments, and briefly refers to planned future schemes and payments.

**Chapter 1.3.** is a summary of the environmental legislation of relevance to agriculture schemes and payments. This has already been covered in some detail in the Heritage Council study Evaluation of Environmental Designations in Ireland (1997), and in other recent publications.

## 1.1. Summary of Policy Developments and Legislation Since 1973

### The 1970s

- I.** Ireland entered into the European Economic Community (EEC) in 1973, one of the main attractions being the Common Agricultural Policy (CAP).
- II.** The Farm Modernisation Scheme (EEC, 1972a) was introduced in Ireland in 1974 (Department of Agriculture, Food and Forestry (DoA), 1975). The scheme funded, inter alia, land improvement and new farm buildings.
- III.** Headage payments for livestock were introduced in 1975 (EEC, 1975). This was the first direct payment scheme, the main objective being farm income support in disadvantaged areas. It was also the first EEC scheme with an objective to preserve the countryside, but this was to be achieved passively through maintenance of the rural population.
- IV.** The Western Drainage Scheme was introduced in 1979 (EEC, 1978). It had a target of 250,000 acres and an estimated cost over the 5 year period of over £40 million, half of which was financed by the CAP Guidance Fund. It was extended to operate until 1986 (EEC, 1981a). The Cross-Border Drainage Scheme was introduced in 1979 (EEC, 1979a).
- V.** The first EEC nature conservation law, the 'Birds Directive', was brought into force in 1979 (EEC, 1979b), and was implemented in Ireland by the Conservation of Wild Birds Regulations (S.I. 291 of 1985). The directive had very little effect on the wider countryside in Ireland.

### The 1980s

- I.** In 1980, the Ewe Premium Scheme, operating under the EEC Sheepmeat Regime, was introduced (EEC, 1980a).

- II.** The Suckler Cow Premium (EEC, 1980b) was introduced in 1981.
- III.** The ten year Programme for Western Development was introduced in 1981 (EEC, 1980c). Afforestation grants were also available from the EEC for the first time under the package.
- IV.** An Foras Forbartha (AFF), the Irish Planning Agency, published its National Heritage Inventory: Areas of Scientific Interest in Ireland (AFF, 1981), which identified the most valuable areas for wild nature, and provided the basis for the current Natural Heritage Areas (NHAs) and Special Areas of Conservation (SACs).
- V.** A two year EEC interest subsidy scheme was made available to farmers for on-farm development (EEC, 1981b) and a national interest subsidy scheme ran for the same period. By 1983, when both schemes ended, 14,500 farmers had been paid £9.287 million (DoA, 1984).
- VI.** The milk super-levy and milk quotas were introduced in 1984 (EEC, 1984) - the first major changes to the CAP since Ireland's entry to the EEC. Sheep and sucker cow numbers increased as a result, both supported by EEC direct payment schemes.
- VII.** In 1985, the EEC passed the Agricultural Structures Regulation (EEC, 1985). The Farm Improvement Programme was introduced under this Regulation in 1986, which subsidised land improvement and on-farm development generally. This Regulation also enabled Member States to fund farmers in Environmentally Sensitive Areas (ESAs) and subsidise afforestation.
- VIII.** The first State of the Environment report was published in 1985, and included a section on agricultural impacts on the natural environment (Cabot, 1985).
- IX.** The reform of the EC Structural Funds was completed in 1988, which included the CAP Guidance Fund. The reform resulted in Ireland being designated as an 'Objective 1' region (highest priority for structural aid), thereby qualifying for a larger share of EC co-funding for, inter alia, agricultural programmes.
- X.** The European Commission published The Future of Rural Society in 1988 (European Commission, 1988). Much of the current debate about the problems of rural areas was initiated by this document.

## The 1990s

- I.** The National Development Plan 1989-1993 (Government of Ireland, 1990a) was approved by the EC. It included the Operational Programme for the Control of Farmyard Pollution Scheme (CFP), the Headage Payment Scheme, operating under the Operational Programme for Rural Development (1989-1993), and an Afforestation Grant Scheme operating under the Forestry Operational Programme (Government of Ireland, 1990b).
- II.** In 1990, the Department of Agriculture published its policy review (Government of Ireland, 1990c). It anticipated further CAP reforms and a greater EC emphasis on direct payments and environmental sustainability. It also supported commonage division, but recommended an extensification scheme to address sheep overgrazing, which was not implemented.
- III.** In July 1990, the EC published proposals to extend and revise environmental schemes within the CAP (Commission of the European Communities (CEC), 1991).
- IV.** The European Commission's Reflections Paper on the development and future of the CAP (COM (91) 100) was published in 1991 (CEC, 1991).
- V.** INTERREG, a cross-border EC funding initiative, was launched by the EC in 1990 (EEC, 1990) and in Ireland in 1991. A joint operational programme for Ireland and Northern Ireland included measures for agriculture and forestry, and environmental measures such as improving water quality.
- VI.** In 1991, the EC introduced its first policy instrument for organic farming (EEC, 1991a). An Organic Farming Unit was set up in the Department of Agriculture in 1991 and the Irish Organic Farmers and Growers Association (IOFGA) was awarded grant aid for marketing and promotion of organic produce.
- VII.** In July 1991, the Agricultural Structures Regulation and its amendments and the Less Favoured Areas Directive were consolidated by a new Regulation (EEC, 1991b). This was a precursor to the 1992 CAP reforms: it included extensification, agri-environmental, forestry and set-aside measures as well as headage payments.
- VIII.** The second EC nature conservation law, the 'Habitats' Directive, was passed in 1992 (EEC, 1992a). This required, inter alia, the designation of Special Areas of Conservation to protect habitats and species of European importance. The directive was to have important implications for Irish agriculture policy from 1997 onwards.

- IX.** The European Commission published Towards Sustainability in 1992 (CEC, 1992). Agriculture was one of the four priority areas for action, and the Commission policy aimed to link this to the impending CAP reforms.
- X.** The MacSharry CAP reforms were completed in May 1992. Prices and market supports for cereals and beef were significantly reduced. Increased compensatory payments were made available to cereal farmers conditional on set aside, and increased direct payments to beef farmers were conditional on modest stocking rate limits. An Extensification Scheme was made available for less intensive farmers. Sheep and suckler cow quotas were introduced.
- XI.** The 'Accompanying Measures' in the CAP reforms included an Agri-Environmental Scheme (EEC, 1992b), an Early Retirement Scheme for farmers (EEC, 1992c), and an Afforestation Scheme for agricultural land (EEC, 1992d).
- XII.** The Report of the Green 2000 Advisory Group (Green 2000, 1993) recommended a basic code of good environmental practice in farming, and further funding for control of farmyard wastes, but made no specific recommendations on overgrazing.
- XIII.** The Rural Environment Protection Scheme (REPS) was introduced in 1994, under EEC Regulation 2078/92 (EEC, 1992b). It was to run for 5 years initially. The REPS represented a major turning point in Irish agriculture policy.
- XIV.** The Operational Programme for Agriculture, Rural Development and Forestry 1994-1999 was launched (Government of Ireland, 1994). It included the Control of Farmyard Pollution Scheme, the Farm Improvement Programme, the Compensatory Headage Scheme and the Agri-Tourism Scheme.
- XV.** The LEADER II scheme was launched in 1995 (Government of Ireland, no date). It offers, inter alia, assistance for rural groups in rural tourism, exploitation and marketing of agricultural, forestry and fisheries products and promotion and improvement of the environment and living conditions.
- XVI.** The Agri-Tourism Scheme was renewed in 1995 and is available to rural dwellers for providing leisure and tourism facilities, support and marketing, and restoration of old farm buildings for tourism.
- XVII.** The Environmental Protection Agency (EPA) published its report State of the Environment in Ireland (Stapleton, 1996). The report emphasised the problems of overgrazing by sheep in certain mountain areas and the contribution of



the agriculture sector to eutrophication of rivers and lakes.

- XVIII.** The Cork Declaration: A Living Countryside was launched by the EU in 1996, in which sustainable rural development was to be put at the top of the EU's agenda.
- XIX.** The EU Commission in July 1997 published Agenda 2000 (otherwise called the 'Santer package'), which inter alia proposed further reforms to the CAP (European Commission, 1997). The proposals include a more coherent rural policy and a further step towards world market prices partially compensated by direct payments.
- XX.** The Department of the Environment published Sustainable Development: A Strategy for Ireland early in 1997 (DoE, 1997). It included an action programme towards sustainable agriculture.
- XXI.** The Mid-Term Review of the Community Support Framework (Honahan, 1997) recommended that headage payments be replaced by transferring some of the funds to support environmentally desirable objectives. The review of the Control of Farmyard Pollution Scheme commented that the scheme was not sufficiently focused on achieving anti-pollution objectives (Fitzpatrick et al. 1997).
- XXII.** The European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997) were passed in March 1997, offering some protection for proposed candidate Special Areas of Conservation (SACs). After much negotiation with farming groups, a compensation package was introduced and the then Department of Arts, Culture and the Gaeltacht launched a payment scheme for farmers in SACs.
- XXIII.** The Report of the Rural Development Policy Advisory Group was published in 1997 (Government of Ireland, 1997a). Among the recommendations were that the REPS needed evaluation and changes made where necessary; and various premium and headage payments should be made dependent on adherence to environmentally friendly farming practices (i.e. cross-compliance).
- XXIV.** The Department of the Environment launched Sustainable Development: A Strategy for Ireland early in 1997 (Government of Ireland, 1997b). It includes an action programme towards sustainable agriculture.
- XXV.** The Department of Agriculture, Food and Forestry published Towards a Sustainable Land Policy for Ireland in 1997 (DoA, 1997).
- XXVI.** A National Biodiversity Plan is intended for publication in 1998, prepared by the Department of Arts, Heritage, Gaeltacht and the Islands, and will include measures to

reconcile agriculture and conservation of biological diversity.

- XXVII.** In March 1998, the European Commission published detailed proposals for further CAP reforms and rural development under the aegis of Agenda 2000 (European Commission, 1998). More support is proposed for integration of agriculture policy with environmental objectives. A new rural development regulation is also proposed, with some improved environmental provisions.

## 1.2. Commentary: Significant Policy Developments Concerning Agriculture Schemes and Payments

The origin of Ireland's current agriculture schemes and payments dates back to Ireland's accession to the then EEC in 1973. One of the key attractions of EEC membership was the economic benefits that would flow from the Common Agricultural Policy (CAP). Since the CAP was founded in 1962, it had been the cornerstone of the Community, and absorbed about two-thirds of its budget by the early 1970s. Currently, it absorbs about 50%.

In the early 1970s, about 95% of the CAP funds were absorbed in price and market support through the CAP Guarantee Fund (price and market support), and the balance was used for structural measures through the CAP Guidance Fund (structural support). However, since the mid-1970s, farm development schemes played an increasingly important role.

### National farm development schemes in the 1970s

Prior to EEC co-funded schemes, farm development such as drainage and land improvement were funded entirely from the Exchequer. The Land Project, which ran until 1976, subsidised the conversion of a massive 1,025 million ha or about 14% of the country. The Land Project Fertiliser Credit Scheme funded a total of 2,384 ha. Other schemes which had environmental impacts were the Mountain Fencing Scheme and the Mountain Grazing (Supplementary Keep) Scheme, which grant aided a total of 74,000 ha by 1976 (DoA, 1976). By the latter half of the 1970s, these national schemes were phased out and replaced by EEC funded schemes, such as the Farm Modernisation Scheme, the Western Drainage Scheme, and the Programme for Western Development.

### The Mansholt Plan

Socio-structural schemes in the CAP originate in 1968, when Sicco Mansholt, the Dutch Vice-President of the European Commission with responsibility for agriculture, proposed a series of measures based on the following principles:

- I.** Farms would have to become larger and more 'efficient' to cope with increased competitiveness for European food products on the world markets, and intervention policy would have to be relaxed.
- II.** A rural development policy would have to be put in place in disadvantaged areas for agriculture, where food could not be produced 'efficiently', in order to stem rural decline and to preserve communities and the environment (EEC, 1993).

There was thus a recognition in the EEC that a two-tier system of agriculture was being created. By the end of the 1960s, agricultural decline and rural depopulation in Europe's disadvantaged areas was already evident, and farmers in favourable areas were able to benefit from new technology and generous EEC price and market supports to expand and intensify their operations.

The 'Mansholt Plan' did not receive much support from Member States. It is mostly remembered without affection in Irish farming circles as a plan to retire 'inefficient' farmers. The Plan did include, as one of its measures, the first early retirement scheme (EEC, 1972b), as well as the Farm Modernisation Scheme (EEC, 1972a).

## **Agriculture schemes and payments in the 1970s and 1980s**

Up until the CAP reforms of 1992, many Irish agriculture schemes and payments were supported through the CAP Guidance Fund. The Headage Payments Scheme was the first EEC direct grant aid to farmers in disadvantaged areas, and is still considered an important socio-economic support. The Western Drainage Scheme, the Programme for Western Development ('Western Package'), the Cross-Border Drainage Scheme and the Farm Modernisation Scheme were the most significant CAP funded development measures during the late 1970s and early 1980s, and an EEC and a national interest subsidy scheme ran from 1981 to 1983 to assist farmers in on-farm development. All of these schemes had a major environmental impact through widespread wetland drainage, land reclamation, and scrub and hedge clearance. An account of the impacts of these drainage schemes is given in *Wetland Drainage in Europe* (Baldock et al. 1984). The Farm Improvement Scheme, under the Agricultural Structures Regulation (EEC, 1985) replaced the Farm Modernisation Scheme in 1986. The afforestation grants measure under the 'Western Package' did not become significant until the latter half of the 1980s. By the beginning of the 1990s, land development schemes had declined in importance. However, the Western Package had subsidised land improvement during the 1980s on a large scale: by 1990, 835 commonages had been improved, 8,873 schemes were approved for mountain and hill pasture reclamation, and 34,564 lowland reclamation schemes were approved (DoA, 1990), and these projects alone cost £43.039 million. The entire Western Package grant aid amounted to £171 million in 1990, including an EEC contribution of £94 million (DoA, 1991).

From 1973 to 1989, state/EU EC grants invested in agriculture amounted to £941 million (11% of total investment). No environmental conditions were applied to agricultural schemes until the early 1980s, and this was only because a clause in the 'Western Package' stated that there must be 'an assurance that the actions undertaken are compatible with the protection of the environment'.

Land improvement grants could be refused or proposals amended by the Department of Agriculture after consultation with the then Forest and Wildlife Service (currently called Dúchas). However, this screening process only applied to sites identified as Areas of Scientific Interest (some of which later became Natural Heritage Areas), and it was reported at the time that only a minority of grant applications were refused through this process (Hickie, 1996). Environmental conditions were not applied to other agriculture schemes and payments.

The bulk of agricultural spending in the 1970s and 1980s was through the CAP Guarantee Fund, which supported prices and markets. This was partly because price and market policy was 100% funded by the EEC and Ireland had to bear the larger share of the co-financing of structural measures (DoA, 1990). The Suckler Cow Premium (introduced in 1981) and the Ewe Premium (introduced in 1980) are examples of direct payment schemes paid by the Guarantee Fund. The Ewe Premium, in particular, has been heavily criticised by environmental and fisheries interests for providing incentives for over-stocking of commonages in western areas.

## **Change in the CAP in the mid-1980s: milk super-levy and quotas**

The period 1970 to 1978 was by then the most prosperous period in the history of Irish farming. During the transition years after EEC entry, the proportion of national spending on agriculture decreased from 65% in 1973 to 30% in 1978 (DoA, 1990). The short-lived boom was followed by a period in 1979-80 which was less economically favourable. The first significant change to the CAP came in 1984 with the introduction of the milk super levy, which penalised milk production above certain levels. This was one of the ways in which the EEC attempted to curtail production, which, even then, was a cause for concern. The milk super-levy was followed by the imposition of milk quotas, which effectively limited further development and entry into dairy farming, then as now the most profitable farm sector in Ireland. Following this major policy change, farmers responded to EEC direct payments for suckler cows and the Ewe Premium scheme for sheep, which was introduced under the EEC's Sheepmeat Regime, established in 1980. As a result, suckler cow numbers increased and sheep numbers rose dramatically (Harte, 1992).

## **Signals of change in EC agricultural policy in the late 1980s**

The reform of the EC Structural Funds in 1988, and the designation of Ireland as an Objective 1 region, allowed Ireland to obtain a greater share of EC funds for agricultural structural measures. By the end of the 1980s, an integrated approach to rural development and environmental management had begun to be incorporated into the language, if not the actions, of EC and national policy. At the same time, the effects of over-stocking of certain hill areas were becoming more evident, and there was more public consciousness of the negative effects of modern agriculture. In the late 1980s, a succession of wet summers and a rapid conversion by many farmers from hay to silage, without proper effluent storage facilities, resulted in a large number of fish kills. The Operational Programme for the Control of Farmyard Pollution was brought into effect in 1989. This was a programme of capital investment in animal housing and effluent storage to minimise pollution from farm wastes. At this time, farming groups demonstrated a lack of enthusiasm for

environmental measures such as the proposed Environmentally Sensitive Areas Scheme (ESA), and the farming press tended to react with indifference or opposition to proposals for environmental measures generally. Part of the reason for this was the possibility that environmental measures might be used to restrict the further development of agriculture.

## **Policy Review in the Department of Agriculture (1990)**

In 1990, the Department of Agriculture published its policy review (DoA, 1990), and acknowledged:

- That direct payments would not be a permanent solution for rural development and that structural improvement was essential
- That environmental damage was occurring through sheep overgrazing
- The principle of sustainability in agriculture and its dependence on a good quality environment

### **The Review recommended:**

- Reduced market supports should be compensated by increased direct payments, e.g. the Suckler Cow premium
- The Sheepmeat Regime, under which the Ewe Premium is paid, should be retained, but it was also recommended to lower the maximum flock size on which premiums are paid
- The Farm Improvement Programme should be retained
- Priority in headage payments for low-income farmers
- Farmers should be compensated for environmental restrictions that go beyond good farming practice, but also acknowledged the 'polluter pays' principle
- A basic code of good environmental practice should be prepared
- An EC extensification scheme for sheep in areas affected by overgrazing
- Increased funds for expansion of the ESA scheme

## **The first Irish agri-environment scheme in 1991**

During the early 1990s, environmental issues began to assume greater importance. EEC Regulation 2328/91 introduced extensification, set-aside, Environmentally Sensitive Area (ESA) and forestry schemes. The ESA pilot schemes, which were the first Irish schemes to offer direct payments to farmers for countryside conservation, were initiated in the Slieve Bloom Mountains and Slyne Head in 1991, but lack of promotion and lack of enthusiasm among farmers limited participation and eventually the schemes were phased out with the introduction of the REPS in 1994 (Hickie, 1997).

## **The MacSharry CAP Reforms of 1992**

The CAP reforms of 1992 represented the most significant shock to the Irish agricultural sector since EEC entry in 1973. The reforms are highly significant in the context of this study. Since the reforms came into effect, there has been a much greater emphasis on agriculture schemes and payments as instruments to support farm incomes. On the other hand, price and market supports began to be reduced.

By the 1980s, the EEC had become the world's second largest exporter of food, and around 70% of the EEC's budget was spent on disposing of surplus food. In addition, there was a growing divide between 'commercial' farms which had exploited the CAP supports and taken advantage of new technologies to develop, and 'marginal' farms in physically difficult regions which were increasingly unviable. The developments signalled by the 'Mansholt Plan' in 1968 and the Department of Agriculture Policy Review in 1990 had become a reality. Also, the environmental impacts of intensive agriculture, favoured by the CAP, could no longer be ignored.

In essence, the main stimuli behind the reform of the CAP were:

- Pressure from countries outside the EC, through the General Agreement on Tariffs and Trade (GATT), to reduce barriers to food imports into the EC and to reduce subsidies on EC exports
- Pressure from within the EC to reduce the costs of supporting agriculture

Even though protection of the environment was listed as one of the reasons for the reforms, in reality trade and budgetary considerations dominated, and the main target was to cut production in the beef and arable sectors to restore a better market balance. Price supports were reduced and more generous compensatory payments introduced to make up the losses from lower prices.

## Arable sector

As a condition of the new Arable Aid Scheme, paid on an area basis, large arable farmers (over 15.13 ha) were required to set aside a proportion of their land annually on a rotational basis in return for receiving compensatory payments on the basis of acreage, while small arable farmers (under 15.13 ha) remained exempt from set-aside.

## Beef sector

In the beef sector, the increased Special Beef Premium and Suckler Cow Premium were to be paid on condition that farmers adhered to a stocking density limit (maximum of 2 livestock units or LUs), in order to curb intensification and thus limit increases in beef production. Quotas were introduced for suckler cows. Farmers with stocking densities of less than 1.4 LU were to be entitled to an Extensification Premium, which was also aimed at curbing increases in production. Although these measures might have seemed beneficial for the environment, the stocking limits were still generous and there were no specific environmental conditions linked to any of the revised payment schemes.

## Sheep sector

In the sheep sector, a ewe quota was introduced, as an attempt to curb increases in sheep numbers throughout the EC. In addition, ewe premium rights inside the Disadvantaged Areas could not now be transferred outside these areas. The flock numbers on which premiums could be paid remained at 1,000 ewes in Disadvantaged Areas and 500 ewes elsewhere. By this stage, overgrazing in certain western areas, encouraged by the Ewe Premium, was beginning to be acknowledged officially.

## Environment and forestry included in CAP reforms

The so-called 'Accompanying Measures' in the CAP reforms included an Early Retirement Scheme for farmers (Regulation 2079/92), an Afforestation Scheme for agricultural land (Regulation 2080/92) and an Agri-Environmental Scheme (Regulation 2078/92). The Accompanying Measures were, in effect, adjuncts to the main reforms, and amounted to just 1% of the CAP budget in 1992. Even so, they represented some significant changes to the CAP, viz:

- I.** Member States were required to prepare an agri-environmental action plan for the country as a whole, which was more ambitious than anything previously introduced. In Ireland's case, this could be funded up to 75% by the EC. The Rural Environmental Protection Scheme (REPS) was introduced in 1994 under this measure
- II.** Regionalisation was introduced, whereby Member States could produce their own plans for each accompanying measure, provided that the plan adhered to a number of general principles. In addition, these measures were only part-funded by the EC, whereas the mainstream CAP schemes and payments were 100% funded by the EC.
- III.** For the first time, afforestation was to be funded through the CAP instead of the Structural Funds. Afforestation was seen as a way of taking land out of agriculture, and encouraging farmers to reduce production of commodities in surplus towards growing timber, which was not in surplus. The Irish Afforestation and Premium Schemes offered the most generous incentives to date for

farmers and others to afforest agricultural land.

- IV.** The Early Retirement Scheme was a further development of the previous EC measure in 1972, designed to increase farm viability but also aimed at taking land out of agricultural use. The Irish Early Retirement from Farming Scheme offered a pension of up to £10,000 for ten years.

Beef, cereal and sheep farmers could continue to produce more than the quotas imposed, but they could not avail of EC aid. Only in the case of milk was there a penalty for over-production (the milk super-levy). Although the MacSharry reforms were heavily criticised by the farm lobby groups prior to 1993 as a threat to the profitability of the agricultural sector, farm incomes in Ireland rose in the years immediately following the reforms, mainly as a result of the new compensatory payments.

### **Agriculture schemes and payments post CAP reforms, 1993-1997**

Agriculture schemes and payments following the MacSharry CAP reforms of 1992 reflect the current EU policies of reducing production of products in surplus (e.g. beef, cereals and sheepmeat), stimulating rural enterprises other than mainstream agriculture (e.g. forestry, organic farming, tourism, and integrated rural development), and giving more support to agri-environmental matters (the REPS, environmental conditions in agriculture schemes and payments).

The Rural Environment Protection Scheme (REPS), introduced in July 1994, represented a sea change in Irish agricultural policy. For the first time, any farmer could apply to join a voluntary 5 year scheme which offered annual payments of £122 per ha per year in return for protection of the countryside. In order to conform with EU policy, the REPS was targeted at small and medium farmers who were already extensive, since the limits placed on fertiliser inputs and stocking rates effectively discouraged the more intensive commercial dairy and arable farmers from participating.

On the structural side, the Operational Programme for Agriculture, Rural Development and Forestry (OPARDF) 1994-1999 was launched. This included the Control of Farmyard Pollution Scheme, the Farm Improvement Scheme, the Agri-Tourism Scheme, the Development of Organic Farming Scheme and the Compensatory Headage Scheme.

Several Community Initiatives, LEADER and INTERREG, continued to operate to stimulate a more integrated approach to rural development, which was an acceptance by policy makers that support of mainstream agriculture alone could not deliver the objectives of halting rural decline and supporting the rural economy as a whole.

The importance of compensatory payment schemes to sections of the farming community was even more emphasised during the mid-1990s. In 1996, for a significant number of sheep farmers the Ewe Premium and Rural World Premium represented 110% of their income, which meant that subsidies had to cover their losses as well as being the only income they had. By the end of 1997, the sheep sector was coming under renewed economic pressure.

### **Proposals for rural development and further CAP reform into the 21st century**

The Cork Declaration: A Living Countryside was launched by the EU in 1996 in Cork. Sustainable rural development was to be put at the top of the EU's agenda.

The EU Commission in July 1997 published Agenda 2000 (otherwise called the 'Santer package'), which inter alia proposed further reforms to the CAP, including a more coherent rural policy and a further step towards world market prices partially compensated by direct payments. Detailed proposals were published in March 1998. One of the major driving forces behind the reforms is the requirement to remain within the market disciplines agreed under the Uruguay Round of the General Agreement on Tariffs and Trade (GATT). The other is the need to prepare for eventual enlargement of the EU to include Eastern European countries. However, the focus of this work remains market management rather than a fundamental review of the directions in which EU agriculture policy should go in the 21st century (Matthews, 1997). These planned policy developments are discussed in more detail in Chapter 9.

## Irish agri-environment policy post CAP reform

More attention is being given to the impacts of agriculture in designated natural areas. The REPS was the first scheme to offer incentives for management of land within Natural Heritage Areas, in 1994. This measure was followed by the SAC scheme and the announcement of a compensation package for farmers in designated Special Areas of Conservation, parallel with the belated enactment of the Habitats Directive into Irish law in March 1997.

More attention is also being given to the impacts of agriculture on freshwater, through legislative changes (e.g. the Waste Management Act, 1996), and advice to farmers. The EU co-funded cross-border Erne Catchment Nutrient Management Programme was launched in 1997 to advise farmers on nutrient management. Managing Ireland's Rivers and Lakes was launched by the Department of Environment in May 1997 (DoE, 1997). It is a catchment-based strategy, in line with proposed EU water policy (CEC, 1997). The strategy, inter alia, aims to reduce artificial phosphate fertiliser by 10% over the next five years, and promote nutrient management planning by farmers, greater uptake of the REPS, and the Code of Good Agricultural Practice (DoA, 1996).

Sustainability began to enter the language of policy makers at EU and national level. The Department of the Environment published Sustainable Development: A Strategy for Ireland early in 1997 (Government of Ireland, 1997b). It includes an action programme towards sustainable agriculture. The Department of Agriculture, Food and Forestry published Towards a Sustainable Land Policy for Ireland in 1997 (DoA, 1997). The Report of the Rural Development Policy Advisory Group was published in 1997 (Government of Ireland, 1997a). Among the recommendations were that the REPS needed evaluation and changes made where necessary; and various premium and headage payments should be made dependent on adherence to environmentally friendly farming practices (i.e. cross-compliance). All the above policy documents address current and future agri-environmental issues in a cautious and conservative manner, reflecting the general reluctance at national and EU level to make extensive or radical changes in policy in the immediate future.

## Conclusions

In the 1970s and 1980s, agriculture schemes and payments concentrated on bringing more land into production and promoting intensification in order to stimulate output. They had a major impact, albeit mostly unquantified, on wildlife habitats, water quality, the landscape and the archaeological heritage.

The only environmental conditions for agricultural schemes and payments until the 1990 applied to the Programme for Western Development, and these were limited. By the end of the 1980s, land improvement schemes had declined in importance, as the Programme for Western Development drew to a close, and large scale arterial drainage schemes undertaken by the Office of Public Works were effectively phased out. Nature conservation legislation was either incapable of addressing agricultural development or was not used to minimise its environmental impact, and planning law did not cover many agricultural activities up until 1990. Water pollution legislation was beginning to be applied more effectively by the late 1980s following a rise in the number of agriculture-related fish kills.

In the early 1990s, environmental issues began to assume more significance in agriculture schemes, mainly because of the requirement to comply with EEC directives. Large land reclamation and drainage projects, and large pig and poultry installations were subject to Environmental Impact Assessment (EIA) from 1990. However, there was little enforcement of planning conditions and EISs for agricultural projects were often deficient. Policy reviews such as Green 2000 (1993) and the Department of Agriculture Policy Review (1990) made little effective difference to the way that agricultural schemes and payments affected the environment.

Agri-environmental issues received more attention since the REPS was introduced in 1994. There was an expectation that the REPS would be able to provide a counter-balance to the generally negative environmental effects of land improvement and drainage schemes and some livestock premium payments. However, the lack of baseline information and monitoring procedures presented great difficulties in assessing if the REPS is fulfilling its objectives. The passing into Irish law of the Habitats Directive early in 1997 heralded the beginning of protection of the most important wildlife sites, many of which are owned by farmers. This was accompanied by a special compensation scheme for farmers in Special Areas of Conservation (SACs).

As the century draws to a close, agricultural sustainability is entering into the language of policy makers, but this may not necessarily translate into effective action to harmonise agricultural and environmental policies at EU and national level. The EU's Agenda 2000 is likely to be agreed by Spring 1999, and will come into force in 2000. However, it appears unlikely to proceed far enough to fully achieve stated environmental policy objectives at EU and national level. This issue is discussed more fully in Chapter 9.

## 1.3. Summary of Environmental Legislation Relevant to Agriculture

In this section, the environmental legislation as it applies to agriculture is summarised. Most of the legislation listed below has its origins in EU directives which Ireland is legally bound to implement. Attention is given to legislation applying to the wider countryside and to environmental designations that apply to privately owned land, i.e. land owned

by farmers. The Heritage Council is referred to its publication Evaluation of Environmental Designations in Ireland for a detailed appraisal of nature conservation legislation as it applies to designated areas. It should be noted that legislation is only as good as its application and enforcement in practice. There has been a tendency in Ireland for legislation not to be applied as effectively as might be expected, due to shortage of staff and finances, or because of a lack of appropriate information, or because of lack of political will.

### **i) The Wildlife Act, 1976 (proposed for amendment in 1998)**

Enforced by the Dúchas (formerly the National Parks and Wildlife Service), operating under the Department of Arts, Heritage, Gaeltacht and the Islands.

The provisions of the Wildlife Act concerning designated areas are contained in Evaluation of Environmental Designations in Ireland (Hickie, 1997). The Act is recognised to be out of date. It is due for amendment in the near future, and will provide for, inter alia, a limited period of protection of Natural Heritage Areas (NHAs). The provisions of the Act applying to the wider countryside include:

- Intentional interference with wild birds, wild mammals or wild plants which are protected under the Act, or their habitats is prohibited.
- The Flora Protection Order, made under the Act, currently protects 68 species of wild plants. Some of the sites of these species are within NHAs and SACs.
- All wild birds, their nests and eggs are protected under the Act, except for a number of 'pest' species (e.g. Wood Pigeon, Hooded Crow).
- Certain game birds (e.g. Red Grouse, Woodcock, Snipe) can be hunted during an open season, under licence.
- Protected terrestrial mammals include Badger, bat species, deer species, hare species, Otter, Hedgehog, Pine Marten, Red Squirrel; one amphibian, the Natterjack Toad, is protected.

### **ii) The 'Birds' Directive**

Introduced in 1979 (EEC, 1979). Implemented in Ireland by the Conservation of Wild Birds Regulations (S.I. 291 of 1985).

Enforced in Ireland by Dúchas, operating under the Department of Arts, Heritage, Gaeltacht and the Islands.

The Directive obliges Ireland to take appropriate steps to avoid pollution or deterioration of habitats or any disturbances affecting certain rare or threatened birds species listed in the Annexes. Among the listed bird species relevant to agriculture are: Greenland White-Fronted Goose, Golden Plover, Merlin, Corncrake. Designation of sites which qualify as Special Protection Areas is mandatory and undesignated qualifying sites must be given the same protection as designated sites. The Birds Directive also requires the avoidance of pollution or deterioration of habitats of listed bird species outside SPAs.

SPAs will in future be incorporated into the network of Special Areas of Conservation From 1997, SPAs are protected by the same site safeguards as SACs (see 'Habitats' Directive, below).

### **iii) The 'Habitats' Directive**

Introduced in 1992 (EEC, 1992). Implemented in Ireland by the European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997).

Enforced in Ireland by Dúchas, operating under the Department of Arts, Heritage, Gaeltacht and the Islands.

The Directive, inter alia, requires sites qualifying as natural sites of European importance to be designated as Special Areas of Conservation (SACs) and properly conserved. Legal provisions for conservation in SACs include:

- Permission for damaging developments in non-priority habitats may only be given for imperative reasons of overriding public interest.
- Permission for damaging developments in 'priority' habitats (e.g. designated peatlands, sand dunes, limestone pavement, turloughs) may only be given for overriding health and safety reasons.
- There must be assessment of developments not connected with, or which take place outside an SAC, but which might have a significant impact on it.
- Sites damaged illegally must be restored.
- Local authorities must assess developments prior to making decisions on planning application.



- Landowners must be notified of designations.
- Landowners may be compensated for proven loss of income arising from designation.
- Management agreements may be made with landowners.
- Management plans should be prepared, either for specific sites or integrated into development plans.

#### **iv) The 'Nitrates' Directive**

Introduced in 1991 (EEC, 1991). Responsible department: Department of Agriculture and Food. No specific implementing legislation.

The Directive requires Member States to monitor ground and surface waters and to designate vulnerable zones if levels of nitrates in groundwater exceed 50mg/litre or are likely to be exceeded in action is not taken. Member States must also designate any freshwaters, estuaries, coastal and marine waters found to be eutrophic from nitrates, or which are likely to become eutrophic in the near future if action is not taken. Annex II sets out a Code of Good Agricultural Practice, which has been implemented in Ireland by means of a booklet (DoA, 1996). Annex III defines measures which need to be taken in action programmes by Member States.

#### **v) The 'Freshwater Fish' Directive**

Introduced in 1978 (EEC, 1978).

Implemented in Ireland by the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 84 of 1988). Enforced by local authorities.

Ireland is legally required by the EU Freshwater Fish Directive to designate Salmonid Waters. Twenty two rivers have been designated to date. Limits are set in the Directive and the Irish Regulations for a number of water quality parameters. However, the limit of 0.2 mg/litre for phosphorus, the main cause of eutrophication of Irish rivers and lakes, is inadequate (Hickie, 1997).

#### **vi) The 'Groundwater' Directive**

Introduced in 1980 (EEC, 1980).

Implemented in Ireland by the Local Government (Water Pollution) Acts, 1977 and 1990, and the Waste Management Act, 1996. All three Acts are enforced by local authorities.

#### **vii) The Planning Acts, 1963 onwards and Regulations made under the Acts**

Enforced by local authorities.

The following rural developments require planning permission and an environmental impact assessment under the Acts:

- Drainage of wetlands over 50 ha
- Land reclamation projects over 100 ha
- Turf development projects over 50 ha
- Afforestation projects over 70 ha
- Piggeries with capacity for 3000 pigs or more on normally drained soils
- Piggeries with capacity for 1000 pigs or more on poorly drained, gley soils
- Felling of trees protected by Tree Preservation Orders
- Fencing of open land and farm roads are normally exempted development, but there are specific exceptions in scenic areas designated in County Development Plans and land open to the public for ten or more years
- Farm buildings over 400 sq ft

#### **viii) Fisheries Acts, 1959-1991 and Water Pollution Acts, 1977 and 1990.**

The Fisheries Acts are enforced by the Regional Fisheries Boards, operating under the Department of the Marine and Natural Resources. Local authorities are responsible for enforcing the Water Pollution Acts. The main provisions of the Acts relevant to agriculture are:

- I.** Prohibition of animal slurry and silage effluent from farmyards entering water courses or wells.
- II.** A local authority can restrict, or in some cases prohibit, slurry spreading and silage making if this could result in water pollution, by means of bye-laws. No such bye-laws have been made.
- III.** Prosecution for causing water pollution may entail liability for costs of replacing fish stocks, compensating people who have suffered losses as a result of the pollution, and compensating the authorities for costs of investigating the pollution.
- IV.** If a person is charged with causing water pollution, he will have to prove in court that suitable and adequate facilities and practices were used to prevent pollution. Otherwise, he may be prosecuted and may liable for fines and costs.

### **ix) Forestry Act, 1946**

Enforced by the Forest Service, currently operating under the Department of the Marine and Natural Resources.

The felling of any tree in a rural area requires a felling licence, usually with re-planting conditions. There is no provision for granting or refusing a felling licence on environmental grounds.

### **x) Arterial Drainage Acts, 1945-1995**

Enforced by the Commissioners of Public Works, who are responsible for arterial drainage. The Acts enable the Commissioners to prepare drainage schemes for entire catchments or parts of catchments. Wetland drainage schemes greater than 50 ha are subject to EIA under the Local Government (Planning and Development) Regulations S.I. No 25 of 1990 and the European Communities (Environmental Impact Assessment) Regulations S.I. No 349 of 1989.

### **xii) Waste Management Act, 1996**

Local authorities have been given powers to require nutrient management planning by farmers. This is in order to control the inputs of nutrients into waters in areas where Environmental Protection Agency water quality data identify agriculture as a significant contributor to eutrophication of rivers and lakes under the Waste Management Act, 1996.

### **xiii) EPA Act, 1995**

Integrated Pollution Control Licences (IPCL) are required for pig and poultry units above the thresholds specified in the European Communities (Environmental Impact Assessment) Regulations S.I. No 349 of 1989.

## **Summary**

Environmental legislation controlling agricultural activities is relatively comprehensive. The various responsible authorities have been given powers to regulate the following:

- I.** Local authorities can enact bye-laws to control agricultural activities such as slurry spreading in order to protect against water pollution.
- II.** Local authorities can require nutrient management planning by farmers to control the inputs of nutrients such as

phosphorus and nitrogen into waters.

- III.** Local authorities and Regional Fisheries Boards have the powers to prosecute farmers for point sources of farm pollution, where it is proven, such as leakages of silage effluent and slurry entering waters. Restitution of fisheries is also provided for.
- IV.** The Department of Agriculture and Food has the power to limit or refuse Ewe Premiums where there is evidence of environmental damage arising. The Department of Agriculture and Food and the Department of Marine and Natural Resources can also refuse capital grants for agriculture and forestry respectively, where there is a threat of environmental damage.
- V.** The Department of Agriculture and Food is allowed to issue guidelines for the environmentally friendly management of set aside under the Arable Aid Scheme.
- VI.** The Department of Agriculture and Food can regulate the management of land transferred under the Early Retirement from Farming Scheme in a manner which is compatible with environmental protection.
- VII.** Dúchas can regulate hunting and has the powers to protect all bird species, their nest and eggs, and most native mammals against interference. Dúchas also has the powers to put in place management plans with landowners to conserve habitats and species, both by voluntary means and by compulsory means (i.e. Refuges for Fauna).
- VIII.** Dúchas is required to designate and protect habitats so designated as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). Local authorities have a legal responsibility to protect SACs through the planning process. Dúchas is also required to put in place countrywide measures for the protection of certain bird species listed in the Birds Directive.
- IX.** Local authorities can regulate a number of agricultural or agriculturally-related activities by granting or refusing planning permission, enforcing the conditions of planning permissions, such as large forestry projects, large piggeries and poultry units, large land reclamation and drainage projects, tree felling under Tree Preservation Orders, fencing of open land under certain circumstances and certain farm buildings. An Bord Pleanála can also grant or refuse planning permission for any agricultural developments listed in the Planning Regulations.
- X.** The Environmental Protection Agency requires Integrated Pollution Control Licences for large pig and poultry units.

## References

- AFF (An Foras Forbartha) (1981): *National Heritage Inventory*. Areas of Scientific Interest in Ireland. Dublin.
- Baldock, D., Hermans, B., Kelly, P., and Mermet, L (1984) *Wetland Drainage in Europe: The Effects of Agricultural Policy in four EEC countries*. Institute for European Environmental Policy and Institute for Environment and Sustainable Development.
- Cabot, D (Ed.) (1985). *The State of the Environment: A report prepared for the Minister for the Environment*. An Foras Forbartha, Dublin.
- CEC (1991) *The Development and Future of the CAP: Reflections Paper of the Commission*. (COM (91) 100 final), Brussels, 1 February 1991.
- CEC (Commission of the European Communities) (1988) *The Future of Rural Society*. Brussels.
- CEC (Commission of the European Communities) (1991) (COM (90) 366).
- CEC (Commission of the European Communities) (1992) *Towards Sustainability: A European Community Programme of Policy and Action in relation to the Environment and Sustainable Development*. COM (92) 23 final, Vol. II. Brussels, 27 March 1992.
- CEC (Commission of the European Communities) (1997) Further amendments were consolidated in Council Regulation (EC) No 950/97 of 20 May 1997 on improving the efficiency of agricultural structures Official Journal NO. L 142 , 02/06/1997 P. 1 -21
- DoA (Department of Agriculture) (1975). Annual Report, 1975. Stationery Office, Dublin.
- DoA (Department of Agriculture) (1976). Annual Report, 1976. Stationery Office, Dublin.
- DoA (Department of Agriculture) (1984). Annual Report, 1983. Stationery Office, Dublin.
- DoA (Department of Agriculture) (1997). Annual Report, 1996. Department of Agriculture, Food and Forestry.
- DoA (Department of Agriculture, Food and Forestry (1997). *Towards a Sustainable Land Policy*. Department of Agriculture, Food and Forestry.
- EEC (1972a) *Council Directive of 17 April 1972 on the modernisation of farms (72/159/EEC)*. Official Journal, No L 096, 23. 04. 1972.
- EEC (1972b) *Council Directive of 17 April 1972 concerning measures to encourage the cessation of farming and the re-allocation of utilised agricultural area for the purposes of structural improvement (72/160/EEC)*. Official Journal, No L 096, 23. 04. 1972.
- EEC (1975) *EEC Directive 75/268 on mountain and hill farming and farming in certain less-favoured areas*. Official Journal No L 128 of 19. 05. 1975.
- EEC (1978) *Council Directive of 18 July 1978 on the quality of freshwaters needing protection or improvement in order to support fish life (78/659/EEC)*. Official Journal No L 222/1, 14. 08. 1978.
- EEC (1978) *Council Directive of 19 June 1978 on a programme to accelerate drainage operations in less-favoured areas of the west of Ireland (78/628/EEC)*. Official Journal, No L 206, 29. 07. 78.
- EEC (1979a) *Council Directive of 6 February 1979 on a programme to promote drainage in catchment areas including land on both sides of the border between Ireland and Northern Ireland (79/179/EEC)*. Official Journal, No L 43/23, 20. 02. 79.
- EEC (1979b) *EEC Directive 409/79 of 25 April 1979 on the conservation of wild birds*. Official Journal, No L 103 25. 04. 79.
- EEC (1980) *Council Directive of 17 December 1980 on the protection of groundwater against pollution caused by certain dangerous substances (80/68/EEC)*. Official Journal No L 20/43, 26. 01. 1980.
- EEC (1980a) *EEC Regulation 1837/80 of 27 June 1980 on the common organisation of the market in sheepmeat and goatmeat*. Official Journal, No L 183, 16. 07. 1980.
- EEC (1980b) *EEC Regulation 1357/80 of 5 June 1980 introducing a system of premiums for maintaining suckler cows*. Official Journal No L 140, 5. 06. 80.
- EEC (1980c) *EEC Regulation 1820/80 of 14 July 1980 for the stimulation of agricultural development in the less-favoured areas of the West of Ireland*. Official Journal, No L 180, 14. 07. 80.
- EEC (1981a) *Council Regulation of 27 July 1981 on a special programme concerning drainage operations in the less-favoured areas of the west of Ireland (81/2195/EEC)*. Official Journal, No L 214, 1. 08. 1981.
- EEC (1981b) *EEC Council Decision 598/81*
- EEC (1984) *EEC Regulation No 1371 of 18 May 1984 laying down detailed rules for the application of the additional levy referred to in Article 5c of Regulation (EEC) no. 804.68*. Official Journal, No L 132, 18. 05. 1984.
- EEC (1985) *EEC Regulation 797/85 of 30 May 1985 on improving the efficiency of agricultural structures*. Official Journal, No L 93, 30. 03. 1985.
- EEC (1990) Interreg (Official Journal No C 215, 30.03.90).
- EEC (1991) *Council Directive of 12 December 1991 on the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC)*. Official Journal No L 375/1, 31. 12. 1991.
- EEC (1991a) *EEC Regulation 2092/91 on the organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs*. Official Journal, No L 198/1, 22. 07. 1991.
- EEC (1991b) *EEC Regulation 2328/91 of 15 July 1991 on improving the efficiency of agricultural structures [amending Directive 795/85/EEC and Directive 268/75/EEC]*. Official Journal, No L 218, 6. 08. 1991.
- EEC (1992) *EEC Directive 92/42/EEC on the conservation of natural habitats and of wild fauna and flora*. Official Journal No L 206, 27. 07. 92 .
- EEC (1992a) *EEC Directive 92/42/EEC on the conservation of natural habitats and of wild fauna and flora*. Official Journal No L 206, 27. 07. 92 .
- EEC (1992b) *EEC Regulation No 2078/92 of 30 June 1992 on agricultural production methods compatible with the requirements of the protection of the environment and maintenance of the countryside*. Official Journal, No L 215, 30. 07. 1992.
- EEC (1992c) *EEC Regulation No 2079/92 of 30 June 1992 instituting a Community aid scheme for early retirement from*

*farming*. Official Journal, No L 215, 30. 07. 1992.

EEC (1992d) *EEC Regulation 2080/92 of 30 June 1992 instituting a Community aid scheme for forestry measures in agriculture*. Official Journal, No L 215, 30. 07. 1992.

European Commission (1997) Agenda 2000. COM (97) 2000 final. Brussels.

European Commission (1998) Agenda 2000: *The Future of European Agriculture*. Directorate-General of Agriculture (DG VI), Brussels. Web address: <http://europa.eu.int/en/comm/dg06/>

Fitzpatrick and Associates, Economic Consultants (1997). *Operational Programme for Agriculture, Rural Development and Forestry* (OPARDF) 1994-1999. Mid-Term Review Report, January 1997. Unpublished.

Government of Ireland (1990a) *National Development Plan*, 1989-1993. Stationery Office, Dublin.

Government of Ireland (1990b) *Forestry Operational Programme*, 1989-1993. Stationery Office, Dublin.

Government of Ireland (1990c) *Agriculture and Food Policy Review*. Stationery Office, Dublin.

Government of Ireland (1994) *Operational Programme for Agriculture, Rural Development and Forestry 1994-1999*. Stationery Office, Dublin.

Government of Ireland (1997a) *Report of the Rural Development Policy Advisory Group*. Stationery Office, Dublin.

Government of Ireland (1997b) *Sustainable Development: A Strategy for Ireland*. Stationery Office, Dublin.

Government of Ireland (no date) *Operational Programme for the Implementation of the EU LEADER II Initiative in Ireland*, 1994-1999. Stationery Office, Dublin.

Green 2000 (1993) Green 2000 Advisory Group: Report presented to the Taoiseach, Mr. Albert Reynolds, T.D., February 1993.

Harte, L. (1992) *Impacts of CAP for activity at farm level*. In: *Environment and Development in Ireland*, edited by John Feehan. Environmental Institute, University College Dublin.

Hickie, D (1996) *Evaluation of Environmental Designations in Ireland. First Edition*. The Heritage Council, Kilkenny.

Hickie, D (1997). *Evaluation of Environmental Designations in Ireland. Second Edition*. The Heritage Council, Kilkenny.

Honahan, P (1997) *Mid-Term Review of the Community Support Framework*. ESRI, Burlington Road, Dublin.

Matthews, A (1997) *The structures and instruments created by the Common Agricultural Policy of the EU*. Paper presented at the conference 'Latest Developments in the EU Common Agricultural Policy'. Academy of European Law, Trier. Dublin Castle, 27-28 June 1997.

Stapleton, L. (1996) *The State of the Environment in Ireland*. Environmental Protection Agency, Ardcavan, Wexford.

## 2. Description of Agricultural Schemes and Premia Payments Operating in Ireland

This chapter is broken down into the following sections:

- 2.1.** Compensatory livestock and arable payments operating under the CAP Guarantee Fund
- 2.2.** Schemes under the CAP 'Accompanying Measures'
- 2.3.** Schemes and payments operating through the EU Structural Funds

### 2.1. Compensatory livestock and arable payments operating under the CAP Guarantee Fund

The schemes described in this section are all funded 100% from the CAP Guarantee Fund. No expenditure is incurred by the Exchequer. The schemes are highly significant following the CAP reforms of 1992, which targeted the beef and cereal sectors in particular. The Ewe Premium is also important as an income support for sheep farmers, especially in the Disadvantaged Areas. The schemes and the linkages between them and the headage payment scheme are complicated, partly because of number of schemes and partly because of the stocking rate limitations on which payments are conditional.

In order to avail of livestock and arable subsidies, farmers must complete an Area Aid Application form each year. This includes a large scale map of the farm showing land for which payments are eligible and the area in hectares, and non-eligible land, such as hedges, ditches, scrub and woodland. Livestock payments are conditional on stocking rate limitations (currently 2 LU per hectare or 0.8 LU per acre), and stocking rates are determined by reference to the forage area on the farm. It follows that the greater the forage area, the greater the amount of livestock subsidies which can be claimed. This should be borne in mind when considering habitat conservation, since there may be an incentive to reclaim habitats in order to increase the forage area.

#### 2.1.1. Ewe Premium Scheme

##### Background

The scheme supports sheep farmers throughout the EU. It began in 1980, and has been amended on a number of occasions. In 1991, the EU introduced a quota regime on premium rights in order to restrict supply so as to re-establish market prices, which had tended to fall pre-1992 (European Commission, 1993).

##### Purpose

Intended as a deficiency payment to supplement the market price received by farmers and to maintain it in the face of fluctuations in the price of sheepmeat.

##### Legislation

EEC Regulation 1837/80 of 5 June 1980 on the common organisation of the market in sheepmeat and goatmeat (O.J. No L 183, 16. 07. 1980). Amended by EEC Regulation 3013/89, EEC Regulation 3493/90, EEC Regulation 2069/92, and EC Regulation 233/94.

##### Nature of payment

Payments are made per animal. Approximately £16 per ewe in 1996.

##### Public expenditure

£113. 088 million in 1996. Spending on EU sheep premiums throughout the Union amounted to 1.7 billion ECU in 1996.

##### General conditions

- Farmers need not submit an area aid application
- Full Premium payable on maximum of 500 ewes in non-Disadvantaged Areas and 1,000 ewes in Disadvantaged Areas, and half the premium on each ewe over the maximum numbers
- Each sheep farmer must hold a quota and have at least ten ewes that have lambed or will be at least one year old by the end of the 100 day retention period
- Quotas may not be transferred outside Disadvantaged Areas
- Current stocking rate limitations: 2 LUs per ha in 1996 (13 sheep per ha, or 5.4 sheep per acre)
- Premium is paid per forage hectare

### **Environmental conditions**

EC Regulation 233/94 of 24 January 1994 (O.J. No L 30/9, 3.02.94) enabled Member States to apply non-mandatory environmental protection measures, including non-payment of the premium for breaches.

Article 5 (d) of EC Regulation 233/94 states:

*'Member States may apply appropriate environmental protection measures on the basis of the specific situation of the land used for the production of sheep and goats eligible for benefit under the premium scheme.'*

*'Member States which avail themselves of this possibility shall impose penalties appropriate to and commensurate with the seriousness of the ecological consequences of any breach of these measures. Such penalties may provide for the reduction, or where necessary the abolition of the benefits linked to the respective premium schemes. Member States shall inform the Commission of the measures they take pursuant to this article.'*

The above non-mandatory measures have not been applied in Ireland.

- I.** Transfers of premium quota rights to flock owners who have grazing rights in designated 'degraded' commonages under the REPS is conditional on those farmers participating in the REPS or who give an undertaking that they will not graze any additional sheep on the degraded areas from 1 November to 30 April, each year. This is designed to prevent the beneficial effects of the REPS de-stocking measure being undermined (see Chapter 2.2.2).
- II.** A proposed cross-compliance measure, if approved by the European Commission, will involve payment of ewe premiums and headage payments to farmers in designated Degraded Areas only if farmers join the REPS. This proposed measure is designed to curb overgrazing (see Chapter 5.1.1).

### **2.1.2. Rural World Premium**

#### **Purpose**

Compensation for reduction in Ewe Premium.

#### **Nature of payment**

Per animal, as per the Ewe Premium. Approx. £4-5 per ewe in 1998.

#### **General conditions**

Sheep farmers who have 50% of farmed area in Disadvantaged Areas. Area aid application is necessary.

#### **Environmental conditions**

None.

### **2.1.3. Suckler Cow Premium**

#### **Background**

The Suckler Cow Premium was first introduced by the EEC in 1980. The premium was increased, along with the Special Beef Premium, in 1993. This was intended as compensation for reductions in prices and market supports following the CAP reforms of 1992.

#### **Purpose**

Support for a form of beef production which is traditionally linked with relatively low financial returns, and particularly to compensate farmers for a fall in beef prices following the CAP reforms.

#### **Legislation**

EEC Regulation 1357/80 introducing a system of premiums for maintaining suckler cows (O.J. No L 140, 5. 06. 80). The scheme was amended by EEC Regulation 573/89 (O.J. No L 63, 7. 03. 1989). The scheme was further amended to set a stocking density limitation by EEC Regulation No 2066/92 of 30 June 1992 amending Regulation (EEC) No 805/68 on the common organisation of the market in beef and veal and repealing Regulation (EEC) No 468/87 laying down general rules applying to the special beef premium for beef producers and Regulation (EEC) No 1357/80 introducing a system of premiums for maintaining suckler cows (O. J. No L 215, 30. 06. 92).

#### **Nature of payment**

Payments are made per animal. The payment is £140. 23 for 1998.

#### **Public expenditure**

£157. 712 million in 1996.

#### **General conditions**

- Farmers must submit an area aid application
- Individual quota based on number of premiums paid in 1992
- Small scale milk producers can qualify for the premium if their quotas are less than 25,638 gallons
- Current stocking rate limitations: 2 LUs per hectare in 1996 (0.8 cows per acre)
- Premium is paid per forage hectare

#### **Environmental conditions:**

None

### **2.1.4. Special Beef Premium**

#### **Purpose**

The premium was increased, along with the Suckler Cow Premium, in 1993 in order to compensate beef farmers for price reductions following CAP reform.

#### **Legislation**

The Special Beef Premium was provided for in Regulation (EEC) No 805/68 on the common organisation of the market in beef and veal. It was amended by EEC Regulation No 3886/92 of 23 December 1992 laying down detailed rules for the application of the premium schemes provided for in Regulation (EEC) No 805/68 on the common organisation of the market in beef and repealing Regulations (EEC) No 1244 and (EEC) No 714/89 (O.J. No L 391, 31.12.92).



As with the Suckler Cow Premium, the Special Beef Premium Scheme was further amended to set a stocking density limitation by EEC Regulation No 2066/92 of 30 June 1992 amending Regulation (EEC) No 805/68 on the common organisation of the market in beef and veal and repealing Regulation (EEC) No 468/87 laying down general rules applying to the special beef premium for beef producers and Regulation (EEC) No 1357/80 introducing a system of premiums for maintaining suckler cows (O.J. No L 215, 30. 06. 92).

#### **Nature of payment**

Payment is made per animal, and can be claimed twice in the life of male cattle. The payment rate is £87 per head each time the premium is paid.

#### **Public expenditure**

£167. 147 million in 1996. Payments were made to 90,000 herd owners on about 2 million cattle in 1997.

#### **Conditions**

- Farmers must submit an area aid application
- Current stocking density limitation of 2 LU per hectare (0.8 LU per acre)
- Premium is paid per forage hectare, which excludes woodland, land in Arable Aid Scheme, and set aside

#### **Environmental conditions**

None

### **2.1.5. Extensification Premium**

#### **Background**

The Extensification Premium is essentially a mechanism to stabilise or reduce beef production by payments to farmers who have low stocking rates comparative to the usual stocking rates for beef production. The premium is now of special significance following the CAP reforms of 1992 targeted at the beef sector.

#### **Purpose**

Reduction of beef production.

#### **Legislation**

The Extensification Premium was first introduced in Article 3 of the Agricultural Structures Regulation of 1991, EEC Regulation 2328/91 of 15 July 1991 on improving the efficiency of agricultural structures (O.J. No L 218, 6. 08. 1991).

#### **Nature of the payment**

Per animal. The payment in 1998 is £29.86 per animal, unchanged from 1996/7. The payment is made automatically to farmers who apply for the other beef premium schemes.

#### **Public expenditure**

£60.491 million in 1996. Up to 70,000 cattle farmers currently receive extensification premiums.

#### **General conditions**

- Farmers must submit an area aid application
- Only applies to male beef cattle and suckler cows, not sheep
- Current stocking density limitation: 1.4 LU/per hectare (0.56 LU per acre)
- Increased premium of £43 per animal where stocking density is less than 1 LU/per hectare
- Headage applications are not considered when calculating stocking density

#### **Environmental conditions**

None

## 2.1.6. Arable Aid Scheme

### Background

Subsequent to the CAP reforms, the intervention price for cereals was to be cut by 29% from July 1993. Compensation was introduced to reduce the impact on farmers but it also had the objective of reducing cereal production. The scheme was introduced in July 1992. It applies to cereals, oilseeds, peas and beans, and potatoes (for starch manufacture only).

### Legislation

EEC Regulation No 1765/92 of 30 June 1992 establishing a support system for producers of certain arable crops (O.J. No L 181, 1. 07.92), as amended, and EEC Regulation No 1766 of 30 June 1992 on the common organisation of the market in cereals (O.J. No L 181, 1. 07.92).

### Nature of payment

The Arable Aid Scheme offers compensatory payments per hectare, but beneficiaries must also set aside a certain proportion of their land to obtain payments ('cross-compliance'). Payments ranged from £274 per ha (£110 per acre) for cereals to £530 for linseeds in 1996. There are, in fact, two schemes:

- I.** General scheme: farmers with land eligible under the scheme which exceeds 15.13 ha must set aside land in order to obtain compensatory payments.
- II.** Simplified scheme: farmers with less than 15.13 ha of cereals are exempted from the set aside requirement.

### Conditions

- Farmers with land eligible under the scheme which exceeds 15.13 ha must set aside land in order to obtain compensatory payments
- Eligible land is any land that was sown with crops with a view to harvest in any of the years from 1987 to 1991
- Applies to cereals, maize, oilseeds (e.g. rapeseed), beans and peas, linseeds or
- Does not apply to fodder beet, sugar beet or potatoes; fodder crops can comprise forage area for livestock premiums
- Land set aside must have been cultivated with a view to harvest in the previous year
- Set aside land does not include trees, pylons, ponds or ditches or other areas of non-farmed land
- Set aside land has to be managed according to rules which are lengthy and complicated
- The rules may change from year to year, as determined by the Department of Agriculture and Food
- Set aside land cannot be used for any type of agricultural production or any other lucrative use (DoA 1996/7)
- From harvest 1996 to 15 January 1997, a green cover must be established before 15 January where a late harvested root crop has been sown
- Where a green cover has been established, it should be retained until 15 April 1997
- Ploughing is not allowed from 16 April to 31 August, except to establish a green cover, or to prepare land for sowing crops for harvesting not earlier than 15 May 1998
- Green cover must be cut at least once during the period 16 July to 15 August, to leave a covering of 10 cm. or less
- Where a green cover has been established, fertiliser or lime or weed control is allowed after 16 April (either by shallow cultivation or non-residual herbicides)
- From 1 September to 14 January, set aside land can be used for grazing livestock or as hay or silage

### Environmental conditions

The only EU environmental conditions that apply to the Arable Aid Scheme are EEC Regulation 1765/92, which states:

*'Member States shall take the necessary measures to remind applicants of the need to respect existing environmental legislation', and;*

EEC Regulation 2293/92, which states:

*'Member States shall apply appropriate measures which correspond to the specific situation of the land set aside so as to ensure the protection of the environment'.*

The Department of Agriculture and Food re-affirms the general EU condition that set aside be managed in such a way as to ensure the protection of the environment, and states that penalties will apply where these rules are not observed (no set aside payment for the land parcel in question). Protection of wildlife is mentioned only once: 'Cutting should always be effected in such a way as to allow an escape route for wildlife' (DoA, 1996).

## **2.2. Agricultural Schemes Under the CAP 'Accompanying Measures'**

These three schemes are the so-called Accompanying Measures that followed the main CAP reforms in 1992. They are the first schemes paid for under the CAP Guarantee Fund that have been regionalised and co-financed, i.e. Ireland can adapt the basic EU measures but it must also pay 25% of the costs. Previously, all CAP Guarantee schemes were centralised and 100% financed by the European Commission. Even though the Afforestation and Agri-Environment Schemes appear to address two distinct issues, they are connected by one of the principal underlying objectives of CAP reform: reduction of surplus agricultural commodities by extensification and/or taking 'surplus' land out of production. The Early Retirement Scheme aims to address the perennial structural problems of the age profile of farmers and poor viability of farm holdings. The Early Retirement and Afforestation Schemes both have modest environmental conditions inserted into the EU legislation.

### **2.2.1. Early Retirement From Farming Scheme**

#### **Background**

The Early Retirement from Farming Scheme was introduced as part of the 'Accompanying Measures' in the CAP reforms of 1992. It is optional for Member States, which must fund 25% of the costs. This scheme is the successor to an earlier scheme introduced under the 'Mansholt Plan', EEC Directive 72/160.

#### **Legislation**

EEC Regulation 2079/92 of 30 June 1992 instituting a Community aid scheme for early retirement from farming (O.J. No L 215/91, 30. 07. 92).

#### **Purpose of scheme**

The scheme provides a pension for elderly farmers to retire and provide an opportunity for young farmers to practice farming. The objectives of the Irish scheme are to 'redress two of the main structural defects in Irish farming, viz. farm sizes and the age profile of farmers' and 'the emphasis is on using the land released to increase and re-structure other holdings to make them viable' (DoA, 1996).

#### **Nature of scheme**

The scheme offers incentives for full-time farmers aged between 55 and 66 to transfer their farms to qualified young farmers by providing a pension up to a maximum of £10,016 in 1997. It is paid per person retiring, on a monthly basis. The rate of annual pension is a basic £4,006 and £250 per ha up to a maximum annual pension of £10,016 in 1997. It is paid for up to 10 years but not beyond a farmer's 70th birthday.

#### **Public expenditure and uptake**

At the end of December 1996, 5,393 farmers had been approved for payments, costing £44 million and 169,000 ha were released to young, qualified farmers, resulting in an average increase in their farm size from 31 ha to 39 ha (DoA, 1996).

#### **General conditions**

Pensions are granted to:

- Retiring farmers between their 55th and 66th birthdays who have practised full-time farming for the preceding 10 years
- Transfer by gift, lease or sale to qualified young farmers
- Minimum holding is 5 ha (12 acres)
- Quota rights must be transferred
- Transferee must expand the holding by at least 5 ha (12 acres) or by 10% of the farm

## Environmental conditions

The EEC Regulation states that the released land must be 'farmed in harmony with the protection of the environment', and that Member States must adopt the necessary laws to ensure, inter alia, that purchase or rental contracts of the land released should contain clauses requiring compliance with the requirements of environmental protection.

Article 6 of EEC Regulation 20979/92, conditions applicable to released land, states:

*'Released land transferred to farming transferees must be farmed for not less than 5 years, in harmony with the requirements of environmental protection.'*

*'Released land transferred to non-farming transferees must be used in a manner compatible with the protection or improvement of the quality of the environment and of the countryside.'*

Article 7 of EEC Regulation 2079/92, National provisions, states:

*'Member States shall adopt the necessary laws, regulations and administrative provisions to implement the programme. These provisions must ensure in particular:*

- *That the purchase or rental contracts of the land released contain clauses requiring compliance with the conditions laid down in Article 6 regarding use of land'*

In other words, Member States are required to ensure that all farms involved in the scheme are managed in a manner that protects the countryside, although the details of how this should be achieved are not specified.

The Department of Agriculture and Food specifies that participating farmers must 'farm in harmony with the requirements of EC and National legislation on environmental protection' (DoA, no date). However, there are no specific guidelines on environmental management. Where no suitable farming transferee can be found, owners are allowed to re-assign land for non-agricultural uses, forestry or ecological reserve creation (DoA, 1994).

### 2.2.2. Rural Environment Protection Scheme (REPS)

#### Background

One of the reasons stated by the European Commission for the CAP reforms of 1992 was the need to protect the environment. The result was the Agri-Environmental Action Programme, a framework regulation under which Member States were legally required to put in place a national agri-environmental scheme. In Ireland, this scheme was entitled the Rural Environment Protection Scheme.

#### Legislation

EEC Regulation No 2078/92 of 30 June 1992 on agricultural production methods compatible with the requirements of the protection of the environment and maintenance of the countryside. (Official Journal, No L 215, 30. 07. 1992.)

#### Purpose of scheme

Encouragement of environmentally-friendly farming methods; protection of wildlife habitats and endangered species of flora and fauna; production of quality food in an extensive and environmentally friendly manner.

#### Nature of scheme

Voluntary agreement with the Department of Agriculture and Food for 5 years. It is expected that the scheme will be renewed in 1999 for a further ten years.

The following measures are included in the basic scheme:

- Waste management, liming and fertilisation plan; limits for nitrogen, phosphorus and lime applied to land specified according to the farming system (i.e. livestock or arable)
- Storage of slurry and silage effluent
- Times and amounts of applications of slurry to land
- Management of sheep dip and pesticides
- Grassland management plan, to avoid poaching, overgrazing and soil erosion; appropriate stocking rates set

- Protection and maintenance of watercourses and wells, to avoid nutrient enrichment and to conserve riparian habitats
- Retention of wildlife habitats, including all the main habitat types found in Ireland
- Maintenance of farm and field boundaries, including hedges and stone walls
- Cessation of use of biocides and fertilisers in and around hedges, ponds and stream
- Protection of historical and archaeological features
- Maintenance of visual appearance of farm and farmyard
- Production of tillage crops without growth regulators, without burning straw and stubble and leaving field margins uncultivated
- Attendance at courses and/or demonstrations
- Keeping of farm records

There are a number of supplementary measures, which offer additional payments on top of the basic scheme, which are set out in Table 2.1:

**Table 2.1. Supplementary Measures in the REPS**

<b>Supplementary REPS Measure</b>	<b>Objective</b>	<b>Application</b>
Natural Heritage Areas (NHAs)	Habitat conservation: extra payments	Applies in Natural Heritage Areas (~7% of territory); mandatory
Degraded Areas	Rejuvenation of commonages suffering from overgrazing, by offering payments for adherence to sustainable stocking strategy and for sheep removed from land.	Applies in degraded commonages designated by the Department of Agriculture, Food and Forestry; mandatory
Long term set aside (20 years)	Conservation of river banks by set- aside of land up to 30 metres from a river. Protection of bank from erosion and conservation of flora and fauna.	Applies to 22 designated Salmonid Waters
Local breeds in danger of extinction	Preservation of livestock breeds on the EU list of endangered species	Countrywide

Public access and leisure activities	To facilitate farmers who undertake to give public access for leisure activities.	Countrywide
Organic farming	To assist in the conversion to or maintenance of organic farming	Countrywide

### Public expenditure and uptake

In February 1998, the Department of Agriculture and Food supplied statistics for the uptake of the REPS and the various supplementary measures. The following is a summary (figures refer to Stage 1):

#### Basic REPS

Total number of farmers approved to date: 31,631, costing £105.4 million.

Area of country under scheme: 1,101,416 hectares

Counties with greatest uptake: Galway (121,687 ha, 4171 farmers); Mayo (104,140 ha, 3400 farmers).

A total of £105,422,461 has been paid out to date, with an average payment per farm of £3332.

#### Natural heritage area supplementary measure (without destocking payment)

Total number of participants: 5794

Area of country under Measure: 176,973

Counties with greatest uptake: Galway (34,485 ha, 1229 farmers); Mayo (27,735 ha, 988 farmers); Donegal (21,776 ha, 692 farmers); Kerry (17,119 ha, 487 farmers); Clare (14,041 ha, 404 farmers).

#### Natural heritage area supplementary measure (with destocking payment)

Total number of participants: 15

Area of country under Measure: 593 ha

Destocking payments in NHAs were only paid in Galway, Kerry and Sligo.

#### Degraded Area Measure

Total number of participants: 361

Area of country under Measure: 13,392 ha

Counties with greatest uptake: Mayo has by far the greatest area and number of participants in this Measure: 9,925 ha and 282 farmers, followed by Galway with 1,849 ha and 45 farmers.

#### Rare Breeds Measure

Total number of participants: 92 farms

Livestock Units of country under Measure: 283 LU.

#### **Riparian Zones Measure (Long term set aside of river banks)**

Total number of participants: 41

Area of country under Measure: 59 ha

#### **Organic farming Measure:**

Total number of participants: 314

Area of country under Measure: 8,840 ha

Counties with greatest uptake: Cork (76 farmers; 2,046 ha); Clare (52 farmers; 1,619 ha)

#### **Demonstration farms**

There are 46 demonstration farms, averaging nearly two farms per county.

Twenty hour training course

A total of 7,592 farmers received payments for attending the training course.

#### **Conditions**

The conditions are quite comprehensive and are set out in the manual prepared by the Department of Agriculture and Food (DoA, 15 May 1996).

Notable points are:

- Participating farmers must submit an environmental plan for the whole farm
- The farm plan must be prepared by a farm planner designated by the Department of Agriculture and Food
- The farmer must comply with the plan for 5 years
- Penalties for non-compliance with conditions

#### **Linkages**

- Afforestation and Premium Schemes: grant aid for afforestation is allowed on any land additional to the 40 ha limit on a farm participating in REPS
- REPS payments in commonages in Degraded Areas are designed to match those obtained from the Ewe Premium and Compensatory Headage Schemes
- NHAs/SACs: recently increased supplementary payments are available to farmers in NHAs/SACs who enter the REPS, up to a new limit of 300 acres (see Chapter 5.2.4)
- Regulation 2078/92 measures are complementary with the existing Development of Organic Farming Scheme (see Chapter 2.3.5)
- The Long Term Set Aside measure applies only to the riparian habitats of designated Salmonid Waters
- Since 1998, sheep farmers in degraded commonages must join the REPS if they wish to claim Ewe Premium or Compensatory Headage Payments

#### **2.2.3. Afforestation and Premium Schemes**

These schemes are the subject of a current evaluation by the Heritage Council. The Council is referred to its study, 'Review of the Impact of Current Forestry Policy on Aspects of Ireland's Heritage' for details of the forestry measures. The Afforestation and Premium Schemes are mentioned in this study (see Chapter 8.1.8), since they are targeted on agricultural land, they are designed to compete with other agricultural payments, and have a considerable potential to impact on the countryside.

## 2.3. Agricultural Schemes Operating Through EU Structural Funds

All the above schemes are co-funded by the EU Structural Funds and the Exchequer, and all are administered by the Department of Agriculture and Food, or its agents. The first five schemes listed above are directed solely at farmers, and operate through the Operational Programme for Agriculture, Rural Development and Forestry, 1994-1999 (OPARDF) (Government of Ireland, 1995). LEADER and INTERREG are so-called Community Initiatives, introduced by the European Commission in addition to Member States' operational programmes. They are more broad-based schemes with a strong rural development emphasis, and are directed at rural communities. Under EU policy, all EU Structural-funded activities have to be included in programmes (usually running for 5 years). The various programmes, including agriculture and rural development programmes, comprise the Community Support Framework (CSF) for each Member State. Programmes are submitted for funding and are approved, with or without amendments, by the European Commission. They are subject to a mid-term review and final evaluation. The previous Headage, Farmyard Pollution, LEADER and INTERREG schemes have been evaluated and the current Headage and Control of Farmyard Pollution schemes have been reviewed in the Mid-Term Review of the CSF (ESRI), (1997).

**There are two main differences between current schemes and earlier schemes:**

- I.** Current schemes are directed not only at farmers but also towards other rural economic activities (e.g. tourism, small businesses, forestry, etc.). This is in recognition of the fact that mainstream agriculture has declined in importance as the mainstay of the rural economy.
- II.** Drainage and land reclamation projects are no longer subsidised by the EU, and all the schemes listed must conform to EU environmental policy or to the requirements of environmental protection. However, these clauses are often vague and open to interpretation.

The Compensatory Headage Scheme has remained essentially unchanged since it was first introduced in 1975, and provides basic income supplements for about 120,000 farmers, many of whom are small and medium farmers in western areas.

### 2.3.1. Compensatory Headage Allowances ('Headage Payments') in Less Favoured Areas

#### Background

Headage payments were introduced in 1975 under EEC Directive 268/75 on mountain and hill farming and farming in certain less-favoured areas, as amended. The current legislative basis is EEC Regulation 2328/91 of 15 July 1991 on improving the efficiency of agricultural structures, as amended (EEC, 1975; EEC, 1991a).

Headage payments are an explicitly socio-economic measure, and operate within the specific terms laid down in Articles 17-19 of EEC Regulation 2328/91. Seventy-two per cent (72%) of Ireland is classified as a Less Favoured Area within the terms of Article 3.4 (less favoured areas) and Article 3.5 (areas affected by specific handicaps). In these areas, farmers are eligible to receive headage payments for cattle, sheep, goats, horses and donkeys. The aim of the scheme is to compensate farmers in order to provide a reasonable level of income in areas with natural disadvantages. In line with the Less Favoured Areas Directive (268/75 EEC), the scheme aims to 'conserve the countryside by the prevention of further depopulation of rural areas' (Government of Ireland, 1995).

#### Definition of Less-Favoured Areas (LFAs)

LFAs are classified under three headings:

- Mountain areas (e.g. the Alps, Mediterranean mountains, not in Ireland)
- Areas threatened with depopulation (applies in Ireland)
- Areas with specific natural handicaps (applies in Ireland)

LFAs in Ireland are entitled Disadvantaged Areas (DAs) and are classified thus:

- Severely handicapped (52%)



- Less severely handicapped (19%)
- Coastal areas with specific handicaps (1%)

Farmers qualify for headage payments in LFAs if their farms are greater than 3 ha (7.5 acres). About 120,000 farmers currently receive headage payments, with an average payment of £1,000 per farmer. Over 80% of the payments go to cattle/beef farmers, who are amongst the lowest income earners in Irish agriculture (Government of Ireland, 1995).

### Payments

Headage payments for the various categories of LFAs and for different livestock categories are complex (especially when other livestock payment schemes have to be considered). The payments as they apply in 1998 are set out in Table 2.2. As of 1998, there is a new ceiling on combined cattle and sheep headage of £3,024 per individual. Payments are limited to £89.62 per forage hectare for beef cows, sheep, goats, horses and donkeys, and £55.99 for all other cattle paid at the full rate. These rates are subject to a stocking density limitation of 1.4 LU per hectare.

### Public expenditure

The total projected cost of headage payments in the OPARDF is £793. 670 million from 1993 to 1999, 65% (£448. 985 million) from the CAP Guidance Fund and 35% (£344. 68 million) from the Exchequer. In 1997, total public expenditure amounted to £127. 423 million.

### Environmental conditions

Payment of sheep headage to farmers in designated 'degraded areas' in the REPS is conditional on joining the REPS. This measure is designed to curb overgrazing.

### Linkages

Environmental cross-compliance with the REPS (see Environmental conditions, above).

**Table 2.2 Headage Payments**

<b>Headage payments in Severely Disadvantaged Areas</b>	
	<i>Rate (£)</i>
Beef cows	84.00 per head
Sheep and goats	10.00 per head
Cattle (1 - 8 livestock units)	40.00 per LU
Cattle (next 22 livestock units)	33.00 per LU
Mares (8 mares)	70.00 per head
Mares (next 22 livestock units)	66.00 per head
<b>Headage payments in Less Severely Disadvantaged Areas</b>	

	<i>Rate (£)</i>
Beef cows and mares	75.00 per head
Sheep and goats	10.00 per head

### 2.3.2. Control of Farmyard Pollution Scheme (CFP) (currently suspended)

#### Background

In the late 1980s, farmers responded to a succession of wet summers with a rapid conversion from hay to silage as winter fodder. This was often carried out without proper effluent storage facilities and resulted in a large number of fish kills. The Operational Programme for the Control of Farmyard Pollution, 1989-1993 was brought into effect in 1989, and was the first Irish operational programme approved by the EC in the 1989-1993 round of Structural Funds. 40,000 farms availed of the scheme.

#### Purpose and nature of scheme

The scheme was essentially a continuation of the 1989-1993 scheme. However, one of the key objectives was to assist small and medium farmers to reduce pollution.

The CFP operated through the Operational Programme for Agriculture, Rural Development and Forestry, 1994-1999 (OPARDF, 1994), but was suspended in April 1995 because it was fully subscribed. 18,500 farms benefited from aid in 1994 and 1995. There is a possibility that the CFP may re-commence in 1998. Capital grants were awarded to farmers who undertook construction/installation of farm waste storage facilities, basic winter housing for cattle or sheep and fodder storage. The objectives of the current scheme are stated as:

- Reduce sources of groundwater and surface water pollution arising from agricultural wastes to improve water quality
- Enhance Ireland's green/quality image as a food producer in order to remain competitive in an increasingly market oriented sector
- Provide better working conditions on farms

#### Public expenditure

Total public spending allocated amounted to £95 million, of which £66 million was from the CAP Guidance Fund. £37.092 million was paid to 3,992 farmers in 1996.

#### Payments

The payment takes the form of a once-off capital grant towards the costs of upgrading farmyards in order to store slurry and silage effluents safely. The rate of grant depends on the scale of the operation and the level of investment. Subsidies of up to 60% are available for small and medium farmers and 30% for larger farmers (see Table 2.3).

**Table 2.3 Aid available for investments under Control of Farmyard Pollution Scheme**

<b>Supplementary REPS Measure</b>	<b>Objective</b>	<b>Application</b>
Type of investment	Enterprises less than 80 units (standard unit for farm size in animals or	Enterprises greater than 80 units

	hectares)	
	Investment ceiling £22,500	Investment ceiling £45,000
Storage facilities for farm wastes Animal housing Fodder storage	60%	30%
Farm roadways Water Supply to fields Screening shelter belts	30% Subject to a maximum investment of £5,000	20% Subject to a maximum investment of £5,000
Mobile equipment for slurry disposal	30% Subject to a maximum investment of £4,000	30% Subject to a maximum investment of £4,000

Source: Government of Ireland (1995) Operational Programme for Agriculture, Rural Development and Forestry, 1994-1999. Stationery Office, Dublin.

#### General conditions

- Income limit: the gross off-farm income should not exceed the reference income relative to the average income for non-agricultural workers (£5,000 in 1994)
- Limit on intensification: investments under the scheme should not lead to increases in production capacity

#### Environmental conditions

Timing of slurry disposal: undertaking to empty slurry tanks not later than 31 October each year, and not to spread slurry between 1 November and 31 January each year.

#### Linkages

There was an important linkage with the Rural Environment Protection Scheme (REPS) (see Section 3.2). REPS payments were conditional on having adequate farm waste storage facilities as part of the farm plan. Since grants were made available for such improvements under the Control of Farmyard Pollution Scheme, this was an added incentive to join the REPS. In addition, the Department of Agriculture and Food encouraged participants to join the REPS.

#### 2.3.3. Farm Improvement Programme (FIP) (currently suspended)

The Farm Improvement Programme operated under the OPARDF 1994-1999. However, the scheme has been in operation since 1986, when it replaced the Farm Modernisation Scheme. In the eleven years since its inception, the scheme has changed from its original emphasis on land improvement (reclamation, hedge and ditch clearance, drainage, etc.) to a scheme which finances upgrading of farmyards in relation to pollution control. The similarity between the latest FIP and the CFP is striking.

**Table 2.4 Aid available for investments under Control of Farmyard Pollution Scheme**

Type of	Rate of capital grant as a % age	Rate of capital grant as a % age
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<b>investment</b>	<b>of approved costs</b>	<b>of approved costs</b>
	Enterprises with 0.5 MWU or less	Enterprises with more than 0.5 MWU
Storage facilities for farm wastes Animal housing Fodder storage	Less Favoured Areas: 45% Other areas: 35%	All areas 30%
Mobile equipment for slurry disposal	30% Subject to a maximum investment of £4,000	30% Subject to a maximum investment of £4,000

Source: Government of Ireland (1995) Operational Programme for Agriculture, Rural Development and Forestry, 1994-1999. Stationery Office, Dublin.

#### **Public expenditure**

Grants of £15 million were paid for farm buildings and farm waste facilities between 1989 and 1994, when the scheme was suspended to new applicants.

#### **2.3.4. Agri-Tourism Scheme**

The outline description of the scheme is contained in a brochure supplied by the Department of Agriculture and Food (DoA, no date). The scheme was introduced on 20 February 1995. It is administered by the Department of Agriculture and Food through its agents the Shannon Development Company in the Shannon Region and under the aegis of Bord Fáilte in all other parts of Ireland. It succeeds an earlier scheme introduced in 1989 (Government of Ireland, 1990).

#### **2.3.5. Development of Organic Farming Scheme**

##### **Purpose of scheme**

The aim of the scheme is ensure a regular supply of organic produce to the market by the development of organic co-operatives, groups and companies (Government of Ireland, 1995). The targets are:

- An increase in the number of organic producers from 200 to 600 (only 0.4% of total agricultural area is farmed organically)
- An increase in value of organic production from £1 million to £3.5 million

##### **Nature of scheme**

Grant aid of up to 50% of capital investment is offered to farmers, groups, companies and cooperatives for the provision of facilities for grading, packing, storage and distribution of organic products. Aid of up to 70% of costs is also provided for recognised bodies such as An Bord Bia and An Bord Glas for marketing and promotion in support of organic farming.

##### **Public expenditure**

The budget forecast for the scheme is £0.8 million.

##### **Conditions**

Grant aid will only be paid to operators (producers, companies and cooperatives) which are inspected and meet the requirements under the EU's Organic Farming Regulation (EEC, 1991b).

## **Linkages**

There is a linkage with the Organic Farming Measure in the Rural Environment Protection Scheme (REPS) (see Section 3.2). This latter measure (described in Section 2.2.2) provides an area payment for farmers who convert to or continue with organic farming methods. The REPS Organic Farming Measure is in part responsible for the increase in organic farming taking place in Ireland, from 5,300 ha in 1994 to 16,865 ha in 1996. Aid under the Development of Organic Farming Scheme is considered necessary to meet the increasing need for grading, packaging, storage and distribution facilities for organic products.

### **2.3.6. LEADER Initiative**

#### **Background and origins**

The LEADER Initiative was first introduced by the European Commission in March 1991 as an integrated scheme to stimulate rural enterprise, and particularly because agriculture was recognised as being no longer the mainstay of the economy in many rural areas. The first Irish scheme, LEADER I, ran from 1991 to December 1994. LEADER I supported 16 groups selected for funding, which amounted to £21 million from the EU, £14 million from the Exchequer and a roughly similar proportion from private sources (DoA, 1995).

LEADER II, the current scheme, was launched in 1995 under the Operational Programme for the Implementation of the EU LEADER II Initiative in Ireland, 1994-1999 (Government of Ireland, no date, a).

#### **Legislation**

Commission Decision of 29 March 1995 on the granting of assistance from the European Agricultural Guidance and Guarantee Fund (EAGGF), the European Regional Development Fund (ERDF) and the European Social Fund (ESF) for an Operational Programme under the Community Initiative LEADER II in the Objective I regions of Ireland.

#### **Purpose of scheme**

The LEADER scheme offers, inter alia, assistance for rural groups in rural tourism, exploitation and marketing of agricultural, forestry and fisheries products and promotion and improvement of the environment and living conditions.

#### **Nature of scheme**

Each individual programme is managed and administered by local groups under contract from the Department of Agriculture and Food. It applies to groups operating in an area with a population of up to 100,000 people.

#### **Public expenditure**

The Operational Programme provides for a gross expenditure of £132 million from 1994-1999. The total projected public spending is £77.29 million, of which EU funds, £54.18 million, Exchequer £23.11 and private sector an estimated £54.8 million.

#### **Environmental incentives**

Incentives are provided under Measure 6 of Sub-Programme 2, for the following:

- Improving environmental awareness
- Protection and restoration of small towns and villages and local architectural heritage
- Waste disposal.

### **2.3.7. INTERREG II Initiative**

#### **Background and origins**

The INTERREG II Programme is a cross-border EU initiative, operated in conjunction with Northern Ireland. It is financed through the EU Structural Funds. The Operational Programme is available from the Department of Agriculture and Food (Government of Ireland, no date, b).

The first INTERREG scheme was launched in 1991. A joint operational programme for Ireland and Northern Ireland included measures for agriculture and forestry, and environmental measures such as improving water quality. Grants of

£2.5 million were paid for agricultural projects and £4.8 million for forestry projects in Donegal, Sligo, Leitrim, Cavan, Monaghan and Louth.

### **Purpose of scheme**

INTERREG was designed to assist local populations of the border areas of the EU to overcome relative disadvantages of their isolation within national economies and the Union as a whole. It aims to stimulate local economic activity in various areas and to encourage cross-border activities and networks. Objectives include the protection of the area's environment and rural development through stimulation of activities in addition to mainstream agriculture.

Ireland has two INTERREG II Programmes:

1. Ireland/Northern Ireland covers the 6 border counties in the Republic and has 5 sub-programmes; communications infrastructure; environmental protection; natural resources; human resources; and economic development.
2. Ireland/Wales - Maritime covers 9 Eastern and South Eastern counties and has 6 sub-programmes: transport; information systems; environment and emergency planning; tourism and culture; economic development and human resources.

### **Public expenditure**

The EU financial allocation to INTERREG is 156.95 million ECU.

### **Agriculture/Forestry projects**

Of the five sub-programmes in the Ireland/Northern Ireland INTERREG Programme, two are of relevance to this study. These are:

a) Sub-Programme 4: Agriculture/Fisheries/Forestry (£35 million). The aim is to support worthwhile cross-border projects which would not be eligible under mainstream programmes. Eligible projects or studies listed in the Agriculture Measure include alternative enterprises, improving quality of agricultural produce and improving management systems for the agri-food sector, and animal/plant health control and monitoring.

Eligible projects in the Forestry Measure include:

- Encouragement of co-operative and/or collective action on planting
- Environmental improvement and harvesting where this is a joint cross-border operation
- Pilot projects on silviculture, protection and marketing

In all of the above measures, the EU aid rate is 75% of public expenditure.

b) Sub-Programme 5: Environmental Protection (£27 million)

This aim of this measure is to protect and enhance water quality and to encourage environmental protection.

The Measure is: Shared and Related River Catchments - Water Quality, Pollution Abatement and Other Environmental Action.

The aim is to improve water quality in cross-border catchment areas in order to facilitate tourism and protect water for economic and domestic use. Eligible projects related to agriculture and rural development include:

- Development of water quality monitoring techniques
- Development of water management strategies
- Site reclamation schemes
- Promotion of innovative collection, disposal and recycling of waste

### **Environmental conditions**

- I.** In general, all projects which are aided under the EU Structural Funds must comply with EU policies on

environmental protection.

- II.** In the agriculture and forestry measures, 'projects must, where appropriate [our emphasis], contribute towards the protection/improvement of the environment.'
- III.** In the environmental measure, project selection criteria include compliance with EU Directives on waste water quality, and implementing existing water quality management plans or development new plans.

### Qualifying projects

The Department of Agriculture and Food declined to give information on approved projects.

### 2.3.8. Erne Catchment Nutrient Management Scheme

#### Background

The scheme operates under the EU Special Support Programme for Peace and Reconciliation, introduced by the European Commission, to operate from 1995-1999. The scheme was introduced because of concern over the growing phosphorus (P) imbalance between crop requirements and applications in the Erne catchment. Over the past twelve years, the amounts of P entering the lakes has been steadily increasing, causing an increase in algal growth and deterioration of water quality.

#### Purpose

To reduce eutrophication arising from agriculture in the Erne catchment.

#### Nature of scheme

The scheme operates in sub-catchments of the River Erne in Cavan, Monaghan and Fermanagh. It offers a nutrient management planning service to farmers on both sides of the border in the Erne catchment. It involves co-operative action between the Department of Agriculture and Food and the Department of Agriculture Northern Ireland, and farmers, to address water quality problems caused by excess phosphorus.

#### Public expenditure

The initial budget for the scheme was 1.4 million ECU, divided between both sides of the border on a fifty-fifty basis.

## References

- DoA (Department of Agriculture, Food and Forestry), (1995). *1994 Annual Review and Outlook for Agriculture, the Food Industry and Forestry*. Stationery Office, Dublin.
- DoA (Department of Agriculture, Food and Forestry) (no date). *Agri-Tourism: Scheme of Grant Aid for Investments*. Guidelines and Application Form. Department of Agriculture and Food, Dublin.
- DoA (Department of Agriculture, Food and Forestry) (1994) *Scheme of Early Retirement from Farming: Guidelines*. Department of Agriculture, Food and Forestry, Dublin.
- DoA (Department of Agriculture and Food) (1996). *EU Arable Area Payments, 1996/97*. Explanatory Leaflet. Department of Agriculture, Food and Forestry, Dublin.
- DoA (Department of Agriculture, Food and Forestry) (1997) *Annual Report 1996*. Stationery Office, Dublin.
- DoA (Department of Agriculture and Food) (1998) *Annual Report 1997*. Stationery Office, Dublin.
- DoA (Department of Agriculture, Food and Forestry) (1996) *Rural Environment Protection Scheme*. Farm Development Service: Agri-Environmental Specifications. Department of Agriculture, Food and Forestry, Dublin.
- EC (Commission of the European Communities) 1993. *Community policy for aid to farms in hill, mountain and less-favoured areas*. Green Europe series. Luxembourg: Office for Official Publications of the European Communities. ISSN 1012-2117.
- EEC (1975) *EEC Directive 75/268 on mountain and hill farming and farming in certain less-favoured areas*. Official Journal No L 128 of 19. 05. 1975.
- EEC (1991a) *EEC Regulation 2328/91 of 15 July 1991 on improving the efficiency of agricultural structures* [amending

Directive 795/85/EEC and Directive 268/75/EEC]. Official Journal, No L 218, 6. 08. 1991.  
 EEC (1991b) *EEC Regulation 2092/91 on the organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs*. Official Journal, No L 198/1, 22. 07. 1991.  
 ESRI (Economic and Social Research Institute) (1997) *Mid-Term Review of the Community Support Framework*. ESRI, Burlington Road, Dublin.  
 European Commission (1998) *Agenda 2000: The Future of European Agriculture*. Directorate-General of Agriculture (DG VI), Brussels. Web address: <http://europa.eu.int/en/comm/dg06/>  
 Government of Ireland (1990) *Operational Programme for Rural Development 1989-1993*. Stationery Office, Dublin.  
 Government of Ireland (1994) *Operational Programme for Agriculture, Rural Development and Forestry*. Stationery Office, Dublin.  
 Government of Ireland (no date, a). *Operational Programme for the Implementation of the EU LEADER II Initiative in Ireland, 1994-1999*. Stationery Office, Dublin.  
 Government of Ireland (no date, b). *INTERREG Programme: Ireland and Northern Ireland, 1994-1999*. Department of Agriculture and Food, Dublin.

### 3. The Current State Of Irish Agriculture

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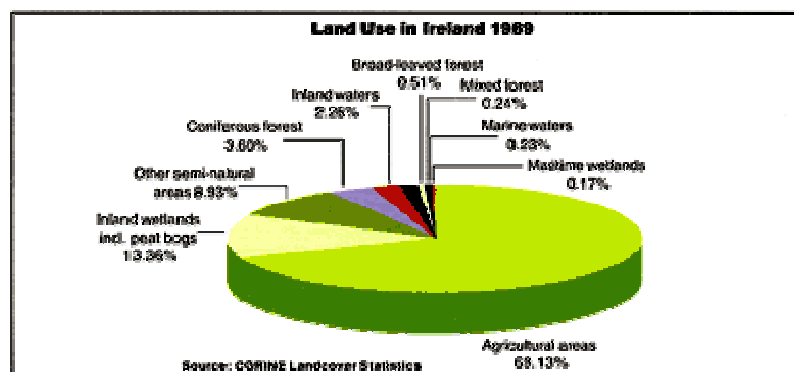
#### Introduction:

It is the aim of this chapter to outline the economic importance of agriculture in Ireland and its predominance as a land use type and to describe agricultural structural change in Irish agriculture. Since agricultural structural change impacts the rural environment, to a greater or lesser extent, this chapter provides the framework for the discussion of agricultural impacts on biodiversity and natural resources (see Chapter 4). An in-depth analysis of the current agricultural production structures and the development of some of these structures over the past 25 to 45 years is given, depending on the availability of data. The structures examined include the number and size of holdings, agricultural land use, the economic size of Irish farms, labour use and the relative importance of different farm types. Three interdependent aspects of agricultural change, i.e. the concentration, specialisation and intensification of production in Ireland since its accession to the EU are examined with particular reference to herd structures and farm inputs. Finally an overview of the development of agricultural incomes before and after the 1992 CAP reform is given and some general implications of the Agenda 2000 proposals with regard to incomes are outlined.

#### The Current State Of Irish Agriculture:

Agriculture, forestry and tourism are the major economic activities in rural Ireland and the rural landscape contains the natural resources on which these activities are based. This rural landscape is also the home and workplace of approximately two fifths of Ireland's population. Almost two thirds of Ireland's land area was categorised as agricultural area in 1995 (Eurostat, 1997a). The area under commercial forestry amounted to 6.5% of the land area with a further 1.5 % being covered by semi-natural forests.  
 A more detailed breakdown, available only for 1989, using CORINE landcover data is shown in Figure 3.1. Note that an unquantified portion of land included in the categories 'Inland wetlands including peat bogs' and 'Other semi-natural areas' is also used for agricultural purposes.

Figure 3.1 Land Use in Ireland 1989



Agriculture plays a fundamental role in the national economy. The gross output and gross product at market prices of



agriculture in 1997 are estimated at £ 3,309.4m and £ 1692.8m respectively. Direct employment in agriculture, forestry and fisheries amounted to 134,000 persons or 10.0 % of the country's workforce in 1997 (Department of Agriculture and Food, 1998a), having declined from 26.9 % in 1970. Downstream employment in the food and drinks sector amounted to a further 3.4% of the working population in 1997. A further unquantified proportion of the rural workforce is indirectly dependent on agriculture for a living through its multiplier effect in the rural economy. Despite the downward trend, Ireland is still more than twice as dependent on agriculture in terms of employment and almost three times as dependent in terms of GDP (Gross Domestic Product) than is the EU as a whole (see Table 3.1). Ireland's agriculture and agri-food sectors are amongst the most important sectors of the national economy. The export of food, live animals and drinks, which is largely based on indigenous raw material, contributed a considerable portion to total net foreign earnings with an export value of over £5.2 billion in 1995 (Department of Agriculture and Food 1997a).

The agriculture sector and the rural areas are faced with a number of important development issues. These are in particular:

- The decline in the number of farms (see Chapter 3.1.2) and the repercussions for the rural communities

**Table 3.1 Agriculture in the Economy of the EU Countries in 1995**

	<b>Share of Agriculture in the GDP (%)</b>	<b>Employment in the Agriculture, Forestry, Hunting and Fishing Sector (%)</b>
Belgium	1.3	2.7
Denmark	2.6	4.4
Germany	0.8	3.3
Greece	7.3	20.4
Spain	3.0	9.3
France	2.0	4.9
Ireland	4.8	11.1
Italy	2.7	7.5
Luxembourg	0.9	3.7
Netherlands	2.9	3.7
Austria	1.1	7.3
Portugal	2.0	11.5
Finland	1.1	7.7
Sweden	0.4	3.0

UK	1.0	2.1
EUR	1.7	5.3

Source: CEC (1997a)

- Low farm incomes and underemployment on farms and the issue of part-time farming (see Chapter 3.2)
- An ageing rural population and an age profile of farm holders which is regarded as an impediment to improving the efficiency of farm structures
- Land-use changes ranging from intensification of land-use practices to enterprise substitution and the discontinuance of farming activities with subsequent afforestation
- The suburbanisation of the rural landscapes

In the context of this report it is also important to note that the economic and social impacts on farming strongly influence the type of enterprises carried out and the intensity of land use, crop and livestock production and thus determine the type and magnitude of positive or adverse impacts on the rural environment.

### 3.1. The Structure of Production

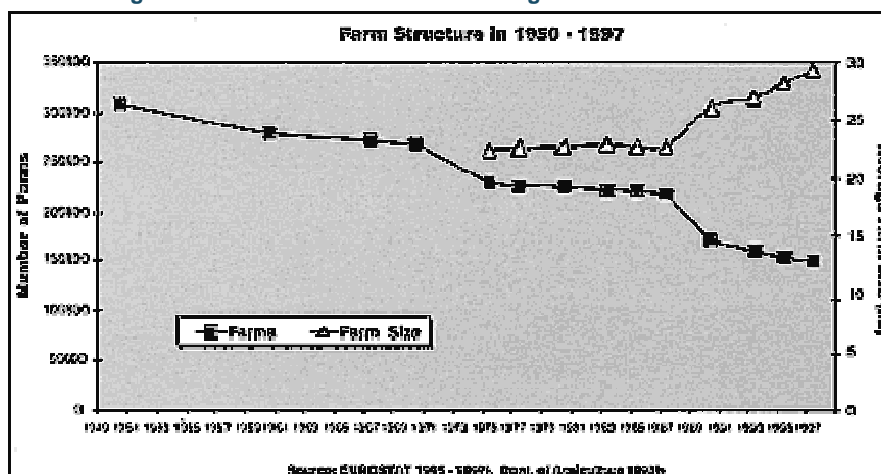
#### 3.1.1. Structures Data

The data used in this section are predominantly derived from original statistical information provided in the Statistical Compendium and the 1996 and 1997 Reviews by the Department of Agriculture and Food (1997a, b, 1998a), in the Farm Structure Surveys and Environment Statistics published by EUROSTAT (various years), in the Central Statistics Office (CSO) agricultural statistics series (various years), in the Commission of the European Communities' yearly report on 'The Agricultural Situation in the European Union' and by the UN Food and Agriculture Organisation (FAO, 1997).

#### 3.1.2. Holdings

In 1995 there were approximately 153,400 holdings in the Republic (Eurostat, 1997a). There was a decline of almost 33% in the number of holdings between 1975 and 1995 while the average farm size increased by 26% from 22.3 ha in 1975 to 28.2 ha in 1995 (see Figure 3.2). These trends are in keeping with the general trend in the EU but, in terms of the decline in the number of holdings, are even more pronounced.

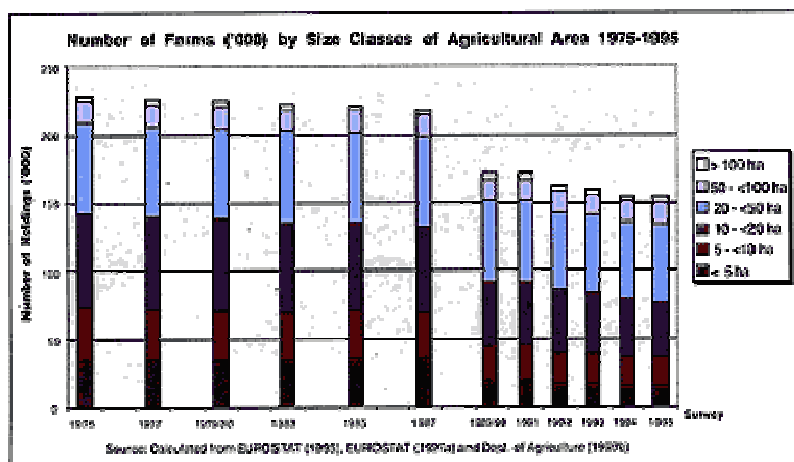
Figure 3.2 Number of Farms and Average Farm Sizes 1950-1997



There has also been a change in the numbers of farms in the different size categories, as shown in Figure 3.3. While the number of holdings with less than 20 ha Agricultural Area (AA) has declined considerably since Ireland's entry into the EU, the number of farms with 50 ha and more agricultural area (AA) has increased slightly. Almost 88% of Ireland's agricultural area was owner-farmed in 1995 which was significantly higher than the European Union's average of 59%

(Eurostat, 1997a).

**Figure 3.3 Number of Farms ('000) by Size Classes of Agricultural Area 1975-1995**



In 1995 almost all farms (96%) were engaged in livestock production with bovines (90% of all holdings) being most important, followed by sheep (31%) and dairy enterprises (28%). Pigs and broilers were only kept on 1.6 % and 1.3 % of holdings respectively. The focus on grass-based livestock production in the cattle and sheep sectors is reflected in the fact that 92% of all holdings had permanent grassland areas. Arable land (including forage crops) was recorded on 54% of farms. But only a very small number of these farms would have devoted more than one hectare to crops such as cereals, sugar beet and potatoes and that more than half of the arable area is used for forage crops.

In 1993 nearly three quarters of all holdings were located in Less Favoured Areas (LFA) under Directive 75/268 (EEC) where compensatory allowances are payable to farmers for the keeping of cattle, equines, sheep and goats (Eurostat, 1995). The breakdown in terms of the areas in different categories of less-favoured areas is as follows (Government of Ireland, 1995):

- Severely handicapped: 52% of the country
- Less severely handicapped: 19% of the country
- Coastal areas with specific handicaps: 1% of the country

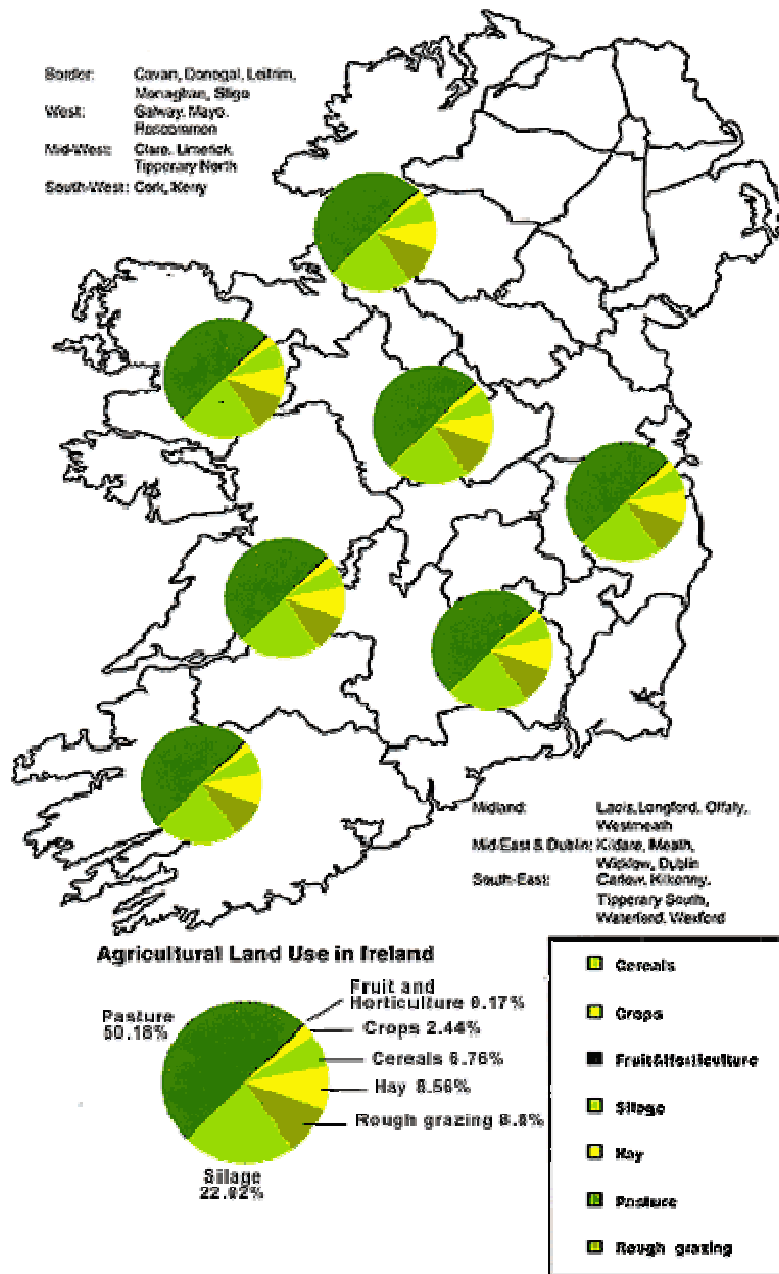
These areas are subject to reclassifications and appeals. In 1996 there were 105,619 beneficiary holdings, i.e. about 70% of all holdings, in receipt of headage allowances and they received an average allowance of 1575 ECU per holding. An average amount of 88 ECU was paid per livestock unit in LFA in 1994 (EC DG VI, 1997). At 23.5 ha the average farm size in the LFA was smaller than the national average of 26.8 ha

### 3.1.3. Areas and Land Use

The 1996 Central Statistics Office (CSO) Agricultural Statistics give a total agricultural area of 4.341.000 ha which is only three quarters of the area used at entry into the EU. About 190,000 hectares have been planted under forestry since 1980 and some land has been lost to industrial and housing development. In examining the various statistics presented in this chapter it should be noted that the 1991 census of agriculture removed approximately 500,000 hectares from the figure for 'agricultural area' (Department of Agriculture and Food, 1997a) for reasons not yet ascertained by the author.

An overview of agricultural land use in the regions and in Ireland as a whole is given in Figure 3.4. Agricultural land use is clearly dominated by grass-based production with 90% of the area farmed being devoted to pasture, silage, hay and rough grazing. Cereals were only grown on about seven percent of the area and the area under cereals has declined by a quarter since Ireland's entry into the EU. Other tillage crops, fruit and horticulture play a very minor role. The regional picture varies somewhat as tillage crops, fruit and horticulture are concentrated in the east and south-east while the largest percentage of rough grazing is found in the western regions. Land use changes will be addressed in Chapter 3.1.7.

**Figure 3.4 Agricultural Land Use in Ireland**



### 3.1.4. Economic Size

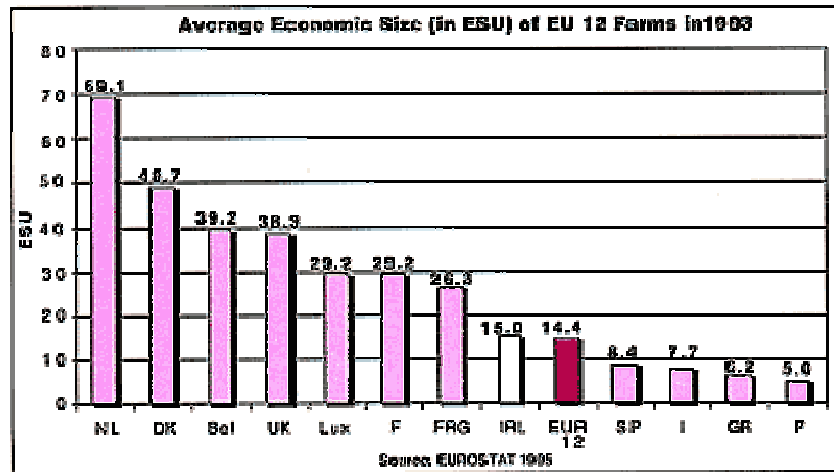
The economic size of holdings provides a better view of structural variations than average holding area, both at a national level and across the EU.

The economic size of a holding is an expression of their total standard gross margin and is thus an indicator of the potential net holding income which again is an important factor in terms of farm viability. It is determined by multiplying for each enterprise the area of production (in ha) or the number of LU by the relevant Standard Gross Margins (SGM). SGMs correspond to an average situation for each enterprise within a given region and are expressed in ECU/ha or ECU/LU. The total standard gross margin of a holding, expressed in ECU, is converted into European Size Units (ESU); in 1993 the conversion rate was 1 ESU = 1,200 ECU (Eurostat, 1995).

The average economic size of Irish holdings increased at a faster pace than the EU average in the late 80s and early 90s (Eurostat, 1995). Figure 3.5. illustrates that, on average, Irish agricultural structures were still 'less developed' than those in many other EU countries in 1993. The average economic size of Irish holdings was slightly higher the EU average in 1993, but French farms were potentially twice, British farms three times and Dutch farms more than four

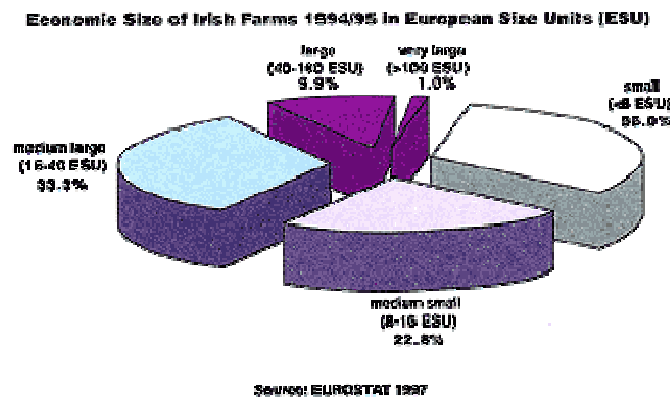
times as profitable.

Figure 3.5 Average Economic Size (in ESU) of EU 12 Farms in 1993



In 1994/5 there were approximately 1300 farms exceeding 100 ESUs, representing one percent of the classified Irish holdings (see Figure 3.6). At the other end of the spectrum, a third of all classified farms were in the smallest size class of 0-8 ESU, with a total average output per holding of ECU 5700 (CEC, 1997a). Such farms would hardly be viable, unless farm incomes were supplemented by direct income support, off-farm employment, or the small farmers unemployment benefit. This assessment is supported by the findings of Kinsella (1995) who examined the viability status of farm households in the Republic of Ireland. He classified only 50% of farms as being viable or potentially viable using a combination of economic and household characteristics.

Figure 3.6 Economic Size of Irish Farms 1994/95 in European Size Units (ESU)



In terms of farm types, the average ESU of mixed livestock farms, pig and poultry operations and tillage farms places them in the 'large' economic size category while the average ESU of specialist cattle-rearing and fattening enterprises places them in the 'small' economic size category (Eurostat, 1995).

### 3.1.5. Labour Use

Labour use is measured in Annual Work Units (AWU). An AWU is 'defined as the labour input of a person employed full-time for a year for agricultural work on a farm holding (or a minimum of 2,200 hours)' (Harley, 1990). This does not include forestry or other non-agricultural activities, but part-time or seasonal work is considered. The main purpose of such labour input statistics is 'to express trends in and levels of agricultural branch income in relation to the trends in agricultural labour input. The need stems from one of the objectives of the CAP, which is 'thus to ensure a fair standard for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture' (Eurostat, 1997b). With the considerable degree of part-time work in agriculture it is more useful to base this analysis on the volume of work carried out (as expressed in AWU) rather than on the number of persons employed in the sector.

All the EU Member States have recorded a continuous decline in the volume of total agricultural labour. In Ireland the average rate of annual decline over the period 1979 to 1996 has been 2% which was a less severe decline than in

many other EU Member States. The share of family labour input in total labour input was estimated at 91% in 1996, the highest rate in the EU apart from Finland (Eurostat, 1997b).

In the late 1980s 40% of all farms provided less than one AWU, demonstrating a considerable amount of under-employment on Irish farms, which was concentrated on farms of small physical and economic size (Eurostat, 1991). From 1987 to 1990 the average AWU per holding increased from 1.27 to 1.5, improving the situation with regard to underemployment. This change may have been due in part to the loss of a large number of small farms in that period (see Figures 3.2 and 3.3). In 1995 the average number of AWUs per holding in Ireland was approximately 1.45. A third of Irish farm holder-managers pursued 'Other Gainful Activities' (OGA) in 1993 and for almost two thirds of these the OGA would have been their principal activity, the percentages being higher for holders of small farms of up to eight hectares in size (Eurostat, 1995). This again highlights the weak economic structure of small and medium farms, the problem of under-employment as well as the need for off-farm employment, alternative farm enterprises and/or direct income supplements. It is important to note in this context that 88 % of all farms were owner-farmed in 1995, the percentage being higher still for small farms. Therefore under-employment impacts directly on the economic situation of farmers. It is expected that a very high number of full-time farms will become part-time farms within the next decade, i.e. the farm holder and/or their spouse will have to seek part-time or full-time off-farm employment to achieve adequate household income levels.

### **3.1.6. Farm Types**

The farm type of a holding in the EU definition for statistical purposes is determined by the relative contribution of the various enterprises to the total Standard Gross Margin (SGM) of the holding (Eurostat, 1995). In terms of numbers, agricultural area and output the most important farm types in Ireland are cattle rearing and fattening followed by dairying and sheep farming (Eurostat, 1995; Department of Agriculture and Food, 1997a). These sectors also account for most food exports. Restructuring in the various sectors and enterprise substitution are discussed below.

### **3.1.7. Concentration and Specialisation of Production**

The concentration and specialisation of production are two dimensions of agricultural structural change. Concentration is here understood as the extent to which production of specific products is concentrated on particular farm types (Harley, 1990). Specialisation is measured as the proportion of the total output of a farm or region accounted for by a particular product (Bowler, 1986).

The concentration of the production of certain commodities is the outcome of structural change as influenced by market and price policies, structural policies and extension or advisory services (see Buckwell, 1989). It is also linked to the process of intensification.

The percentage of the agricultural area devoted to different crops and the percentage of different livestock categories by farm type is shown in Appendix I. It can be seen, for example, that more than 90 % of the dairy herd was kept on specialist dairy farms. There is also a high level of concentration on specialist sheep farms and in pig units, while poultry production is concentrated on poultry, mixed pig and poultry units and on dairy farms. Almost a third of all land used for cereal production is held by specialist cereal growers and almost two thirds of fruit is grown on specialist fruit plantations.

With regard to the more dominant farm types, the process of concentration is particularly evident in the cereal and dairy sectors. Between 1980 and 1993 the number of specialist cereal producers decreased by approximately 66% while the area devoted to cereals on these holdings decreased by 46 %, indicating that larger areas were used for cereal production on the remaining farms. Furthermore, total cereal production declined by only 20% during this period, which points to more intensive production. A similar, but more pronounced change occurred in the dairy sector. While the number of specialist dairy producers declined by 38% between 1980 and 1993, the total area devoted to dairy cattle on these farms declined by only 14%, suggesting that the livestock density on the remaining farms increased significantly.

Developments within the beef and sheep sectors point to enterprise substitution and specialisation rather than to concentration. The growth in the number of specialist beef farmers was only slightly smaller than the growth of the overall output of this farm type, i.e. the level of concentration has changed only slightly. In the sheep sector the picture is more complex. Following the introduction of the Ewe Premium in 1980 a process of specialisation began with a sharp increase in the number of specialist sheep producers in the mid and late eighties. While sheep numbers increased sharply between 1985 and 1992 the number of specialist sheep farmers began to decline again in the late eighties. However, the total number of holdings keeping sheep was on the increase during that time. These processes indicate enterprise substitution and specialisation until the mid-eighties, followed by a process of intensification, which lasted until about 1992. There are no data available which would allow for a separate interpretation of the trends in lowland sheep and mountain sheep production or in LFA and non-LFA with their different subsidies for sheep flocks.

If concentration is seen in terms of the land as a productive resource increasingly being confined to fewer but larger farms (see Bowler, 1986), the aggregate picture of changes in the number of farms and farm size in Ireland indicates a level of concentration which is in keeping with the average trend in the EU as a whole (see Figures 3.2 and 3.3). However, such change has been much more pronounced in the continental EU Member States, particularly in Denmark,

France, Luxembourg and Belgium (Eurostat, 1995 & 1997a).

The aggregate picture given in Figure 3.2., however, masks the considerable changes within the various production sectors. Figures 3.7 to 3.9 show a considerable amount of restructuring in the cattle, dairy, sheep, pig and poultry sectors, with unit sizes increasing. In fact, in 1992 Ireland had the highest proportion of sows in units of over 100 animals in Europe. Almost one third of the national sow herd was owned by 12 individuals or corporate groups in 1995 (Lee, 1995).

Figure 3.7 Cattle and Dairy Herd Structure 1975-1995

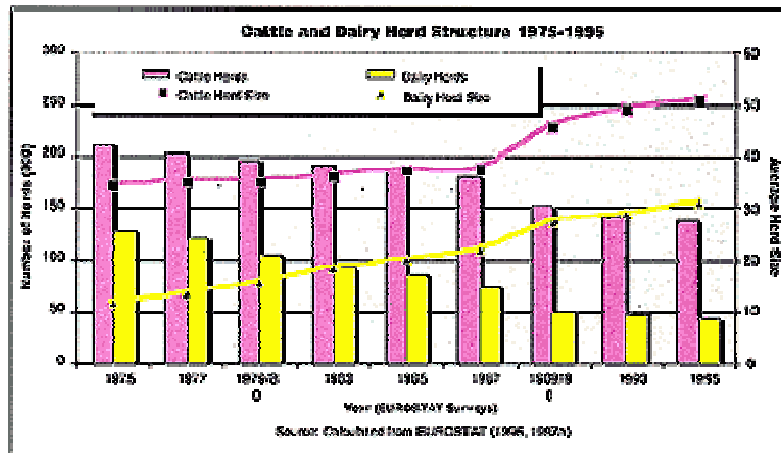


Figure 3.8 Pig and Poultry Unit Structures 1975-1995

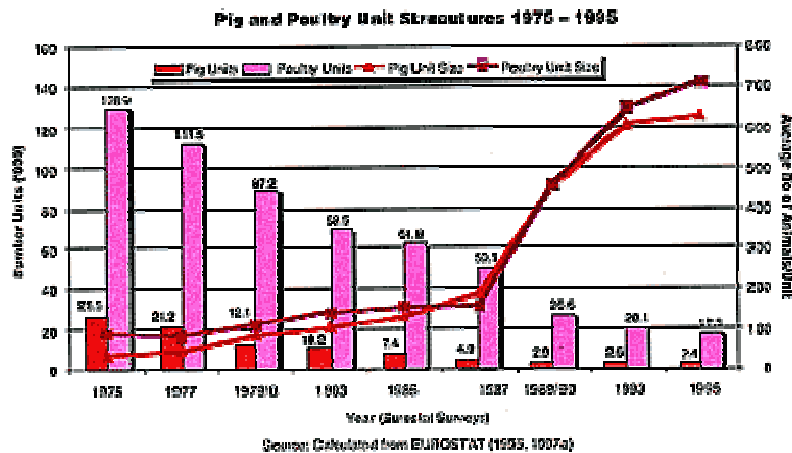
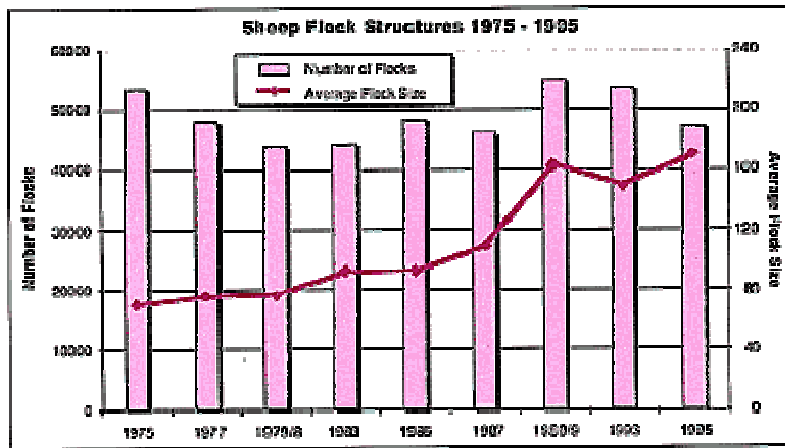


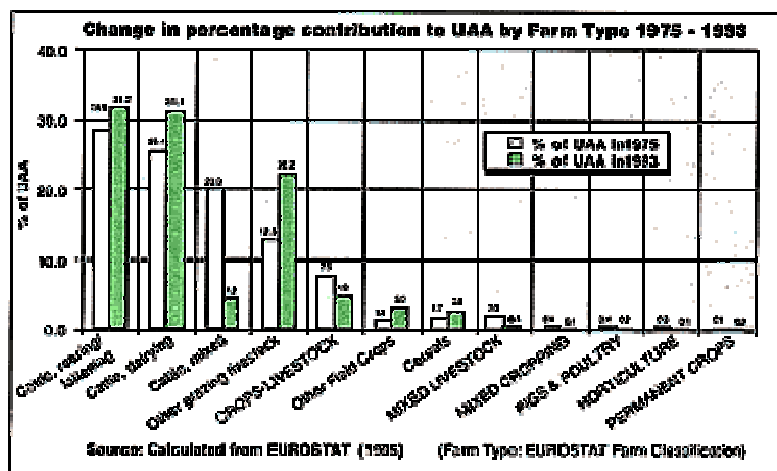
Figure 3.9 Sheep Flock Structure 1975-1995



The decline in numbers of holdings with dairy cows, pigs and poultry has been much more pronounced than the overall decline in farm numbers indicating a considerable amount of specialisation in these sectors, i.e. in the extent to which particular farm types specialise in specific products (see Harley, 1990).

Apart from the changes within the various sectors there has also been a general shift from farm types with mixed activities to more specialised types as can be seen in Figure 3.10 which shows the percentage contribution of the various EUROSTAT farm types to the overall Utilised Agricultural Area (UAA).

Figure 3.10 Change in percentage contribution to UAA by Farm Type 1975-1993



With regard to the most dominant sectors, the percentage of agricultural area devoted to specialist cattle production, dairying and 'other grazing livestock', i.e. predominantly sheep, has increased while the proportion of the area given to mixed cattle enterprises or mixed farms with crops and livestock has decreased. These changes again are indicators of the specialisation trends in farming. In interpreting these figures it must be borne in mind that the overall figure for UAA has decreased from approximately 5,000,000 ha in 1975 to approximately 4,280,000 ha in 1993. Some of this decline in UAA can be attributed to private and public afforestation which amounted to a total of almost 190,000 hectares between 1980 and 1995 (Department of Agriculture and Food, 1996). But notably the 1991 Census of Agriculture also removed approximately 500,000 hectares from the figure for Agricultural Area (AA).

The increase in the land area under forestry, particularly in the western regions, is an important factor in agricultural structural change. Much of the afforestation in the west is the outcome of the generally weaker economic structure of farming in these regions. Driven by economic incentives provided under the reformed CAP and previous national and EC afforestation schemes, there has been a strong increase in private planting by full-time and part-time farmers (see Department of Agriculture and Food, 1996). At the same time the selling of part or all of individual holdings to the state Forestry Board, Coillte Teoranta, has provided a final escape route for farmers whose enterprises are no longer viable. This conversion to another type of land use has repercussions for wildlife and the environment which have been addressed in the recent report to the Heritage Council entitled Review of Current Forestry Policy - The Impact on Aspects of Ireland's Heritage.

### 3.1.8. Intensification of production



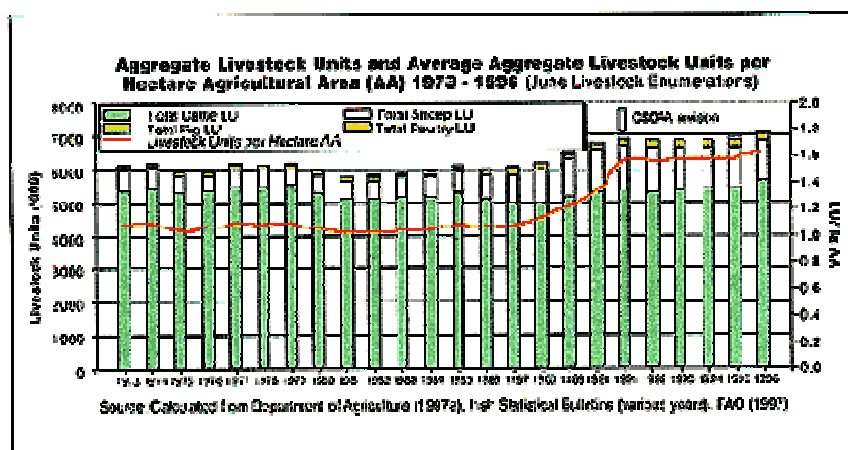
Processes of intensification are quite closely linked to processes of specialisation of production, in that it is often economies of scale that make intensification worthwhile. Incentives for intensification were provided under the Farm Modernisation Scheme 1974-1985, the Western Drainage Package (1979-1988), the Programme for Western Development 1981-1990 and the currently suspended Farm Improvement Programme (from 1986) all of which played a key role in the promotion and financing of larger scale holdings and farm improvements. It should be noted that there are still some outstanding measures to be carried out under the Farm Improvement Programme farm plans, as the plans remain active for a maximum of twelve years (Browne, pers. comm., 1998).

Suitable parameters for the determination of the intensification of agricultural production are the level of farm inputs (fertilisers, pesticides, compound feeds), mechanisation, trends in livestock density and herd structures, as well as the ratio of hay production to silage production. Trends in field size and the degree of farm improvements, e.g. drainage or reclamation, are also of interest. Not all these parameters can be addressed here due to a lack of baseline data and some aspects will be addressed in the section on agricultural impacts on biodiversity and natural resources.

The trends in herd or flock sizes in the cattle, dairy, sheep, pig and poultry sectors have already been outlined in the previous section. Relevant indicators of intensification linked to these structural changes are changes in aggregate number of livestock units (LU) in the country and in national figures for livestock units per hectare of agricultural area which are shown in Figure 3.11. The increase in aggregate livestock units can primarily be attributed to the significant increase in sheep numbers following the introduction of the Ewe Premium in 1980. However, the increase in aggregate pig and poultry LU are also notable as the agricultural area devoted to these enterprises is declining, i.e. an increasing number of animals is being kept on a decreasing area (see Figure 3.10) which has repercussions on nutrient inputs per unit area. This problem of the concentration of nutrients has, to some extent, been addressed by exporting pig and poultry manure from the holdings on which the animals are housed (see case study 5.3).

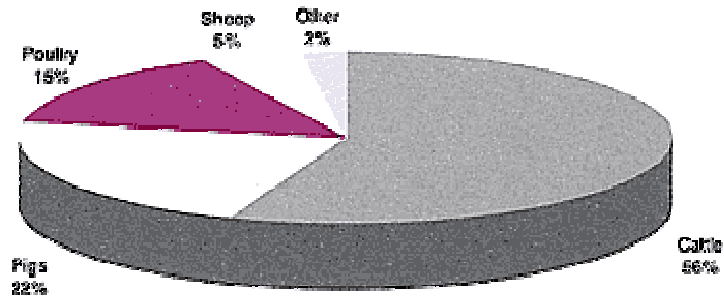
The countrywide figure for aggregate livestock units per hectare AA based on the June livestock enumerations has increased from 1.08 LU/ha in 1973 to 1.63 LU/ha in 1996. It should, however, be borne in mind that the 1991 census of agriculture removed approximately 500,000 hectares from the figure for 'agricultural area' which explains part of the sharp increase between 1990 and 1991. There is a strong variation of livestock density on farms. According to the 1990 Teagasc National Farm Survey more than 40% of grassland areas carried less than 1 LU/ha while 5% of grassland areas carried more than 2 LU/ha (Department of Agriculture and Food, 1996).

**Figure 3.11 Aggregate Livestock Units and Average Aggregate Livestock Units per Hectare Agricultural Area (AA) 1973-1996**



Associated with the increase in livestock numbers the production of compound feeds increased steadily between 1988 and 1995 (Department of Agriculture and Food, 1997a). While there was a further increase in pig compound production in 1996, overall production declined as a consequence of a number of factors including weather conditions, milk super levies in 1995 and the BSE crisis (Department of Agriculture and Food, 1997b). Between 1980 and 1995, cattle feed production increased by 85%, pig feed production by 26% while poultry feed production increased by 61%. The production of 'miscellaneous' feedingstuff has increased dramatically by 167% since 1980, reflecting among other things the dramatic rise in sheep numbers (Department of Agriculture and Food, 1997a). The breakdown of the usage of compound feeds by sector in 1996 is given in Figure 3.12, clearly indicating the high nutrient inputs in the pig and poultry sectors relative to the overall number of livestock units in these sectors as shown in Figure 3.11 above. Conversely the figures highlight the grass-based production structures in the cattle and sheep sectors. Usage of compound feedingstuff for cattle represents the greatest proportion of total production, with almost half of this being used in the dairy sector (Department of Agriculture and Food, 1997b).

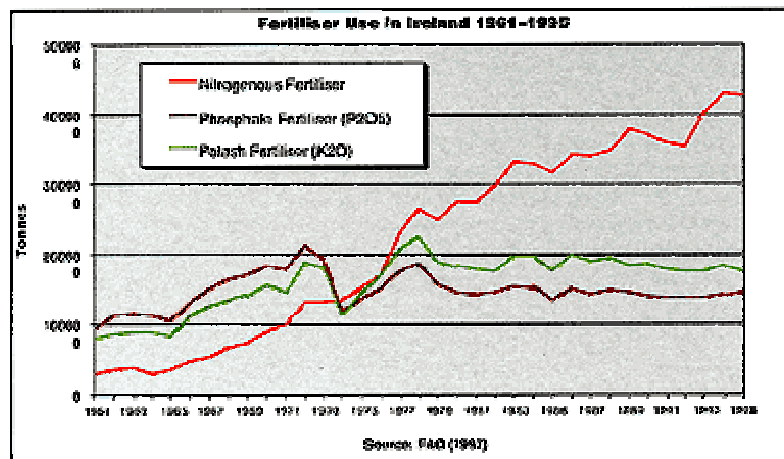
**Figure 3.12 Compound Feed Usage by Sector in 1996**



Source: Department of Agriculture (1997b)

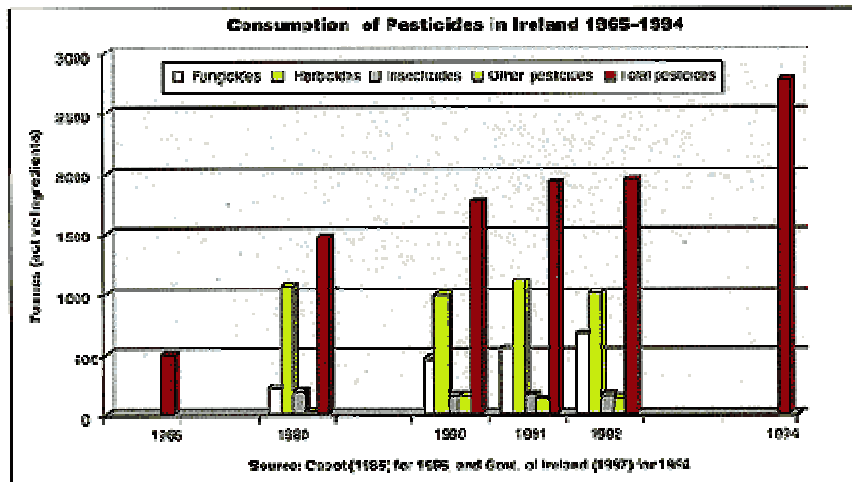
Another important indicator of the intensification of production is the amount of fertiliser used. Figure 3.13 shows the trend in artificial fertiliser consumption in Ireland between 1961 and 1995. There was a strong increase in the use of phosphate (shown as P<sub>2</sub>O<sub>5</sub>) and potassium (shown as K<sub>2</sub>O) fertilisers in the 1960s and major fluctuation in the 1970s; since 1980 the inputs have been fairly stable. The use of phosphate fertilisers during the 1980s and 1990s was, on average, 15% lower than during the 1970s, while the consumption of potassium was about 10% higher on average. The use of fertiliser nitrogen (N) began to increase sharply after Ireland's entry into the EC. It increased more than threefold between 1973 and 1995. The use of fertiliser nitrogen per hectare of agricultural area increased more than fourfold from 22.9 kg/ha in 1973 to 96.8kg/ha in 1995. However, there is strong spatial variation in the levels of use. Generally higher input levels are associated with the south and south-east, due to the concentration of tillage cropping in these regions (Lee, 1986). Higher input levels are also associated with silage production and dairying.

Figure 3.13 Fertiliser Use in Ireland 1961-1995



With regard to pesticide use there are few data available. Figure 3.14 gives an indication of the national trend between 1965 and 1994 in relation to pesticide usage. There has clearly been a substantial increase in pesticide use, particularly in the use of fungicides. The increase for 'other pesticides' (most of them growth regulators) shown in Figure 3.14 can be attributed to the increased use of these substances on cereals (Eurostat, 1996). The average amount of pesticides used in 1994 was 0.56 kg active ingredients per hectare agricultural area which was the second lowest figure in the EU after Sweden. The low level of pesticide usage in Ireland would seem to reflect the relatively small proportion of arable land and permanent crops which tend to be the areas receiving most pesticide applications. It can reasonably be assumed that there is a strong spatial variation in the levels of pesticide usage in Ireland reflecting the uneven distribution of land use types (see Figure 3.4).

Figure 3.14 Consumption of Pesticides in Ireland 1965-1994



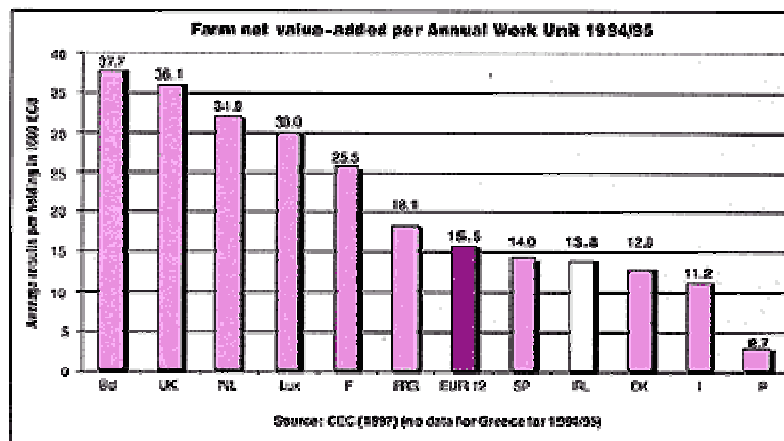
Another indicator of intensification is the increase in yield per unit area (to which both artificial fertiliser and pesticide use levels are, to a certain extent, linked). The yield of major arable crops per unit area increased considerably between the late sixties and early eighties and kept pace with overall yield increases in the EC during that period (Lee, 1987).

The ratio of hay production to silage production is a further indicator of intensification. Grassland, including meadows, pasture and rough grazing, accounted for 90 % of the area used for agriculture in 1995. Hay and silage comprised about thirty percent of the total agricultural area. Since 1970 there has been a steady increase in silage production, accelerated by a series of wet summers in the mid-eighties. The production of silage has increased from 0.3 million tonnes in 1960 to over 20 million tonnes in 1990 (Government of Ireland, 1997). Silage making is generally associated with more intensive management than hay production. The intensity of management varies between regions, depending on the general level of intensification of production (see Mayes & Stowe, 1989).

### 3.2. Farm Incomes

Farm income is an important indicator of the viability of farms, as well as of the availability of disposable income for investments, e.g. in pollution control. Figure 3.15 compares the incomes of European farmers on the basis of net value-added per Annual Work Unit (AWU) for 1994/95 (CEC, 1997a). It shows that the average return per AWU on Irish farms is below the EU average and well below those in the UK, Benelux and France.

Figure 3.15 Farm net value-added per Annual Work Unit 1994/95



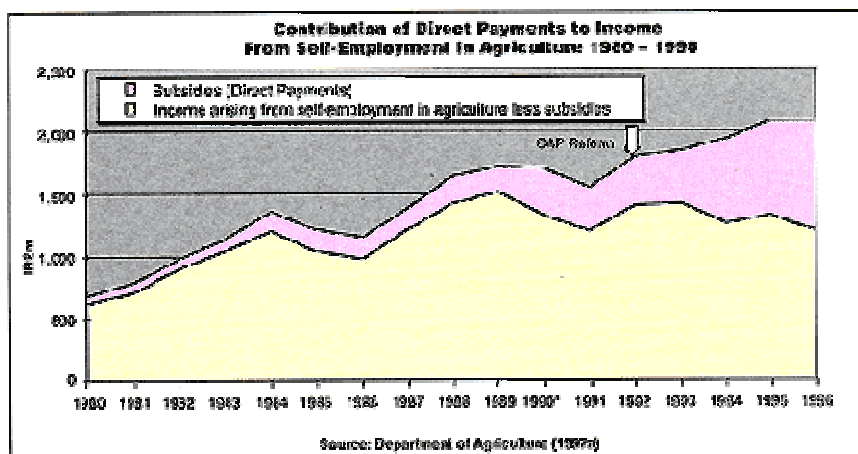
An examination of the figures for farm net value-added per AWU by sector indicates that the low figure for Ireland can be mainly attributed to the weak performance of drystock farms. Tillage, mixed crop and livestock farms exceeded the EU average, while dairy farms on average performed just below the EU average. No figures were available for the 'granivores' farm type, e.g. pig and poultry farms, in Ireland (CEC, 1997).

A pre-CAP reform study of farm incomes in Ireland (Caskie et al., 1991) showed that there was a serious low income problem in Irish farm households, which was 'mainly associated with households on small farms and medium-sized farms, with a high drystock component, where agriculture is the main source of income'. There were considerable income disparities between regions and between farm size and farm type categories. The highest income levels were associated with dairying on farms of over forty hectares. In the 1970s and 1980s the risk of relative poverty of farm households was consistently two or three times higher than that in the self-employed non-farming sector and it was seven times that of employees.

The real agricultural income index increased steadily between 1992, i.e. the year of the CAP reform, and 1995 following a significant decline in 1991. Although present income figures remain significantly lower than those of the late 1970's the fact that the numbers engaged in agriculture have decreased means that a higher level of per capita farm income is being achieved. The total income from self-employment in agriculture has increased by about 15% during the implementation years of the CAP reform, i.e. up to 1996 (Department of Agriculture and Food, 1997a). Since the number of holdings has decreased the average income per farm would have increased even more substantially than this. While figures for 1996 were not available there are indications that farm incomes in Ireland fell slightly in that year (Eurostat, 1997c).

A substantial proportion of the increase in total agricultural incomes can be attributed to the continued application of the 1992 CAP reform which included the introduction of new types of compensatory payments as well as the upgrading of certain types of existing aid (see Chapter 2). The contribution of direct payments to income from self-employment in agriculture in Ireland between 1980 and 1996 is shown in Figure 3.16.

**Figure 3.16 Contribution of Direct Payments to Income From Self-Employment in Agriculture 1980 - 1996**



The level of subsidies earned by the agricultural sector has continued to rise significantly and constituted 42% of the total incomes in 1996. These payments are important in maintaining farm incomes in the disadvantaged areas of the West, particularly on farms with mainly cattle and/or sheep enterprises (Caskie et al., 1991). Direct payments to farmers are made through a number of schemes (see Chapter 2) and these can be grouped into three main categories:

- Headage payments in Less Favoured Areas (13% of total direct payments in 1996)
- Livestock premia and Arable Aid (57% and 10% of total direct payments in 1996, respectively)
- Other payments: (including those made under the CAP accompanying measures); disease eradication and compensation, (incl. BSE); installation aid for young farmers and other adjustments (20% of total direct payments in 1996) (Keeney et al. 1997)

The recent CAP reform proposals as part of the AGENDA 2000 will have a major impact on farm incomes and their composition. The European Commission proposes to deepen and extend the 1992 reform through further shifts from price support to direct payments and these payments are to be set at an appropriate level while avoiding overcompensation (CEC, 1997c). It has been estimated that direct payments are going to increase from their current level to about 60% of net farm income (Varley, 1997). The Commission further proposes the introduction of an individual ceiling covering all direct income payments granted under the Common Market Organisations. Member States would be authorised to modulate direct payment per farm within certain limits and relative to employment on the farm (CEC, 1998). These differentiation criteria also refer to a potential modulation of direct payments by farm size. The EU Agricultural Commissioner pointed out that, "This issue is gaining more and more importance, not least from the point of view of social cohesion. However, a differentiation of agricultural support according to farm size is not easy to put into practice since a family running a small farm may draw a large income from off-farm activities and, on the other hand, a large farm may provide employment for a number of farm workers. In my view, Member States or regions should be allowed to introduce differentiation criteria within commonly agreed limits" (CEPS, 1997).

Some aspects of this complex problem will be addressed in Appendix II of this study, where the current distribution of direct payments relative to total household income and by farm type will be explored.

### 3.3. Summary and Conclusions

- I.** Agriculture is one of the major economic activities in rural Ireland and it plays a fundamental role in the national economy in terms of direct and downstream employment as well as in terms of its contribution to GDP and the trade balance.
- II.** Almost two thirds of Ireland's land area is classified as being used for agricultural purposes. Agricultural structural change is strongly influenced by market and price policies, structural policies and extension or advisory services. Agricultural structural change in turn influences the type and magnitude of positive or adverse impacts on the rural environment which will be discussed in Chapter 3.
- III.** There has been a significant decline in the number of farm holdings in the past thirty years while the average farm size has increased. The decline in the number of farms has been most pronounced in the size class of less than twenty hectares.
- IV.** Agricultural land use is clearly dominated by grass-based production with ninety percent of the area farmed being devoted to pasture, silage, hay and rough grazing, while cereals and field crops are grown on less than ten percent of the agricultural area.
- V.** The average economic size of Irish holdings, measured in European Size Units, increased at a faster pace than the EU average in the late 80s and early 90s and was slightly above the EU average in 1993. As is the case in all the other EU Member States Ireland has recorded a continuous decline in the volume of total agricultural labour.
- VI.** The analysis of agricultural structural change shows that there are increasing levels concentration, specialisation and intensification of production in Irish farming. There are, however, strong regional variations and major differences between farm types. The process of concentration of production is most evident in the dairy, sheep, pig, poultry and cereal sectors. In all livestock sectors there has been a considerable amount of restructuring with unit sizes increasing. There has been a general shift from mixed farm enterprises to more specialised production.
- VII.** There has been an increase in the aggregate number of livestock units in the country of approximately fifteen percent since Ireland's accession to the EU, which can be primarily attributed to the significant increase in sheep

numbers following the introduction of the Ewe Premium in 1980. Since agricultural land has also been taken out of production, the average stocking density per hectare has increased by approximately 50 percent during this period, albeit coming from a low base.

- VIII.** The use of fertiliser nitrogen (N) has increased more than threefold between 1973 and 1995 while the use of phosphorus (P) and potassium (K) has remained relatively stable since the late seventies. There has been a dramatic increase in the production and consumption of compound feeds which - together with the increase in overall livestock numbers and increased fertiliser inputs - has led to a major increase in nutrient inputs per unit area.
- IX.** Further indicators of the intensification of agricultural practices are significant increases in silage production, increasing field sizes and mechanisation, and a sharp increase in the use of pesticides.
- X.** Farm incomes are important indicators for the viability of farms, as well as of the availability of disposable income for investments. The average return per Annual Work Unit on Irish farms was below the EU average in the mid 1990s and well below income levels in the UK, Benelux and France. The real agricultural income index increased steadily between 1992 and 1995. Although present income figures remain significantly lower than those of the late 1970s the fact that the numbers engaged in agriculture have decreased means that a higher level of per capita farm income is being achieved. The level of subsidies earned by the agricultural sector has continued to rise significantly and constituted 42% of the total incomes in 1996.
- XI** . The recent CAP reform proposals as part of the AGENDA 2000 will have a major impact on farm incomes and their composition. The Commission proposes to deepen and extend the 1992 reform through further shifts from price support to direct payments. Direct payments may be more closely linked to environmental conditions and may also be modulated by farm size with individual ceilings covering all direct income payments granted under the Common Market Organisations (see also Chapter 9).

## References

- Bowler (1986): *Intensification, Concentration and Specialisation in Agriculture: the case of the European Community*. - in: *Geography* 71 (1) 14-24. UK
- Buckwell, A (1989): *Economic Signals, Farmers' Responses and Environmental Change*. *Journal of Rural Studies*, Vol. 5, No. 2, 149-160. Great Britain.
- Cabot, D (1985): *The State of the Environment*. An Foras Forbatha, Dublin
- Caskie, D P, Markey, A P, McHenry, H L, Moss, J E & Phelan, J F (1991): *Study of Farm Incomes in Northern Ireland and the Republic of Ireland*. A study prepared for Co-operation North, Dublin and Belfast

CEC (1991b): *The Development and Future of the Common Agricultural Policy - Proposals of the Commission*. Brussels, February 1991.

CEC (1997a): *The Agricultural Situation in the European Community*, 1996 Report, Brussels, Luxembourg, 1997

CEC (1997b): *Agenda 2000 - Volume I - Communication: For A Stronger And Wider Union*. DOC/97/6, Strasbourg, 15 July 1997

CEC (1997c): *Agenda 2000, Agriculture, Summary*, DG VI, Brussels

CEPS (1997): *Franz Fischler: The CAP and Rural Development : Europe must play a winning game*. (Summary) Centre for European Policy Studies CEPS, Brussels, 20 June 1997

CEC (1998): *AGENDA 2000 Commission Proposals. Explanatory Memorandum The future for European Agriculture*. <http://europa.eu.int/en/comm/dg06/>

Department of Agriculture and Food (1996): *Report of the National Farm Forestry Forum*, Dublin

Department of Agriculture and Food (1997a): *Statistical Compendium* URL: <http://www.irlgov.ie/daff/revcomp.xls>

Department of Agriculture and Food (1997b): *1996 Review and Outlook for Agriculture, the Food Industry and Forestry*. March.

Department of Agriculture and Food (1998a): *1997 Review and Outlook for Agriculture, the Food Industry and Forestry*. March.

Department of Agriculture and Food (1998b): *Role of Agriculture and Food Industry in the Irish Economy*. Press release 8/4/98. <http://www.irlgov.ie:80/daff/eapr98.htm>

EC DG VI (1997): *European Commission Directorate-General for Agriculture (DG VI) CAP 2000 Working document*. Situation and Outlook: Rural Developments July.

Eurostat (1991): *Farm Structure Survey 1987*. Brussels - Luxembourg

Eurostat (1995): *Farm Structure Survey 1993*. Brussels - Luxembourg

Eurostat (1996): *Environment Statistics*. Brussels - Luxembourg

Eurostat (1997a): *Statistics in Focus; Agriculture, forestry and fisheries 1997*, 12

Eurostat (1997b): *Statistics in Focus - Agriculture, forestry and fisheries 1997*, 9

Eurostat (1997c): *Statistics in Focus; Agriculture, forestry and fisheries 1997*, 3

FAO (1997): *FAOSTAT Database* URL: <http://apps.fao.org/default.htm>

Government of Ireland (1995): *Operational Programme 1994-1999 for Agriculture, Rural Development and Forestry*, Dublin.

Government of Ireland (1997): *Sustainable Development - A Strategy for Ireland*, Dublin

Harley (1990): *Agriculture in the European Community: Structures, Policies and Environmental Opportunities*. Royal Society for the Protection of Birds, Sandy, UK.

Keeney, M., A. Matthews and J. Frawley, (1997): *'The Distribution of Direct Payments in Irish Agriculture'*, paper read to the Economic Policy conference, Dublin Economic Workshop, at Kenmare, October 17-19.

Kinsella J. (1995). *'A Study of Farm Development Information Needs for Viable and Potentially Viable Farms in Ireland'*, Unpublished PhD Thesis, Department of Agribusiness, Extension and Rural Development, University College Dublin.

Lee, J (1987): *European Land Use and Resources - An analyses of future EEC demands*. - in: *Land Use Policy Vol 4*, No. 3, July.

Lee, J (1995): *Some aspects of Sustainability as Applying to Agriculture in Ireland*. National Sustainability Indicator Forum, University College Dublin, April 18-19, 1995.

Mayes, E & Stowe, T (1989): *The Status and Distribution of the Corncrake in Ireland 1988*. - in: *Irish Birds 4*, 1-12. IWC Dublin.

Varley, M. (1997): *Agenda 2000: An Irish perspective. President's Address to the Agricultural Economics Society of Ireland Annual Conference*, 24th October 1997.

Personal communication: Browne, A., Teagasc, Ennis, (pers comm. January 1998)

Compass Ireland. CORINE Landcover Statistics (pers. comm. November 1997)

## 4. Agricultural Impacts on Biodiversity and Natural Resources in Ireland

### Introduction

It is the aim of this chapter to identify the impact of agricultural practices and agricultural structural change in Ireland on biodiversity and natural resources. The various aspects of structural change in the sector have been described in the previous chapter. The complexity of the influences of agricultural policy on farming practices and farmers' decision-making in response to economic signals make it immensely difficult to assign the observed changes in the rural

landscape to particular agricultural schemes or payments (see Buckwell, 1989). There is a paucity of baseline information on biodiversity and natural resources and an absence of monitoring programmes specifically designed to assess the impacts of agricultural practices on the environment. This situation often only allows for very broad conclusions about the impacts of agriculture to be made.

Agricultural land use has helped to shape the Irish countryside for thousands of years. Indeed, human interference with the natural vegetation has been so extensive that it can be difficult to distinguish entirely natural vegetation types, as is the case in most European landscapes. However, agricultural management has created a range of cultural landscapes, varying with different geological and climatic influences and with diverse land use practices. By exercising its influence on the natural components of the landscape agriculture has also enriched aspects of Ireland's wildlife heritage over the millennia.

More recent developments in agriculture, as expressed in the processes of specialisation, concentration and intensification of agricultural production outlined in the previous chapter, have, at least in some areas, had negative environmental implications. The visual fabric of Ireland's landscapes is changing, some habitats and species are hard pressed for survival and pollution from agricultural sources impacts upon wildlife, soil and water resources as well as on human health.

Obviously agriculture is only one of the factors which impact upon the rural environment. Other factors include urbanisation and suburbanisation, industrial development, transport structures, tourism developments, afforestation and peat extraction. However, as the main land use type in terms of area agriculture in Ireland remains the primary determinant of rural landscape change.

While pressures on the environment due to agricultural structural changes are more pronounced in a number of European regions, particularly in northern Germany, the Netherlands, parts of France or south-east England, a number of adverse environmental changes have occurred in Ireland in recent decades. These will be addressed in the following sections.

### **Baseline Information**

Satisfactory data on land use change, habitat change or species trends are scarce. The first comprehensive large-scale land use inventory of Ireland has been compiled as part of the EC CORINE Land Cover Project which began in the late 1980s. There have been some local surveys, and the Wildlife Service of the Office of Public Works (OPW) carried out national or regional surveys of certain habitat types, including peatlands, woodlands and grasslands, as well as a number of species surveys. The first comprehensive survey, the National Heritage Inventory of the 1970s, resulted in the identification and the drawing up of a list of Areas of Scientific Interest in Ireland (An Foras Forbatha, 1981). This inventory was updated and revised in the 1980s (Wildlife Service, 1989). Further updating in the 1990s by the National Parks and Wildlife Service (NPWS) resulted in the publication of the list of proposed Natural Heritage Areas (pNHA). These pNHA sites have served as the baseline inventory for the listing of proposed Candidate Special Areas of Conservation (pCSAC) which is being prepared in order to meet Ireland's obligations under the EU Habitats Directive. Remote sensing and the use of Geographic Information Systems (GIS) are likely to improve the data situation in the future.

A limited amount of data on land use and landscape features is being collected by approved planners for farms participating in the Rural Environment Protection Scheme. This information is held by the Department of Agriculture and Food and may serve as reference material in the future.

With regard to species trends the amount of data available is also limited and consists of material produced by, amongst others, the Wildlife Service Research Branch, universities, NGOs such as BirdWatch Ireland, the British Trust for Ornithology and the Biological Records Centre, Monkswood in the UK. Red Data Books have been prepared for some groups of flora and fauna.

Water quality data are available from the Environmental Protection Agency (EPA). The latest published data relate to the four year survey period of 1991-1994. Data on fish-kills are collected by the Marine Institute on an annual basis.

## **4.1. Impacts on Ecological Processes and Life Support Systems**

Ecological processes can be defined as 'those processes that are governed, supported or strongly moderated by ecosystems and are essential for food production, health and other aspects of human survival and sustainable development' (IUCN, 1980). Ecological processes govern energy flow and nutrient cycles in ecosystems.

Agricultural activities break both energy flow and nutrient cycles to a greater or lesser extent. For example, the harvesting and removal of crops leads to a loss of both nutrients and (fixed) energy from agricultural systems. In a mixed crop and livestock enterprise both energy and nutrients would to some extent be returned to the land in the form of animal manure and harvest residues. In specialised enterprises energy flow and nutrient cycles are disrupted to a



greater extent. Intensive livestock units may be faced with the problem of the disposal of surplus nutrients in the form of slurry, while conventional crop production requires nutrient inputs in the form of purchased chemical fertiliser (see case studies 5.3, 5.4, 5.6). Fertiliser production may lead to further environmental problems as a consequence of the energy consumed and the waste generated in its production. If animal waste is transported from a 'surplus region', e.g. from large pig or poultry production units to another region where it could be used as fertiliser again energy inputs are required for transport.

The closer agricultural systems are modelled on the original ecosystems which are being modified, i.e. the more self-contained and complex they are, the more efficient (in terms of energy use and nutrient cycling) and sustainable they become and the less inputs are required.

## 4.2. Impacts on Biological Diversity

### 4.2.1. What is Biodiversity

The word 'biodiversity' is a contraction of biological diversity and is commonly used to describe the number, variety and variability of living organisms. In order to manage biodiversity, it has to be measured, and measures of diversity only become possible when some quantitative value can be ascribed to them and when these values can be compared. It is thus necessary to try and disentangle some of the separate elements of which biodiversity is composed. It has become widespread practice to use 'Biological diversity' as an umbrella term for natural diversity at three hierarchically-related levels of biological organisation: (i) genetic diversity at the molecular level of biological systems, (ii) species diversity and (iii) ecosystem diversity, i.e. the number and frequency of ecosystems (Wilcox, 1983; McNeely, 1988).

#### Genetic diversity

Genetic diversity represents the heritable variation within and between populations of organisms. Genetic variation enables both natural evolutionary change and artificial selective breeding to occur.

#### Species diversity

Very commonly biodiversity is used as a synonym of species diversity, and of 'species richness' in particular. Species richness describes the number of species in a defined area or habitat. There are a number of difficulties involved in this approach as (i) the concept of what represents a distinct species differs considerably between groups of organisms, (ii) organisms of a defined species which differ widely from each other in some respect by definition contribute more to overall diversity than those which are very uniform, (iii) the more different a species is from any other species the greater its contribution to any overall measure of global biological diversity and (iv) the ecological importance of a species within an ecosystem can have a direct effect on community structure, and thus on overall biological diversity.

#### Ecosystem diversity

The quantitative assessment of diversity at the ecosystem, habitat or community level remains problematic as there is no unique definition and classification of ecosystems at the global level. It is thus difficult in practice to assess ecosystem diversity other than on a local or regional basis and then the assessment is based largely on their vegetation. Ecosystem diversity is often measured indirectly through measures of the diversity of the component species, using a variety of approaches. However, there is no one authoritative index for measuring ecosystem diversity. Additionally ecosystems are different from genes and species in that they explicitly include abiotic components, such as soils and climate. For this reason the impact of agriculture on soil and water resources will also be assessed in this chapter.

#### Biodiversity - its meaning and measurement

The differences between these conceptual perspectives on the meaning of biodiversity, and the associated semantic problems, are not trivial. Management intended to maintain one facet of biodiversity will not necessarily maintain another. For example, a timber extraction programme which is designed to conserve biodiversity in the sense of site species richness may well reduce biodiversity measured as genetic variation within the tree species harvested. Clearly, the maintenance of different facets of biodiversity will require different management strategies and resources, and will meet different human needs. Even if complete knowledge of particular areas could be assumed, and standard definitions of diversity be derived, the ranking of such areas in terms of their importance with respect to biological diversity remains problematic. Much depends on the scale that is being used. Thus, the question of what contribution a given area makes to global biological diversity is very different from the question of what contribution it makes to local, national or regional biological diversity. This is because, even using a relatively simplified measure, any given area contributes to biological diversity in at least two different ways - through its richness in numbers of species and through the endemism (or geographical uniqueness) of these species. The relative importance of these two factors will inevitably change at different geographical scales, and sites of high regional importance may have little significance at a global level. Neither of these factors include any explicit assessment of genetic diversity. Although the word biodiversity has

already gained wide currency in the absence of a clear and unique meaning, greater precision will be required of its users in order that policy and programmes can be more efficiently defined in the future' (WCMC, 1995).

#### 4.2.2. Agriculture and Biological Diversity

Biodiversity changes in time and space. While the known changes over geological time are not relevant in the context of this study, agriculture's recent impacts on genetic, species and habitat diversity are at the core of its concern. Globally there is large-scale geographic variation in species diversity, the underlying reasons for which are not fully understood. Ireland's biological diversity has been strongly influenced by two factors. Firstly, after the last glaciation landbridges to Britain and the continent were severed before major recolonisation by some species groups could occur which left the island's flora and fauna considerably impoverished. Secondly agricultural land use has enriched aspects of the wildlife heritage over thousands of years due to large-scale ecosystem modification. For example the removal of a forest cover and its substitution with grassland or tillage gives light-demanding species larger areas in which they can survive and reproduce. Furthermore farmers have extended the range of a number of species by introducing species to areas that they probably would not have reached without human influence. The maintenance of existing levels of diversity would appear to involve the maintenance of those landscapes which are, at least in part, man-made along with adequately sized areas of natural ecosystems. It is commonly accepted that today a number of species and species communities in Ireland are dependent upon the continuation of certain specific agricultural practices for their survival.

#### 4.2.3. Genetic Diversity in Agriculture

Farming activities have contributed to genetic diversity of domesticated species through cultivation, selection and breeding over millennia. This genetic diversity is central to a number of applications in agriculture, i.e. livestock breeding, adjusted varieties, food and fibre production and medicinal plants. The loss of biodiversity in crop varieties and livestock breeds is of almost negligible significance in terms of overall global diversity, but genetic erosion in these populations is of particular human concern in so far as it has implications for food supply and the sustainability of locally-adapted agricultural practices. 'For domesticated populations, the loss of wild relatives of crop or timber plants is of special concern for the same reasons. These genetic resources may not only underlie the productivity of local agricultural systems but also, when incorporated in breeding programmes, provide the foundation of traits (disease resistance, nutritional value, hardiness, etc.) of global importance in intensive systems and which will assume even greater importance in the context of future climate change. Erosion of diversity in crop gene pools is difficult to demonstrate quantitatively, but tends to be indirectly assessed in terms of the increasing proportion of world cropland planted to high yielding, but genetically uniform, varieties' (WCMC, 1995). From an anthropocentric point of view the variety of genes found in nature thus represents a resource of enormous significance. At the same time 'the genetic variability contained in wild species is essential for their very survival' (Wilcox, 1982, see Vida, 1978).

#### 4.2.4. Agricultural Impacts on Genetic Diversity

Genetic diversity, as represented by genetic differences between discrete populations within wild species, is liable to reduction as a result of the same factors that impact on species diversity, i.e. direct (hunting, collection and persecution) and indirect (habitat destruction and modification) factors (WCMC, 1995).

A Country Report on the needs and opportunities in the field of agricultural plant genetic resources has been submitted to the UN Food and Agriculture Organisation (Department of Agriculture and Food, 1995a). However, this report does not include an analysis of the status of current agricultural plant genetic resources.

Due to the lack of baseline data no quantitative assessment can be made of the loss of genetic variability in either wild or domestic species in Ireland. The intensification of agricultural production, desired economies of scale which demand high levels of uniformity, and market pressures would appear to have led to the abandonment of a number of Irish breeds, strains and landrace varieties. As a result these have died out or become rare; some to the point of near extinction with an inadequate gene pool remaining. Some cereal varieties are held in national and international ex-situ collections. Table 4.1. gives an overview of rare animal breeds, their overall status and their status under the REPS supplementary measure 'Rearing animals of local breeds in danger of extinction'.

The REPS offers incentives to breeders of some of these breeds. To be eligible, a farmer must be a participant in REPS and must be a member of a relevant breed society or conservation organisation and must keep relevant records.

**Table 4.1 Irish rare breeds, status and incentives provided under REPS Supplementary Measure 3**

Rare Breeds		Status (where known) 23	Incentive provided under REPS

			<b>Yes</b>	<b>No</b>
<b>Cattle</b>	Kerry	340 ( in herdbook (1994) minimally endangered	X	
	Irish Maol (Moiled)	?	X	
	Tory Cow	?		X
	Dexter	> 1000 (British Isles)	X	
<b>Equines</b>	Connemara Pony	1750 ( in herdbook (1994) not endangered	X	
	Irish Draught	1458 ( in herdbook (1994) not endangered	X	
	Kerry Bog Pony	22 (1995)		X
<b>Sheep</b>	Galway	204 ( in herdbook (1994) critically endangered	X	
	Roscommon	(?)		X
<b>Goats</b>	Irish Goat	700 ( in herdbook (1994) potentially endangered		
<b>Pigs</b>	Large White	340 ( in herdbook (1994) critically endangered		X
	Irish Landrace	420 ( in herdbook (1994) critically		X

		endangered	
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With regard to threatened domestic plant species there is very little information available. The Irish Genetic Resources Conservation Trust together with the Irish Seedsaver Association and the Trinity College Botanic Gardens are currently engaged in the in-situ and ex-situ conservation of traditional Irish cereal varieties. The Small Grains Collection (US) donated samples of wheat and oat landraces in 1996 which have been cultivated in Kilkenny. The collection will probably be enlarged by donations from the Russian Vavilov Institute in the near future and will bring the collection of heritage cereals to about forty varieties (Miklas, 1998). Small-scale traditional rotational tillage on the Aran Islands may have preserved a rye landrace. However, the genetic characteristics of this rye have not yet been determined (Waldren, pers. comm. 1997). The Irish Seed Saver Association in collaboration with University College Dublin are also involved in the re-discovery and preservation of old Irish apple varieties. Their collections in Dublin and Scariff, Co. Clare now contain 140 varieties, many of which had been considered extinct.

Information on other crop species could not be obtained.

#### 4.2.5. Agricultural Impacts on Species and Habitat Diversity

The loss of biological diversity can take many forms but at its most fundamental and irreversible it involves the extinction of species. While species extinction is - over geological time - a natural process which occurs without the intervention of man, it is beyond question that extinctions caused directly or indirectly by man are occurring at a rate which far exceeds any reasonable estimates of background extinction rates (WCMC, 1995).

In the context of this study it is primarily habitat destruction and modification and their indirect effects on species diversity which are of relevance. Virtually any form of sustained human activity results in some modification of the natural environment. This modification can affect the relative abundance of species. It can increase diversity but in extreme cases may also lead to species extinction. This may result from the habitat being made unsuitable for the species or through habitat fragmentation. Habitat fragmentation divides previously contiguous populations of species into small sub-populations. 'If these are sufficiently small, then chance processes lead to raised probabilities of extinction within a relatively short time' (WCMC, 1995). There is a general agreement amongst scientists that habitat protection is central to species protection (SRU, 1985; Plachter, 1991).

#### Endangered species and the Red Data Lists

The Red Data Lists or Red Data Books identify the status of species in terms of their risk of extermination within a given area, usually on a national basis. Such lists have been drawn up for various groups of fauna and flora, but rarely for habitat types. One of the criticisms of Red Data Lists is that they merely monitor the final phases of species decline, i.e. species have to become rare before they are considered threatened and therefore worthy of protective measures (Bauer, 1989). Furthermore it is usually only a fraction of the total fauna and flora that is assessed in a formal manner. Little is known about the status of most invertebrates and lower plants. In Ireland Red Data Books have been prepared for vascular plants (Curtis & McGough, 1988), Characeae (Joint Nature Conservation Committee (JNCC), 1992) and vertebrates (Whilde, 1993).

Rarity can only be defined with reference to a particular area. In taking a European perspective it is worth noting that a number of species which are still relatively common in Ireland are rare, threatened or extinct on the Continent. This aspect has been taken into account in the drawing up of Irish Red Data Books.

The known status of Red Data List species in Ireland is summarised in Table 4.2.

**Table 4.2 Red Data Lists in Ireland**

Species Group 25	Extinct No. / %	Endangered No. / %	Vulnerable No. / %	In det. No. / %	Int. Imp. No. / %	Total No. / %

<b>Mam mals</b>	n . a .	-	-	1 / 1 . 8	2/3 .6	1 0/ 1 8	r . a .	1 3 / 2 3
<b>Birds</b>	n . a .	7/?	2/?	2 / ? ?	6/?	6/ ?	r . a .	4 1 /?
<b>Rept iles</b>	n . a .	-	-	-	-	-	r . a .	-
<b>Amp hibia ns</b>	n . a .	1/5 0	-	-	-	1/ 5 0	r . a .	2 / 1 0 0
<b>Fish</b>	n . a .	-	-	8 / ?	-	1/ ?	r . a .	9 /?
<b>Inve rtebr ates</b>	?	89/ ?	?	?	?	?	r . a .	8 9 /?
<b>Vasc ular Plan ts</b>	1 0 / 0 . 8	6/0. 5	44/ 3.4	7 / ? . 0	6/0 .5	n. a.	1 / ? . 2	1 6 0 / 1 2. 2

Indet. = Indeterminate; nt. = species which are not now rare/or threatened (applies to vascular plants only);

Int.Imp. = Internationally important; % refers to percentage of total number of species in the respective group, where known; n.a. = not applicable.

#### Reasons for species decline - habitat destruction

The prevailing causes of the decline and loss of species are habitat change and habitat loss, while direct persecution, wilful destruction, trapping, collection and sale is of minor importance for most species.

Ireland still hosts important populations of mammals such as a number of bat species, otters, pine marten and badgers which have become rare or threatened on the continent and which are vulnerable to habitat changes which can be induced by changes in agricultural land use such as for example a loss in habitat diversity, the drainage of wetlands or the loss of nesting sites for bats.

With regard to birds it can generally be said that bird species of upland habitats, wetland habitats and granivore species in the western regions have been negatively affected by changes in land use in recent decades. Table 4.3 shows that twenty-nine Red Data Book bird species, representing nearly 70 % of the total list are in some way dependent on agricultural land use for the maintenance of their habitats. The degree of dependence on certain agricultural land uses varies between species. The corncrake (*Crex crex*), for example, breeds almost exclusively on agricultural land in Ireland, i.e. in meadows cut for hay or silage (see Case Study 5.7). The black-tailed godwit (*Limosa limosa*) nests on lowland wet pasture and its breeding success is directly linked to very low livestock densities (see Beintema et al., 1982).

A number of Ireland's wintering birds such as greenland white-fronted geese (*Anser albifrons flavirostris*), whooper swans (*Cygnus cygnus*) or barnacle geese (*Branta leucopsis*) use agricultural grassland for winter feeding. The chough (*Pyrrhocorax pyrrhocorax*) is dependent on grazed coastal swards usually alongside cliffs. Other species such as quail (*Coturnix coturnix*) and grey partridge (*Perdix perdix*) make use of both grassland and crops but also need hedgerows and patches of unutilised vegetation for cover and breeding. Important habitats for many of Ireland's upland bird species have been severely damaged as a direct result of excessive sheep stocking densities. The bird species affected most were red grouse (*Lagopus lagopus*), dunlin (*Calidris alpina*), golden plover (*Pluvialis apricaria*) and hen harrier (*Circus cyaneus*) (Murphy, 1995).

**Table 4.3 Red Data List of bird species dependent on agricultural practices**

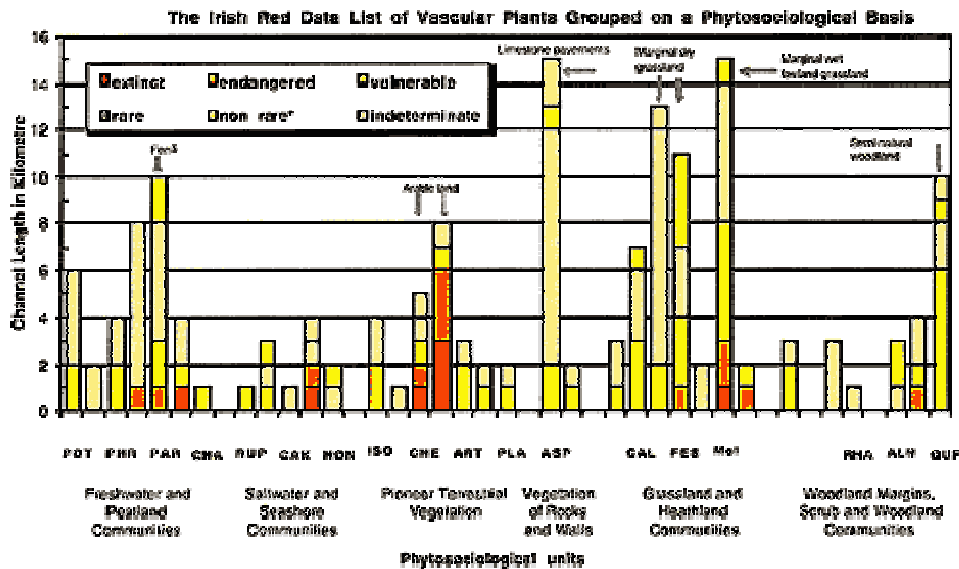
<b>Land Use Type / Habitat</b>	<b>Red Data Book Species</b>
Lowland Farmland incl. Tillage	Whooper Swan Grey Partridge Quail Corncrake Barn Owl Turtle Dove Corn Bunting Tree Sparrow
Lowland Wet Grassland (Breeding)	Garganey Pochard Black-tailed Godwit
Lowland Wet Grassland Barnacle Goose (Wintering)	Whooper Swan Black-tailed Godwit Gadwall Shoveler Pintail Hen Harrier Short-eared Owl Red-necked Phalarope Greenland White-fronted Goose
Uplands 26	Golden Plover Greenshank Hen Harrier Merlin Peregrine Falcon Short-eared Owl Ring Ouzel Chough Twite Dunlin
Upland Woodlands	Redstart

Lowland Heaths	Nightjar
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Sources: Whilde (1993), RSPB (1991), Peterson (1983), Nairn et al. (1988)

Species listed in the Red Data Book for vascular plants are grouped together on a phytosociological basis in Figure 4.1. There are obvious concentrations of extinct, rare or threatened species in phytosociological units (classes) which represent agricultural habitats. These concentrations occur in the phytosociological class Secalinetea (arable weeds which are associated with cereals) and in the phytosociological class Chenopodietea (arable weeds which are associated with root crops) and generally in anthropo-zoogenic grasslands and heaths. A further large group of Red Data List species occurs in the 'wall-fern class' (Asplenietea) which includes open vegetation of rock crevices, such as limestone pavements and walls. Within the anthropogenic meadow and pasture communities most Red Data List species can be assigned to wet marginal grasslands (Molinietalia communities) as opposed to the drier grasslands of the Arrhenatheretalia type, which are usually more intensively managed (Figure 4.1, Appendix III). Other important grassland types, which host concentrations of Red Data Book plants, are sandy dry grasslands, mostly coastal dune grasslands (Koelerio-Coryneporetea), and the dry limestone grasslands (Festuco-Brometea) found principally in the Burren of Co. Clare (see Case Study 5.1) as well as on calcareous eskers and moraines in the Irish midlands.

Figure 4.1 The Irish Red Data List of vascular plants grouped on a phytosociological basis



Source: based on Curtis & McGough (1988). An explanation of the abbreviations for the phytosociological units is given in Appendix III.

A number of factors which contribute to the decline of Irish Red Data Book plant species have been identified by Temple Lang & Hickie (1992) and these are listed in Table 4.4. However, the direct contribution of agriculture to species decline as opposed to that caused by other land uses has not been quantified for Ireland. Such an analysis has been carried out by Sukopp (1981) for Germany in which he concluded that 38% of plant species losses could be attributed to agricultural land use. While the environmental problems faced in Ireland and Germany are not of the same order of magnitude, similar trends can reasonably be expected for Ireland.

Table 4.4 The Irish Red Data Book: Endangered, vulnerable and extinct flowering grass plants and ferns in Ireland

Habitat group	No. of listed species	Threats
Coastal (estuaries, salt marsh, sand)	26	Land reclamation, Spartina, commonage division, overgrazing,

dunes, cliffs, shingle)		recreational pressure
Grassland (pastures, meadows, heaths, eskers, mountains)	49	Agricultural intensification, quarrying, overgrazing
Wetland (rivers and lakes, marsh/fen, lakeshore, damp places)	56	Drainage, afforestation, turf extraction
Woodland (acid and limestone woodland, scrub, hedges)	16	Clearance for agriculture
Artificial habitats (walls, arable farmland)	12	Abandonment of traditional tillage

Source: Temple Lang & Hickie (1992)

### **Agricultural activities leading to habitat destruction**

A number of factors which are directly or indirectly linked to agriculture have led to habitat loss and habitat change in Ireland. These include:

- Arterial and field drainage
- Commonage division
- Land reclamation including the removal of small scale farmland habitats such as trees, hedges, dry-stone walls, remnant woodlands and scrub
- The substitution of silage-making for hay-making
- The abandonment of small-scale rotational cropping
- Increasing sheep numbers and overgrazing of marginal grasslands and heaths
- Increasing use of fertilisers, increasing stocking densities and increased nutrient inputs through supplementary feeding
- Increasing use of pesticides

The origins of some of these factors, particularly drainage practices, can be traced back to the last century (Ryan, 1986), but most changes would appear to be associated with the entry of Ireland into the EU and the various farm support schemes and special aid schemes that have been subsequently available (see Chapter 1).

### **Arterial drainage**

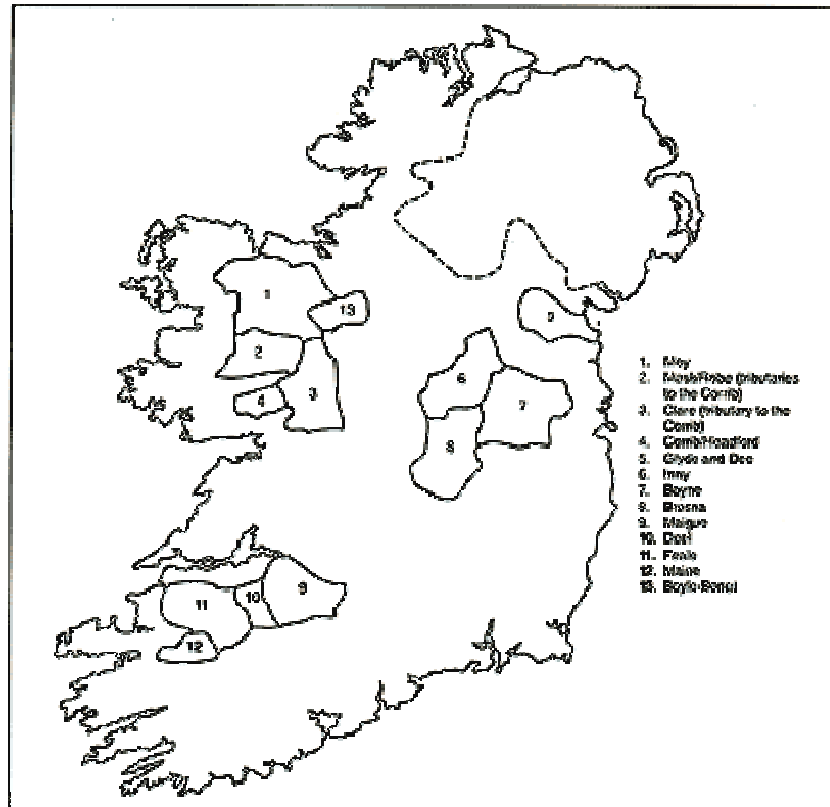
From the middle of the last century until the passing of the 1945 Arterial Drainage Act, 203,600 ha land had been drained. Under the 1945 Act thirteen major catchments and at least 25 small catchments have been drained (Figure



4.2.) affecting 262,800 ha of land (Burdon, 1986). The last schemes were carried out into the mid 1980s in the Boyne, Maigue, Corrib-Mask and Boyle-Bonet catchments.

State investment in drainage construction works has fallen considerably since the mid-eighties (Temple-Lang & Hickie, 1992) and it seems unlikely that schemes such as the Finn-Lackey or the Shannon will go ahead.

**Figure 4.2 Arterial drainage schemes in Ireland**



Source: Baldock et al (1984)

**Field drainage**

Arterial drainage has paved the way for field drainage schemes. National grant aid for field drainage was given under the Land Project 1949, which led to the drainage of 1,168,000 ha. Within the framework of the CAP further schemes were enacted which grant-aided field drainage. Work was carried out under the Farm Modernisation Scheme 1974-1985 (202,350 ha) (Burdon, 1986) and the Western Drainage Package 1979-1988 (182,540 ha) (Minister for Agriculture and Food, 1989). The suspended Farm Improvement Programme of 1986 only provided for minor drainage works in conjunction with field reclamation and no figures are available for the extent of works of this nature. As with arterial drainage, the extent of grant-aided field drainage has declined substantially through the 1980s. No data are available as to the extent of non-grant aided works.

The total area drained under the various Acts and schemes is 2,022,590 ha or almost thirty per cent of the total area of Ireland. (Burdon, 1986). Temple Lang & Hickie (1992) listed a number of sites which had been designated as Areas of Scientific Interest and which had been damaged or destroyed since their designation. State and EC funded arterial drainage schemes were responsible for much of the damage. Drainage has also resulted in damage to fisheries (Baldock, 1990).

One particular rare form of wetland, the turlough was particularly affected by arterial drainage schemes, primarily during the last century (Coxon & Drew, 1986). For example, the Rahasane turlough in eastern County Galway, which forms part of the Dunkellin river catchment, was drained as recently as 1992. This turlough is a wetland of international importance for wintering wildfowl. It had been designated an Area of Scientific Interest of international importance by the Wildlife Service and was recognised as meriting the status of a Special Protection Area (SPA) under the EU Wild Birds Directive. Nevertheless the drainage operation could proceed, as no grant aid was provided, which in turn ruled out any

consultation between representatives of the Department of Agriculture and Food and the National Parks and Wildlife Service of the OPW on the matter. The site is now a proposed Candidate Special Area of Conservation.

The drainage and improvement of wet meadows has been implicated in the decline of the marsh fritillary (*Euphydryas aurinia*), now one of the most rapidly declining butterflies species in Europe (Thomas & Lewington, 1991). The species is listed in Annex IIa of the Habitats Directive as a priority species of community interest the conservation of which requires the designation of Special Areas of Conservation (EC, 1992).

### **Commonage division**

Commonage division has been carried out by the Land Commission in the western areas, affecting 23,412 ha in 248 commonages between 1982 and 1989. Nearly half of the land subject to division was situated in County Mayo (Temple-Lang & Hickie, 1992; Minister for Agriculture and Food, 1991). Commonage division often provides the individual farmer with the incentive to manage the divided areas more intensively, i.e. by way of higher stocking rates or fertiliser inputs. Mountain and hill pasture improvement in Less Favoured Areas was eligible for grant-aid under the Farm Modernisation Scheme (1974-1985), the Farm Improvement Programme (since 1986) and the Programme for Western Development (1981-1990). The conditions governing the approval of farm improvement and development plans under these programmes would appear to have favoured individual as to group applications. This was demonstrated by the relatively small number of group applications sought for commonage improvement under the Programme for Western Development. According to Temple Lang & Hickie (1992) a number of sand dune and machair sites has been affected by commonage division. Habitat damage can be caused by the improvement of heather-moorland through drainage, fencing, fertilising and possibly reseeding, all of which are designed to increase the carrying capacity of these areas. This may in turn lead to overstocking on the remaining undamaged areas of rough grazing on holdings or commonages (NCC, 1990). Certain breeding waders of open moorland (e.g. golden plovers) shun enclosed areas (Ratcliff, 1976).

### **Land reclamation**

Depending on the individual circumstances, land reclamation can involve the removal of scrub, trees, hedgerows and other small-scale farmland habitats, boulders and unnecessary fencing, and may also involve minor drainage operations. Within the framework of farm improvement plans, land reclamation was grant-aided under the now suspended Farm Improvement Programme with capital grants providing 30% and 20% of the capital costs in LFAs and other areas respectively. Aid had also been made available for lowland reclamation in the disadvantaged areas under the Programme for Western Development. Between 1981 and the end of 1990 more than 25,000 approvals for intensive lowland reclamation had been issued and payments of almost £20 million had been made. No figures for the extent of the areas affected are available.

The number of approvals issued for farm development plans peaked in the mid-eighties and declined subsequently. The rate of hedgerow loss and possibly that of other small-scale habitats has probably also declined. It was estimated by Webb (1988) that approximately 16% of all hedges have disappeared since 1938. Hedgerow removal appeared to be localised and concentrated on the larger farms irrespective of the farm type. The greatest losses were noted in the south County Laois and south County Kildare area, i.e. intensive tillage areas. Under the REPS hedgerows have to be maintained as part of the agri-environmental plan for each farm.

Speculation that on some farms hedgerows as well as other small-scale habitats were removed before entry into REPS in order to avoid the maintenance work required under the scheme was re-enforced by the issue of a circular from the Department of Agriculture and Food to REPS planners stating that they had received a complaint from the NPWS to this effect and that such practices were unacceptable (Department of Agriculture and Food, 1995b).

Land reclamation has been intensively studied in the Burren region of Counties Clare and Galway. Two separate surveys found that more than 1,600 hectares of land had been reclaimed in the 1980s and early 1990s and this has impacted on habitats of international importance such as limestone pavements and orchid-rich limestone grasslands in former Areas of Scientific Interest (ASIs), proposed NHAs and proposed CSACs. Details on the reclamation studies and the intensification of agricultural management in the Burren are outlined in Case Study 5.2. In the early 1990s almost three kilometres of hedgerows and dry-stone walls had also been removed in the process of reclamation (Drew, 1996). Under the European Communities (Natural Habitats) Regulations, 1997/30 reclamation in the Burren has become a 'notifiable action' in the pCSACs and requires the consent of the responsible Minister.

Land reclamation and re-seeding have also been implicated in the decline of the chough (Whilde, 1991).

### **Substitution of silage for hay**

The increasing substitution of silage for hay has already been noted in Chapter 3.1.8. Since 1970 there has been a steady increase in silage production, accelerated by a series of wet summers in the mid-eighties. The production of silage has increased from 0.3 million tonnes in 1960 to over 20 million tonnes in 1990 (Government of Ireland, 1997). Silage making is generally associated with more intensive management than hay production. The intensity of

management varies. The number of cuts per year can vary between one and four, with fertiliser or slurry being applied between cuts and there may be frequent reseeding with monodominant high yielding grasses such as rye grass (*Lolium perenne*) (see Mayes & Stowe, 1988). The switch from hay to silage production has been facilitated by investment aid for the installation or upgrading of fodder storage facilities provided under the Programme for Western Development (1981-1990), under the Farm Improvement Programme (since 1986) and the currently suspended Control of Farmyard Pollution Scheme (since 1989).

In recent years the decline of the internationally threatened corncrake (*Crex crex*) has been linked to the increase in grass silage production. Further reasons for the decline of this species include the conversion of hay meadows to closely grazed sheep pasture, encouraged by the introduction of the Ewe Premium in 1980 (Mayes & Stowe, 1988) and possibly the early grazing of grassland, which is subsequently closed off for silage production (Duff, pers. comm. 1992). This would reduce habitat availability during the early nesting season. Details on the Irish Corncrake Conservation Scheme and the role of the REPS in the conservation of the corncrake population are given in Case Study 5.7.

#### Abandonment of Small-Scale Rotational Cropping

The traditional agricultural practice of small-scale rotational cropping, the maintenance of a local seed supply with no or only occasional crop cleaning and the lack of herbicide use have ensured the survival of a number of rare or threatened arable weed species, which were discovered by National Parks and Wildlife Service botanists in 1987 (Curtis et al., 1988). Two of these species, darnel (*Lolium temulentum*) and cornflower (*Centaurea cyanus*), had previously been considered extinct in Ireland and the other two species, the bristle oat (*Avena strigosa*) and smooth brome (*Bromus racemosus*) have become very rare. All these species apart from the bristle oat are listed in the Irish Red Data Book.

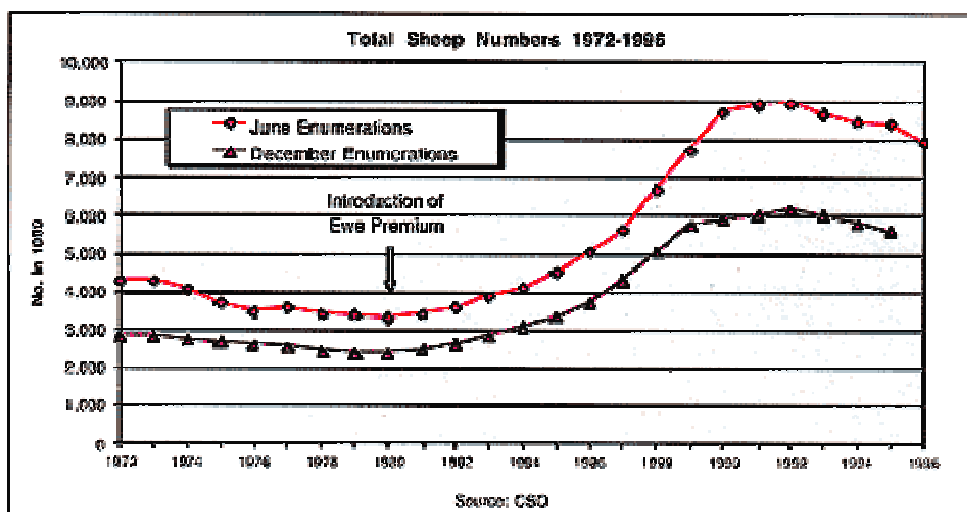
No particular agricultural support scheme can be held responsible for the abandonment of small-scale rotational cropping. This development is part of the general trend towards intensification and specialisation.

#### Overgrazing

The problem of overgrazing by sheep in the upland regions in the west of Ireland was first highlighted by the Salmon Research Agency in 1990 when it reported damage to important game fisheries in the west, due to run-off of excessive quantities of peat silt from eroding peatlands. Bleasdale & Sheehy Skeffington (1992) found that there was little remaining heather moorland in Connemara and concluded that this was due, at least in part, to the high grazing pressure in the region. While overgrazing can negatively affect a number of vegetation types attention is currently primarily focused on the damage done to blanket bog and wet heath communities.

On heathlands overgrazing reduces the cover of heather and leads to increases in grass species such as purple moorgrass (*Molinia caerulea*) and mat grass (*Nardus stricta*). Severe cases of overgrazing lead to soil erosion, particularly in the winter months. In the late 1980s this was still a localised phenomenon. By the mid-1990s the situation had become so serious that it had reached the attention of the popular media. In recent years a number of studies have been carried out which have assessed the extent of the damage and its impacts (see case study 5.1.). The high stocking rates are a direct outcome of the sheepmeat regime of the EU and the headage payments in the LFAs. Following the 270% growth of the national flock (June enumeration) between 1980, i.e. the year of the introduction of the Ewe Premium, and 1992, there has been a decline from 1992 onwards, which appears to be attributable to market forces. The uptake of the supplementary measure 'Degraded Commonages' under the REPS was very limited up to 1997 and therefore does not seem to have been a factor in the decline of the national flock in recent years. The problem of overgrazing and its causes are discussed in more detail in case study 5.1.

**Figure 4.3 Total Sheet Numbers 1972 – 1996**



### Increased nutrient inputs

The excessive use of fertilisers, particularly nitrogen and phosphorous, has a number of indirect effects on habitats. Nutrient enrichment of agricultural as well as non-agricultural habitats (the latter being caused by run-off, leaching or drift) impacts on the competitiveness of species that are adapted to nutrient-poor conditions such as those which are prevalent in heathland, calcareous grassland or oligotrophic waterbodies. An example of this type of impact has been demonstrated by a study of the effects of fertiliser application on the Burren limestone grasslands (An Foras Forbatha, 1972). It was shown that fertilisation resulted in an increased yield and percentage cover of most grasses, white clover (*Trifolium pratense*), compositae and 'agricultural weeds', while the 'non-weed species' that were abundant in the limestone sward, were reduced in yield, variety and percentage cover. The latter group includes a number of rare and threatened species for which the Burren is renowned. Calcareous dry grasslands are severely threatened habitats in Europe. Fertilisation is one of the main factors in their decline (Council of Europe, 1981).

The eutrophication of waterbodies, e.g. through phosphate run-off and leaching, can lead to excessive growths of algae and other water plants<sup>31</sup> and may cause deterioration of water quality to the point of the 'collapse' of the ecosystem through oxygen depletion. However, some habitat types have such a low nutrient status that even very minor eutrophication can disrupt or eliminate plant and animal communities. This would be true for many western oligotrophic lakes and has been demonstrated, for example, by the collapse of the arctic charr populations in Lough Conn and Lough Corrib in the early 1990s (EPA, 1996). The problem of eutrophication will be further discussed in the following section on water quality.

It has been shown in the discussion of the intensification of Irish agriculture in Chapter 3.1.8 that there has also been a dramatic increase in the production and consumption of compound feeds which - together with the increase in overall livestock numbers and increased fertiliser inputs - is likely to have led to a major increase in nutrient inputs per unit area with repercussions for biodiversity as outlined above.

### Increased pesticide use

Data on pesticide use in Ireland have been given in Chapter 3.1.8. The extinction of some arable weed species is linked, at least in part, to herbicide use in tillage production. An indirect effect of a changing vegetation structure and composition following herbicide applications is the loss of invertebrates, such as carabid beetles or lepidoptera (butterflies and moths) which are often dependent on the presence of particular plant species. The maintenance of conservation headlands in tillage crops, i.e. marginal strips which do not receive fertiliser or pesticides, has been shown to have a positive effect on both floristic and faunal diversity (Raskin et al., 1992). Furthermore, organic production techniques, which do not permit pesticide usage, have been shown to be particularly beneficial to the preservation of rare arable weeds and to the maintenance of general plant species diversity (Friebe, 1992) as well as to increased species numbers of birds, lepidoptera and arthropods. A compilation of recent comparative research in Europe on biodiversity on organic and conventional farms is included in Appendix IV. Following the introduction of the REPS there has been a very significant growth in the number of certified organic farms in Ireland which might be expected to have a positive impact on biodiversity. Evaluation reports on the implementation of the EU agri-environmental measures in other Member States have highlighted the proven environmental benefits of organic farming on soil and water quality and on biodiversity (CEC, 1997).

Despite the massive growth of the national sheep flock since 1980 there does not appear to have been a corresponding increase in the use of insecticides, according to available figures (see Chapter 3.1.8). Sheep are dipped to control a range of ectoparasites, including scab and blowfly. Apart from having serious human health implications sheep dips are toxic to aquatic life. Recent statistics indicate that the majority of sheep dip pollution in Scotland is now caused by pyrethroid dips which are replacing the more traditional organophosphate ones. While the pyrethroid dips are thought to be less harmful to human health than the organophosphate based preparations, they are 100 times more toxic to aquatic life (Scottish Environmental Press Agency (SEPA), 1997). Information on the relative amounts of the different types of dips used in Ireland and on potential damage to aquatic life from non-point source pollution by sheep-dip could not be obtained for this study.

### **The protection of semi-natural habitats in Special Areas of Conservation**

Under the EU Habitats Directive of 1992 Ireland is under an obligation to designate and maintain or restore, at a favourable conservation status, natural and semi-natural habitats and species of wild fauna and flora of Community interest as defined in the Annexes of the Directive. The designated sites will contribute to the NATURA 2000 ecological network across the EU. Where it is deemed necessary the state can further encourage the management of linear features in the landscape which are essential for the migration, dispersal and genetic exchange of wild species, such as rivers with their banks or traditional field enclosures (EC, 1992).

In March 1997 the Minister for Arts, Heritage, Gaeltacht and the Islands notified the transposition into Irish law of the EU Habitats Directive and the designation of proposed Special Areas of Conservation. 'The areas involve over about 550,000 hectares in some 400 sites. Many of these valuable sites are contained in the western part of the country. The most extensive areas involve blanket bog, heath and uplands, covering about 200,000 hectares; lakes and rivers, approximately 100,000 hectares; estuaries, mudflats and cliffs, about 90,000 hectares; a further 40,000 hectares of shallow bays and 54,000 hectares of saltmarsh, machair and sand dunes. Other habitats include 30,000 hectares of limestone pavement, 10,000 hectares of raised bogs, 15,000 hectares of fens and 3,000 hectares of turloughs.' (Higgins, 1997). Ireland hosts sixteen priority habitat types and a further 42 non priority habitat types of Community importance under the terms of the Habitats Directive. Out of a total of 400 sites to be designated, 214 host priority habitat types (NPWS, 1995). According to the Deputy President of the Irish Farmers' Association (IFA), Mr Michael Slattery about 500,000 ha, i.e. 90% of the candidate SAC lands are owned by 'up to 10,000 farmers.

The maintenance of the favourable conservation status of many of the habitats covered by the Habitats Directive and included in the SACs is directly (through active management, e.g. grazing) or indirectly (through the absence of negative impacts, e.g. nutrient inputs) dependent on sustainable agricultural practices. Farmers who have some or all of their lands in SACs are being supplied with a map of the area being proposed for designation, a description of the site indicating the for its designation, a list of notifiable actions, and information on procedures for objections and appeals as well as on compensation. A compensation package has recently been agreed with the European Commission. Agreed sets of management prescriptions are still outstanding for a number of the habitat types.

## **4.3. Impacts on Ground and Surface Water**

Agricultural impacts on water resources in Ireland include point source pollution from farmyard run-off, silage run-off, slurry tanks and pesticide spills, as well as wider problems resulting from nitrate and phosphate leaching and run-off.

### **4.3.1. Impacts on Ground Water**

Ireland's groundwater quality and pollution risks to groundwater have been reviewed by Daly (1992). Since there is no nation-wide or systematic groundwater quality monitoring in Ireland, there is a paucity of information on groundwater quality. Only drinking water sources are monitored on a regular basis by the local authorities. The existing information suggests that the main problems arise from point source pollution (e.g. farmyards, septic tanks, accidental spillage) rather than from diffuse sources. However, in the more intensively managed agricultural areas background nitrate levels have risen.

An investigation of groundwater nitrate concentrations in the south and north-east of the country in the early 1990s showed that 97 per cent of samples had nitrate concentrations which were less than the maximum admissible concentration (MAC) set by the Drinking Water Regulations. The information gained in the study suggests that nitrate contamination occurs in individual boreholes and wells, probably due to the proximity of waste sources such as silage and slurry pits, but that the general bodies of groundwater are relatively free of this contamination (EPA, 1997).

A study carried out by Thorn & Coxon (1992) attempted to relate land use and soil management characteristics to the quality and chemistry of borehole waters in Counties Kildare and Carlow. The results suggest that fertiliser use and the proportion of arable land in the vicinity of the boreholes impacts upon groundwater quality. However, difficulties in the interpretation of the study results arise as a consequence of the rotation of arable land and grassland and as a consequence of point source pollution arising from poor agricultural waste management and improper siting of wells.

Studies in a number of karst areas in Ireland have shown that in most places surveyed more than fifty percent of wells and springs were contaminated - usually by septic tank effluent or wastes from farming activities - with the most intense pollution occurring following rainfall (Thorn, 1991).

Water quality problems in the Burren region have been studied by Drew (1990). The characteristics of the karst aquifer make the groundwater resources in the region particularly vulnerable to contamination. Silage effluent and septic tank overflow bacterial contamination were identified as the most widespread form of pollution. Increasing use of artificial fertilisers was indicated by Drew (1990) as being a possible source of increased nitrate levels in a spring draining part of a hill in the central Burren.

Further details on water quality problems in the Burren region are included in Case Study 5.2.

While in areas such as the Burren with its thin and patchy soils pollutants very quickly reach the karst aquifer, in other regions with thicker soils and a different underlying geology the time taken for pollutants to reach groundwater may vary and can take up to 20-30 years (CEC, 1996). Thus the full impact of the increase in nitrogenous fertiliser use (see Chapter 3.1.8), particularly in the more intensively managed regions, may take some time to emerge.

#### 4.3.2. Impact on Surface Water

Overall the surface water quality in Ireland is good, particularly if compared to many continental European countries. In the 1991-1994 EPA survey period the bulk (71 per cent) of river and stream channels surveyed were in an unpolluted condition. However, since long-term water quality monitoring of rivers began by An Foras Forbatha in 1971, overall water quality has deteriorated. The following overview is based on the report on 'Water Quality in Ireland 1991-1994' by the Environmental Protection Agency (EPA, 1996).

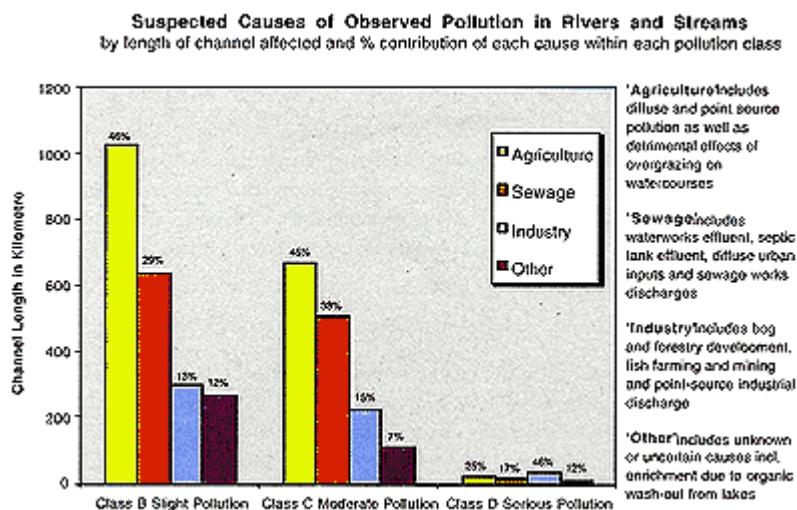
The analyses of long-term (since 1971) and recent (since 1987) trends up to and including the survey period 1991-1994 for rivers and streams shows that there has been:

- A reduction in unpolluted channel length from 84 percent to 57 percent of the total surveyed since 1971
- A five-fold increase in the extent of slight pollution since 1971
- A three-fold increase in the extent of moderate pollution since 1987
- A reduction from 6 percent to approximately 1 percent in the extent of serious pollution since 1971 (EPA, 1996)

The gradual decrease of channel length affected by serious pollution is largely attributed by the EPA to the installation or improvement of sewage treatment facilities while the upward trend in eutrophication is largely attributed to diffuse agricultural sources, i.e. organic and inorganic fertilisers, and to a lesser degree to point source sewage and industrial discharges.

The suspected causes of all observed pollution in the channels surveyed is given in Figure 4.4. The category 'Agriculture' includes the adverse effects of overgrazing by sheep in the western regions (such as scouring, siltation and substratum instability with the ensuing loss of biodiversity and damage to salmonid productivity), as well as the eutrophication caused by diffuse and point sources of agricultural waste.

**Figure 4.4 Suspected Causes of Observed Pollution in Rivers and Streams**



The EPA report attributes almost half of the observed slight and moderate pollution and a quarter of the observed serious pollution of rivers and streams to agriculture with the great bulk of serious pollution being chronic as opposed to 'once-off' pollution incidents. 'Once-off' type pollution events, as for example those caused by waste spillages or releases of short duration, are unlikely to be accurately reflected in the EPA data due to the nature of the survey (EPA, 1996).

### **Eutrophication**

The on-going eutrophication is now the main problem affecting inland waters. Therefore the key physico-chemical parameters of interest are nitrates and phosphates, particularly the latter, which is considered to be the limiting nutrient in freshwaters. Most of the nitrate and phosphate found in natural waters comes from external organic and inorganic sources, principally sewage and industrial waste discharges, and from the run-off from agricultural land of artificial fertiliser and slurry (EPA, 1997).

Diffuse agricultural sources of phosphorus (P) are a major cause of eutrophication in Ireland's surface waters and rainfall-induced run-off from intensive agricultural lands is considered to be responsible for a very large proportion of phosphorus inputs into certain lakes in Ireland (EPA, 1997). Of particular concern is the land-spreading of volumes of pig and poultry slurry from intensive animal rearing facilities which exceed the assimilative capacity of the land available for their disposal (see Case Study 5.3).

Tunney (1990) estimated the P balance for the whole country for 1988 and found that there was an annual surplus of 46,000 tonnes, equal to 60% of total P inputs and that significant reductions in P applications could be made without reducing production. A recent joint Irish-UK study (Poulton et al., 1995) noted that current recommended phosphorus application rates in Ireland are two to three times higher than those issued by the Ministry of Agriculture, Food and Fisheries in the UK.

The built-up of soil P levels has been demonstrated by Carton et al. (1996). Between 1950 and 1991 the average P level of soil samples analysed at the Teagasc soil laboratory has increased more than ten-fold to 9.3mg/l. Since 1991 the level has dropped to about 8mg/l and stabilised. The authors also showed that soil samples received from farms which were about to enter the REPS had significantly lower P levels than non-REPS farms. This would suggest that on average the farms with excess soil P levels are not entering REPS at the same rate as those with low and medium soil P levels. Carton et al. (1996) conclude that farmers with high soil P levels (i) probably ignore the P contribution of slurry applications and (ii) probably do not follow Teagasc P recommendations. A Teagasc campaign was launched in the autumn of 1997 in response to a government target of reducing phosphate inputs to soil by 10% per year for five years, with a view to halving application rates. Teagasc recommendations for grazing and silage have recently been revised (see also Chapter 5.3.11).

Excessive levels of nitrate in rivers are usually associated with the higher applications of artificial fertilisers on arable land and the relative ease with which nitrate is leached from arable land. The EPA water quality survey figures clearly highlight the contrast between the relatively unimpacted rivers of the west and those in the east and south-east of the country where a higher proportion of land is used for tillage. While the bulk of the surface waters surveyed in the 1991-1994 period had nitrate concentrations below the EU guideline value, this value was exceeded in some rivers during the winter months for short periods and the highest concentrations were measured in south-eastern rivers. Nitrate concentrations in surface waters continue to increase in many rural areas and the rate of increase is greatest in the south-east region (EPA, 1996).

### **Overgrazing**

Serious water quality problems result from overgrazing by sheep in the western regions. The EPA report categorised the observed effects on rivers as follows:

- I.** Scouring effects and increased instability of substrata: in severe cases of hillside erosion sand and gravel washed down the river system has a very severe impact on river biota by increasing the impact of normal flash floods and by encouraging the movement of substrata downstream.
- II.** Peat siltation: peat from the surface layers of overgrazed hillside blanket bog permeates the gravel of many river beds

in the western regions, particularly where there is a reasonably thick cover of peat and in areas which are still in the early stages of damage. Siltation and clogging of stream beds as well as localised increases in acidity impact negatively on fish egg survival and macroinvertebrate communities.

- III.** River bed peat and algal mats: this effect may be indicative of a certain degree of eutrophication resulting from the overgrazing-induced erosion, but the precise impacts on biotic communities have not, as yet, been determined.
- IV.** High bacterial counts and eutrophication impacts: the rapid run-off and leaching of nutrients from sheep droppings to streams and rivers may account for signs of eutrophication in remote catchments affected by overgrazing.
- V.** Increased peat staining and reduced light penetration: a consequence of soil erosion, peat staining leads to reduced littoral production with possible adverse impacts on biodiversity in affected rivers and lakes.
- VI.** Impact on upland water balance: the disruption of the surface peat layer reduces the water retention capacity of the bogs which may reduce the productivity and biodiversity in salmonid streams as a consequence of reduced summer flows.

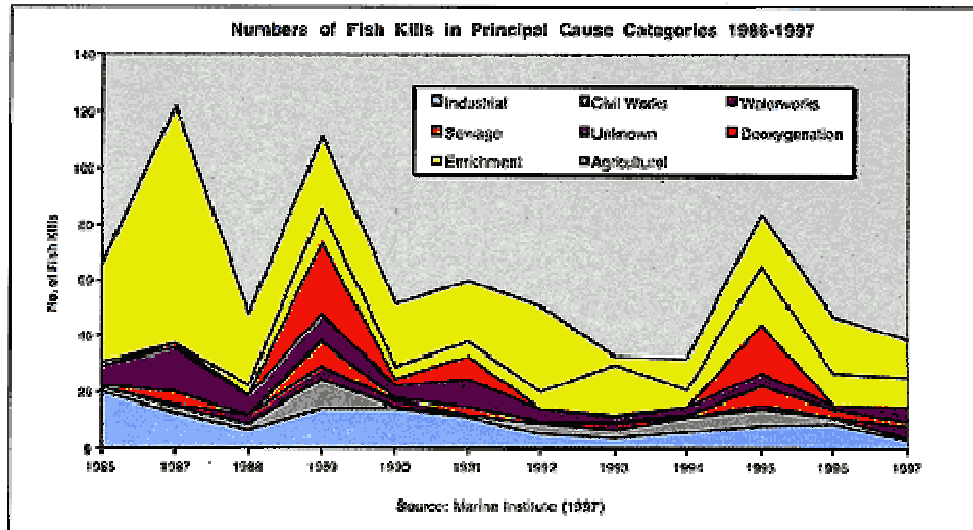
The problem of overgrazing is further addressed in case study 5.1.

## **Fish kills**

Fish kills are a symptom of extreme environmental disruption caused by a variety of factors including 'once-off' incidences such as spillages as well as diffuse pollution exacerbated by climatic factors. The number of fishkills by principal cause categories from 1986 to 1997 is shown in Figure 4.5. There has been a marked overall decline in fish-kills since the 1980s which is indicative of the considerable efforts by central and local government and by the Central and Regional Fisheries Boards in tackling the problem. The introduction of the Control of Farmyard Pollution Scheme in 1989 would appear to have been a significant factor in reducing agriculture-related fish kills. The number of fish-kills due to silage effluent has also decreased considerably in the past decade - apart from a peak of nine incidences in 1996 - which is probably attributable to the widespread change from the use of silage clamps to baled silage. However, agricultural sources remain the single biggest cause of documented fish kills in Ireland with thirteen incidences or one third of the total, followed by eleven incidences caused by eutrophication which may also partly attributable to diffuse agricultural pollution sources (Marine Institute, 1997a-c). The relatively high number of unexplained fish kills and those attributed to deoxygenation and eutrophication of unknown cause may reflect the considerable proportion of river stream channel which is subject to slight and moderate pollution (EPA, 1996).

**Figure 4.5 Numbers of Fish Kills in Principal Cause Categories 1986-1997**





## Pesticides

Quantitative data on the presence of pesticides and other trace organics in water resources are very limited. Improper storage, handling, use and disposal of pesticides can result in pollution.

In 1996, the EPA published the results of a country-wide preliminary survey (December 1995 to December 1996) of pesticide residues in water supplies. Samples were taken in 26 counties from water supplies serving 1.8 million consumers. From 3,300 analytical samples only 5 samples contained levels of pesticides which were above the statutory drinking water quality standards. 'On re-testing, the supplies with positive results were shown to be clear' (Government of Ireland, 1997).

In the period 1994 to 1997 six fish kills were attributed to pesticides with the causes given as 'crop spraying', 'fungicide', 'herbicide', 'pesticide', 'sheep dip' and 'agri-chemical' (Moriarty, 1996; Marine Institute 1997a,b).

The recommended method of disposal for sheep dip residues is land spreading either mixed with water or mixed with farm wastes such as slurry. The releasing of these moderately persistent and highly toxic organo-phosphate (OP) dips or the new synthetic pyrethroid (SP) dips into watercourses, soakways or drains would be an offence under the Water Pollution Acts. Land spreading of diluted pesticides renders them subject to run-off risks similar to those of fertilisers. The fact that almost 60% of the national sheep flock is kept in the western regions<sup>36</sup> where a large percentage of soils are categorised as being high in run-off risk (Sherwood 1992) gives rise to concern. Furthermore the risk of leaching in areas with thin soils and poor aquifer protection must be considered. Land spreading of diluted sheep-dip is permitted on lands under the REPS, subject to defined landspreading precautions and maximum volumes. In SACs the 'use of any pesticide or herbicide' is a notifiable action, but the disposal of diluted sheep-dip is not explicitly prohibited.

## 4.4. Impacts on Soils

Agricultural effects on soils include physical impacts such as soil erosion and soil compaction, and impacts on soil chemistry induced by the use of organic and inorganic fertilisers and biocides. A detailed analysis of the impacts on biological, physical and chemical properties of soils has been given elsewhere (SRU, 1985).

### 4.4.1. Soil Erosion

Soil erosion as a consequence of overgrazing has already been discussed in relation to peatlands, dunes and machair grasslands. A further problem has been identified by Gardiner & Burke (1983), namely the erosion of cultivated steeply sloping land in conjunction with heavy rainfall. These latter effects appear not to have been quantified to date. However, due to the small percentage of agricultural land under tillage and the very limited area of cultivated sandy soils susceptible to wind or gully erosion these impacts would appear to be very limited in extent (see Morgan and Rickson, 1988).

### 4.4.2. Micropollutants

Land spreading of organic waste can have undesirable effects on soil chemistry. Copper, used as a growth promoter in pig production, can accumulate in soils on which slurry generated in intensive pig production is spread. If applied to grassland, this can render the vegetation unsuitable for sheep grazing as sheep are sensitive to copper. Morgan & O'Toole (1992) have estimated that there has been a 32% increase in the volume of slurry generated from housed pigs between 1975 and 1990. The pigmeat sector was not targeted by the 1992 CAP reform and further expansion has taken place in recent years (see Chapter 3.1.7).

The use of phosphate fertilisers can also lead to accumulations of heavy metals in soils. Inorganic phosphate fertiliser contains cadmium (Cd), zinc (Zn), mercury (Hg) and other heavy metals as impurities. The considerable overuse of phosphorous fertilisers in Ireland has already been discussed and this may pose a risk of trace metal enrichment of soils. The application of sewage sludge to agricultural land must be viewed with even greater caution due to its high content of heavy metals (see O'Riordan & Dodd, 1992) and dangerous organic compounds (Lee, 1995). Long-term spreading of metal-rich sludges leads to topsoil heavy metal enrichment, particularly on grassland. It must be borne in mind that this process is irreversible. Excessive heavy metal intake is detrimental to both animal and human health.

Research conducted by Teagasc (McGrath, 1994) has shown that measurements of concentrations of organochlorines, pesticide residues and PCBs in Irish soils were indicative of low pollutant levels, reflecting a relatively low level of pesticide usage by EU standards. It was noted, however, that DDT and its breakdown products were still present at significant levels, especially in soils in fruit growing enterprises. Levels of heavy metals in soils were also indicative of low pollutant levels (Lee, 1995).

#### **4.5. Impacts on Air Quality and Global Climate**

Intensive livestock production gives rise to increased emissions of nitrous oxide (N<sub>2</sub>O), ammonia (NH<sub>3</sub>) and - especially in the case of ruminants - methane (CH<sub>4</sub>). Land application and storage of slurry and manures are other important sources of ammonia emissions. Ammonia contributes to the acidification of soils and water through acid rain and methane and nitrous oxide are greenhouse gases. Nitrous oxide has been implicated as contributing to ozone depletion. Measured on the basis of their global warming potential CH<sub>4</sub> and N<sub>2</sub>O emissions contributed 46% of Ireland's total emissions of primary greenhouse gases in 1990. CH<sub>4</sub> and N<sub>2</sub>O emissions were 811,000 t and 29,400 t respectively with approximately 80% of emissions each resulting from agriculture. N<sub>2</sub>O emissions primarily arise from soils as a natural process of nitrogen circulating in the environment, but the use of nitrogen fertilisers, slurries and manures enhances this effect. Methane originates predominantly from enteric fermentation by ruminants - other sources are slurry and manures. While there has been a minor upward trend for methane in provisional data for 1995, nitrous oxide emissions decreased to approximately 26,000 t with 73% coming from agricultural sources. Stabilising animal populations and improved feed quality is expected to contribute to the stabilisation of direct livestock CH<sub>4</sub> emissions (Government of Ireland, 1997; Department of the Environment, 1997).

Gaseous emissions of ammonia amounted to 123,000 t in 1994 and resulted almost entirely from agriculture. Thus, ammonia emissions from livestock were equivalent to almost 30% of fertiliser N usage in that year. The landspreading of fertiliser N can also result in nitrous oxide emissions and it is estimated that 'an annual average of 5% of applied fertiliser N is emitted as N<sub>2</sub>O' (Lee, 1995).

The overall contribution of agriculture to CO<sub>2</sub> emissions is very low (European Commission, 1997). However, grassland, and 'especially low input grassland, is believed to act as a sink for carbon dioxide and nitrous oxide. Conversely ploughing of grassland releases large amounts of carbon dioxide through the decay of organic matter, for up to fifty years' (Lee, 1995).

Peatlands, with which Ireland is well endowed, are an effective carbon sink. The average residence time for carbon in peat is approximately 10 times longer than in vegetation (Hickie, 1990). Drainage and cultivation of peatlands, be it for agricultural purposes or for afforestation, releases large amounts of carbon dioxide into the atmosphere and destroys their capacity to act as carbon sinks in the future. Thus peatland reclamation for agricultural purposes also contributes to the greenhouse effect.

Odour nuisances arise temporarily in association with the spreading of slurry or more permanently in connection with large animal production units, particularly in the pig and poultry sector.

#### **A note on climate policy**

The Kyoto Protocol under the United Nations Framework Convention on Climate Change, adopted on 11 December 1997 sets, inter alia, a legally binding target for the member states of the EU to reduce emissions of a basket of six greenhouse gases including carbon dioxide, methane, nitrous oxide, by 8 per cent below 1990 levels in the period 2008-2012. The protocol does not set separate targets for each gas and it is a matter for each party to achieve its target by the emission limitations and reductions considered most appropriate overall. In March 1998 the Department of the Environment received the results of a major consultancy study which identifies and evaluates the scope for intensifying existing policies and measures to limit and/or reduce greenhouse gas emissions and to make recommendations for the ongoing development of Ireland's greenhouse gas emissions abatement strategy, continuing adaptation and review of

policies, actions and lifestyles. This study addresses all greenhouse gases, including HFCs, PFCs and SF6 and all sectors of the economy. The consultancy study, together with inventories and projections compiled by the EPA will facilitate the putting in place of the necessary measures to limit and/or reduce these emissions (Dempsey, 1998).

A report on greenhouse gases compiled by the Economic and Social Research Institute in November 1997 advocates the application of the polluter-pays-principle and of fiscal measures, such as a carbon tax to all sectors. With regard to the farming sector the ESRI states that it should not be insulated from policy changes and that that the sector's contribution to could be reduced by shifting market supports away from livestock (Irish Times 13/11/97).

#### 4.6. Summary and Conclusions

- I.** Agricultural management has created a range of cultural landscapes. Its influence on the natural components of the landscape has enriched aspects of Ireland's wildlife heritage as has also enriched agricultural genetic resources over the millennia. A substantial number of species of flora and fauna of national and international significance and their habitats are dependent on the continuation of specific, usually low-input, agricultural practices for their survival.
- II.** The main problem in assessing the impact of agriculture on biodiversity and on natural resources is the paucity of baseline data and an absence of monitoring programmes specifically designed to assess its positive and negative effects. There is, as yet, no comprehensive land use monitoring system which allows changes in the landscape over recent decades to be investigated. Habitat inventories are largely confined to areas of special conservation concern such as NHAs or SACs. Little is known about the status of most invertebrates and lower plant species or about wild and agricultural genetic resources. The Red Data Book on vascular plants requires updating. While a comprehensive monitoring system exists for surface waters, there is no nation-wide or systematic groundwater monitoring programme. Hence, information on the presence of nitrates or pesticides in groundwater is limited. The same is true with regard to soil pollutants.
- III.** Existing studies suggest that the intensification of agricultural production as expressed in higher input levels as well as general structural change has led to reduced species diversity and to habitat loss. However, the type and magnitude of these effects vary strongly between regions and in many areas traditional low-input agricultural practices have preserved species and habitats that are rare in the European context. Many bird species listed in Vertebrate Red Data Book are dependent to a greater or lesser extent on agricultural habitats and hence can be affected by impacts arising from agricultural land use changes. A high percentage of vascular plant species listed in the Red Data Book are concentrated in agricultural habitats. Of particular importance in this regard are low-input cereal and root crop production areas, unimproved grasslands and fens.
- IV.** Water quality in Ireland has declined in recent decades. Groundwater pollution problems appear to arise mainly from point-sources. In regions with a high tillage component, groundwater nitrate levels from diffuse sources have risen. Point-source pollution problems affecting inland surface

waters diminished rapidly from the late 1980s onward but these problems have been gradually replaced by those caused by eutrophication. Diffuse agricultural sources of phosphorus and run-off from intensive agricultural land are the major cause of enrichment in surface waters. Occasional excessive nitrate levels in rivers are associated with tillage areas. In the western regions serious water quality problems result as a consequence of overgrazing by sheep.

Overgrazing leads to soil erosion in blanket peatlands. Erosion problems in other soil types appear to be of little significance.

**V.** Existing information suggests that the level of micropollutants, including heavy metals is low in Irish soils. Persistent pesticide residues, however, are detectable in soils under permanent crops.

**VI.** The agricultural sector is responsible for a significant proportion of Ireland's emissions of primary greenhouse gases as well as for almost all of its ammonia emissions.

**VII.** The complexity of the influences of agricultural policy on farming practices make it difficult, in many instances, to assign the observed changes in the rural landscape to particular agricultural schemes or payments. Many of the impacts on biodiversity and natural resources are the long-term outcome of agricultural structural changes. While most structural changes in the agricultural sector would appear to be associated with the entry of Ireland into the EU and the various farm support schemes and special aid schemes that have subsequently become available, the Common Agricultural Policy (see Chapter 1) now also makes provisions for the maintenance of genetic, species and habitat diversity in cultural landscapes.

## References

- Alexander, R (1989): *Wildlife in the Countryside*. - in: Gillmor, D (ed.)(1989): *The Irish Countryside - Landscape, Life, History, People*. Wolfhound Press, Dublin, p.49-82.
- An Foras Forbatha (1972): *An investigation into the effects of fertiliser application on limestone grassland in the Burren, Co. Clare*. unpubl.; Dublin.
- An Foras Forbatha (1981): *Areas of Scientific Interest in Ireland*. Stationary Office, Dublin
- Baldock, D (1990): *Agriculture and Habitat Loss in Europe*. WWF International CAP Discussion Paper Number 3. London.
- Baldock, D., Hermans, B., Kelly, P., and Mermet, L (1984) *Wetland Drainage in Europe: The Effects of Agricultural Policy in four EEC countries*. Institute for European Environmental Policy and Institute for Environment and Sustainable Development.
- Bauer (1989): *Grenzen des 'Rote Liste Instruments' und Möglichkeiten einer alternativen Bewertung von Biotopen*. - in: Blab & Nowak (1989) 95-106 *Zehn Jahre Rote Liste gefährdeter Tierarten in der Bundesrepublik Deutschland*. Schr.R.f. Landschaftspflege und Naturschutz. BFANL. Bonn-Bad Godesberg.
- Beintema, A J & deBoers, T F (1982): *Verstoring von Weidevogellegfels door weidend Vee*. - in: *Mitteilungen der LOELF* (3) 35-55
- Buckwell, A (1989): *Economic Signals, Farmers' Responses and Environmental Change*. *Journal of Rural Studies*, Vol. 5, No. 2, 149-160. Great Britain.
- Burdon, D J (1986): *Hydrogeological Aspects of Agricultural Drainage in Ireland*. - in: *Environmental Geological Water Sciences*, Vol. 9, No. 1, 41-65. New York
- Cabot, D (1985): *The State of the Environment*. An Foras Forbatha, Dublin
- Carton, O T, Ryan, M & W L Magette (eds) (1996): *Phosphorus Recommendations for Grassland Good Agronomic Practice*. Teagasc, Johnstown Castle, Wexford. December 1996.
- CEC (1996): *Commission of the European Communities. Communication from the Commission. Progress Report on*

implementation of the European Community. Programme of Policy and Action in relation to the environment and sustainable development 'towards sustainability'. COM(95) 624 Brussels, 10.1.1996

CEC (1997): Commission of the European Communities. Report from the Commission to the Council and the European Parliament on the application of Council Regulation (EEC) No. 2078/92 on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside. Brussels, 4.12.1997. COM (97) 620 final.

Council of Europe (1981): Dry grasslands of Europe. Nature and Environment Series 21. Strassbourg.

Council of Europe (1987): Management of Europe's Natural Heritage - twenty-five years of activity. Environment Protection and Management Division. Strasbourg.

Coxon, C & Drew, D P (1986): Groundwater flow in the lowland limestone aquifer of eastern Co. Galway and eastern Co. Mayo, western Ireland. -in: Paterson, K & Sweeting, M M (eds.)(1986): New Directions in Karst. Proceedings of the Anglo-French Karst Symposium; September 1983. Geo Books, Norwich, UK, p 259-279.

Curtis, T & McGough, H N (1988): The Irish Red Data Book I Vascular Plants. Wildlife Service, Dublin.

Curtis, T G F, McGough, H N & Wymer, E D (1988): The Discovery and ecology of rare and threatened arable weeds, previously considered extinct in Ireland, on the Aran Islands, Co. Galway. - in: Irish Naturalists Journal, Vol. 22, No. 12.

Daly, D (1992): A Review of Development, Quality and Pollution Issues. - in: Feehan, J (ed.) (1992): Environment and Development in Ireland. Proc. of a Conference held at University College Dublin, 9-13 December 1991, pp 476-482. The Environmental Institute UCD, Dublin

Dempsey, N (1998) Response to Question No. 10531/98 by D. Spring. Dail Debates 6/5/98.

Department of Agriculture, Food and Forestry (1995a): International Conference and Programme for Plant Genetic Resources: Country Report - Ireland. Dublin.

Department of Agriculture and Food (1995b) Circular 9/95 To each approved REPS Planner. 21.2.95

Department of the Environment (1997): Second National Communication under the United Nations Framework Convention on Climate Change.

Drew, D (1990): The Hydrology of the Burren, Co. Clare. - in: Irish Geography 23(2) 69-89

Drew, D (1996): A Survey of Recent Reclamation in the Burren. Unpubl. report. Heritage Council, Dublin 1996

EAAP (1997): European Association For Animal Production (EAAP) Database. Commission of Animal Genetics at the Department of Animal Breeding and Genetics, School of Veterinary Medicine Hannover, Germany. URL [http://www.dainet.de/genres/genreadk/tgr/tgr\\_i2.html](http://www.dainet.de/genres/genreadk/tgr/tgr_i2.html)

EC (Council of the European Communities) (1992): Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. Official Journal NO. L 206 , 22/07/1992

EPA Environmental Protection Agency (1997): State of the Environment - Inland Waters. Extracts from 'State of the Environment 1996' URL: <http://www.compass.ie/epa>

EPA Environmental Protection Agency (1996): Water Quality in Ireland 1991-1994. Wexford.

European Commission (1997): Agriculture and Environment. Working Notes on the Common Agricultural Policy. Directorate General for Agriculture, Brussels

Feehan, J (ed.) (1992): Environment and Development in Ireland. Proc. of a Conference held at University College Dublin, 9-13 December 1991. The Environmental Institute UCD, Dublin.

Friebe, B (1990): Bedeutung des organischen Landbaus für den Erhalt von Ackerwildkräutern. - in: Natur und Landschaft, 65. Jg. (1990) H7/8, 379-382. Stuttgart

Gardiner, M J & Burke, W (1983): Soil erosion and conservation measures in Ireland. - in: Prendergast, A G (ed.; 1983): Soil erosion. CEC Report EUR 8427 EN; p 53-57

Government of Ireland (1997): Sustainable Development - A Strategy for Ireland, Department of the Environment, Dublin

Hickie, D (1990): Forestry in Ireland- Policy and Practice. An Taisce Publication, Dublin.

Higgins, M D (1997): Dail Motion of Designation of Special Areas of Conservation Dáil Eireann, Wednesday 13 March 1997 by Minister Michael D. Higgins, Dublin.

Irish Times 13.11.97 'ESRI report calls for tax on greenhouse gases'

IUCN (1980): World Conservation Strategy - Living Resource Conservation for Sustainable Development; IUCN/WWF/UNEP/FAO/Unesco. Gland/Switzerland

JNCC Joint Nature Conservation Committee (1992): Red Data Book of Britain and Ireland. Peterborough.

Lee, J (1995): Some Aspects of Sustainability as Applying to Agriculture in Ireland. Presented at the National Sustainability Indicator Forum, University College Dublin, April 18-19, 1995. Johnstown Castle, Wexford

Marine Institute (1997a): Fish kill summary data 1983 to 10/12/97. Data Sheet. Fisheries Research Centre, Abbotstown, Dublin

Marine Institute (1997b): Fish kills 1997 - Reports received by 10/12/97. Data Sheet. Fisheries Research Centre, Abbotstown, Dublin

Marine Institute (1997c): Fish kills 1996. Data Sheet. Fisheries Research Centre, Abbotstown, Dublin

Mayes, E & Stowe, T (1989): The Status and Distribution of the Corncrake in Ireland 1988. - in: Irish Birds 4, 1-12. IWC Dublin.

Murphy, J. (1995) Sheep, forestry and turf saving take toll on upland birds. IWC News, Vol. 82, Spring 1995.

McGrath, D (1994): unpublished data, Johnstown Castle, Wexford. - cited in Lee, J (1995): Some Aspects of Sustainability as Applying to Agriculture in Ireland. Presented at the National Sustainability Indicator Forum, University College Dublin, April 18-19, 1995. Johnstown Castle, Wexford

McNeely, J A (1988): Economics and Biological Diversity - Developing and Using Economic Incentives to Conserve Biological Resources; IUCN, Gland/Switzerland

Miklas, M (1998): Recovering Traditional Irish Cereal Varieties. Irish Seedsaver Association Newsletter, Spring 1998. Scariff.

Minister for Agriculture and Food (various years): Annual Report, Stationary Office, Dublin.

Morgan, R P C & Rickson, R J (eds.)(1988): The EC network: a catalogue of institution research workers and research projects concerned with soil erosion and soil conservation in the European Community. CEC Report EUR 11388 EN.

Moriarty, C (1996): Fish kills in Ireland in 1994 and 1995 - Reports received by 10/12/97. Data Sheet. Fisheries Research Centre, Abbotstown, Dublin

Nairn, R G W & Sheppard, J R (1985): Breeding waders of sand-dune machair grasslands in north-west Ireland. *Irish Birds* 3 (1): 53-70

Nairn, R G W, Herbert, I J & Heery, S (1988): Breeding Waders and other wet grassland birds of the River Shannon Callows, Ireland. - in: *Irish Birds* (3) 521-537.

NCC (1990): Nature Conservation and Agricultural Change. Focus on Nature Conservation Series No.25. Peterborough.

NPWS National Parks & Wildlife Service (1995): Development of management plans and emergency actions aimed at candidate SAC's. (LIFE95 NAT/IRL/000822), NPWS, Dublin.

O'Donnell, C (1996) Pesticides in Drinking Water: Results of a Preliminary Survey December 1994 - December 1995. Environmental Protection Agency, Wexford. Cited in: Government of Ireland (1997): Sustainable Development - A Strategy for Ireland, Dublin

O'Riordan, E G & Dodd, V A (1992): Sludge - its management and disposal. - in: Feehan, J (ed.) (1992): Environment and Development in Ireland. Proc. of a Conference held at University College Dublin, 9-13 December 1991, pp. 303-311. The Environmental Institute UCD, Dublin.

Peterson, R (1983): A Field Guide to the Birds of Britain and Europe. Collins, London

Plachter, H (1991): Naturschutz. G. Fischer Verlag, Stuttgart

Poulton, P R, Tunney, H & A E Johnson (1995): Comparison of Teagasc (Ireland) and MAFF (England and Wales) fertiliser P recommendations. - in: Phosphorus Loss to Water from Agriculture, International Workshop 27-29 September, 1995, Johnstown Castle, Wexford. Quoted in: EPA (1996).

Raskin, R, Glück, E & Pflug, W (1992): Floren- und Faunenentwicklung auf herbizidfrei gehaltenen Agrarflächen - Auswirkungen des Ackerrandstreifenprogramms. - in: *Natur und Landschaft*, 67. Jg. (1992) H 1, 7-14. Stuttgart

Ratcliff, D A & Thompson, D B A (1988): The British Uplands - their ecological characteristics and international significance. - in: Usher, M B & Thompson, D B A (eds.; 1989): *Ecological Change in the Uplands*. Blackwell Scientific Publ. (Spec. Publ. No. 7 of the Brit. Ecol. Soc.), 9-36.

Ratcliff, D A (1976): Observations of the breeding of golden plover in Great Britain. - in: *Bird Study* 23, 63-116

RSPB - Royal Society for the Protection of Birds (1991): A Future for Environmentally Sensitive Farming. RSPB Submission to the UK Review of Environmentally Sensitive Areas 1991. Sandy, Bedfordshire, UK.

Ryan, T D (1986): Agricultural Drainage Practices in Ireland. - in: *Environmental Geological Water Sciences*, Vol. 9, No. 1, 31-40. New York.

SEPA Scottish Environment Protection Agency (1997): SEPA Warns of Environmental Dangers of Sheep Dip. Press release 23/97.

Sherwood, M (1992): Weather, Soils and Pollution from Agriculture. AGMET; Teagasc, Wexford.

SRU (1985): Sondergutachten des Rates von Sachverständigen fuer Umweltfragen (1985): Umweltprobleme der Landwirtschaft. Drucksache 10/3613; Deutscher Bundestag; Bonn. ('Comprehensive and detailed global review on agriculture and the environment')

Sukopp, H (1981): Veränderungen von Flora und Vegetation. - in: *Beachtung ökologischer Grenzen bei der Landbewirtschaftung - NF Sonderheft*, 197, 255-264

Temple-Lang, J & D Hickie (1992): The Wildlife Act and European Community Conservation Measures - An Up-to-date Review. - in: Feehan, J (ed.) (1992): Environment and Development in Ireland. Proc. of a Conference held at University College Dublin, 9-13 December 1991. The Environmental Institute UCD, Dublin.

Thomas, J. & Lewington, R. (1991). *The Butterflies of Britain and Ireland*, London: Dorling Kindersley.

Thorn, R & C. Coxon (1992): Nitrates, Groundwater and the Nitrate Directive. - in: Feehan, J (ed.) (1992): Environment and Development in Ireland. Proc. of a Conference held at University College Dublin, 9-13 December 1991, pp 483-486. The Environmental Institute UCD, Dublin

Thorn, R (1991): Comments on the water supply and liquid waste disposal aspects of the proposed visitor centre in the proposed Burren National Park, Co. Clare, Ireland. - in: The case for an independent and comprehensive impact assessment of a visitor/interpretation centre at Mullaghmore for the Burren National Park in Co. Clare, Ireland. Submitted to DG XI by the Burren Action Group, Plantlife, An Taisce, World Wide Fund for Nature, 19.7.1991.

Tunney, H (1990): A note on a Balance Sheet Approach to Estimating the Phosphorous Fertiliser Needs of Agriculture. *Irish Journal of Agricultural Research* 29, 149-154. Quoted in Carton, O T, Ryan, M & W L Magette (eds) (1996): *Phosphorus Recommendations for Grassland Good Agronomic Practice*. Teagasc, Johnstown Castle, Wexford. December 1996.

Vida, G (1978): Genetic Diversity and Environmental Future. - in: *Environmental Conservation*, Vol. 5, No.2, 127-132. World Conservation Monitoring Centre (1995): *Biodiversity: An Overview*. World Conservation Monitoring Centre, Cambridge, UK, December 1995

Webb, R (1988): The Status of Hedgerow Field Margins in Ireland. - in: *PARK* (ed.; 1988)

Whilde, A (1991): Farming in the Republic of Ireland. - in: Curtis D J et al. (1991): *Birds And Pastoral Agriculture in Europe*. Proceedings of the Second European Forum on Birds and Pastoralism, Port Erin, Isle of Man, 26-30 October 1990

Whilde, A (1993): Threatened mammals, birds, amphibians and fish in Ireland. *Irish red data book 2: vertebrates*. HMSO, Belfast.

Wilcox, B A (1982): In Situ Conservation of Genetic Resources: Determinants of Minimum Area Requirements. - in: McNeely, J A & K R Miller (1984): *National Parks, Conservation and Development (The Role of Protected Areas in Sustaining Society)*. Proc. of the World Congress on National Parks, Bali, Indonesia, 11-22 Oct. 1982. IUCN. Washington D.C.

Wildlife Service (1989): Index to Areas of Areas of Scientific Interest; unpublished.

Personal Communication

Waldren, S., Trinity College Botanic Gardens, pers. comm. December 1997

Duff, N., IWC Corncrake Field Worker, pers. comm. 1992

## 4. Agricultural Impacts on Biodiversity and Natural Resources in Ireland

### Introduction

It is the aim of this chapter to identify the impact of agricultural practices and agricultural structural change in Ireland on biodiversity and natural resources. The various aspects of structural change in the sector have been described in the previous chapter. The complexity of the influences of agricultural policy on farming practices and farmers' decision-making in response to economic signals make it immensely difficult to assign the observed changes in the rural landscape to particular agricultural schemes or payments (see Buckwell, 1989). There is a paucity of baseline information on biodiversity and natural resources and an absence of monitoring programmes specifically designed to assess the impacts of agricultural practices on the environment. This situation often only allows for very broad conclusions about the impacts of agriculture to be made.

Agricultural land use has helped to shape the Irish countryside for thousands of years. Indeed, human interference with the natural vegetation has been so extensive that it can be difficult to distinguish entirely natural vegetation types, as is the case in most European landscapes. However, agricultural management has created a range of cultural landscapes, varying with different geological and climatic influences and with diverse land use practices. By exercising its influence on the natural components of the landscape agriculture has also enriched aspects of Ireland's wildlife heritage over the millennia.

More recent developments in agriculture, as expressed in the processes of specialisation, concentration and intensification of agricultural production outlined in the previous chapter, have, at least in some areas, had negative environmental implications. The visual fabric of Ireland's landscapes is changing, some habitats and species are hard pressed for survival and pollution from agricultural sources impacts upon wildlife, soil and water resources as well as on human health.

Obviously agriculture is only one of the factors which impact upon the rural environment. Other factors include urbanisation and suburbanisation, industrial development, transport structures, tourism developments, afforestation and peat extraction. However, as the main land use type in terms of area agriculture in Ireland remains the primary determinant of rural landscape change.

While pressures on the environment due to agricultural structural changes are more pronounced in a number of European regions, particularly in northern Germany, the Netherlands, parts of France or south-east England, a number of adverse environmental changes have occurred in Ireland in recent decades. These will be addressed in the following sections.

### Baseline Information

Satisfactory data on land use change, habitat change or species trends are scarce. The first comprehensive large-scale land use inventory of Ireland has been compiled as part of the EC CORINE Land Cover Project which began in the late 1980s. There have been some local surveys, and the Wildlife Service of the Office of Public Works (OPW) carried out national or regional surveys of certain habitat types, including peatlands, woodlands and grasslands, as well as a number of species surveys. The first comprehensive survey, the National Heritage Inventory of the 1970s, resulted in the identification and the drawing up of a list of Areas of Scientific Interest in Ireland (An Foras Forbatha, 1981). This inventory was updated and revised in the 1980s (Wildlife Service, 1989). Further updating in the 1990s by the National Parks and Wildlife Service (NPWS) resulted in the publication of the list of proposed Natural Heritage Areas (pNHA). These pNHA sites have served as the baseline inventory for the listing of proposed Candidate Special Areas of Conservation (pCSAC) which is being prepared in order to meet Ireland's obligations under the EU Habitats Directive. Remote sensing and the use of Geographic Information Systems (GIS) are likely to improve the data situation in the future.

A limited amount of data on land use and landscape features is being collected by approved planners for farms participating in the Rural Environment Protection Scheme. This information is held by the Department of Agriculture and Food and may serve as reference material in the future.

With regard to species trends the amount of data available is also limited and consists of material produced by, amongst others, the Wildlife Service Research Branch, universities, NGOs such as BirdWatch Ireland, the British Trust for Ornithology and the Biological Records Centre, Monkswood in the UK. Red Data Books have been prepared for some groups of flora and fauna.

Water quality data are available from the Environmental Protection Agency (EPA). The latest published data relate to the four year survey period of 1991-1994. Data on fish-kills are collected by the Marine Institute on an annual basis.

## 4.1. Impacts on Ecological Processes and Life Support Systems

Ecological processes can be defined as 'those processes that are governed, supported or strongly moderated by ecosystems and are essential for food production, health and other aspects of human survival and sustainable development' (IUCN, 1980). Ecological processes govern energy flow and nutrient cycles in ecosystems.

Agricultural activities break both energy flow and nutrient cycles to a greater or lesser extent. For example, the harvesting and removal of crops leads to a loss of both nutrients and (fixed) energy from agricultural systems. In a mixed crop and livestock enterprise both energy and nutrients would to some extent be returned to the land in the form of animal manure and harvest residues. In specialised enterprises energy flow and nutrient cycles are disrupted to a greater extent. Intensive livestock units may be faced with the problem of the disposal of surplus nutrients in the form of slurry, while conventional crop production requires nutrient inputs in the form of purchased chemical fertiliser (see case studies 5.3, 5.4, 5.6). Fertiliser production may lead to further environmental problems as a consequence of the energy consumed and the waste generated in its production. If animal waste is transported from a 'surplus region', e.g. from large pig or poultry production units to another region where it could be used as fertiliser again energy inputs are required for transport.

The closer agricultural systems are modelled on the original ecosystems which are being modified, i.e. the more self-contained and complex they are, the more efficient (in terms of energy use and nutrient cycling) and sustainable they become and the less inputs are required.

## 4.2. Impacts on Biological Diversity

### 4.2.1. What is Biodiversity

The word 'biodiversity' is a contraction of biological diversity and is commonly used to describe the number, variety and variability of living organisms. In order to manage biodiversity, it has to be measured, and measures of diversity only become possible when some quantitative value can be ascribed to them and when these values can be compared. It is thus necessary to try and disentangle some of the separate elements of which biodiversity is composed. It has become widespread practice to use 'Biological diversity' as an umbrella term for natural diversity at three hierarchically-related levels of biological organisation: (i) genetic diversity at the molecular level of biological systems, (ii) species diversity and (iii) ecosystem diversity, i.e. the number and frequency of ecosystems (Wilcox, 1983; McNeely, 1988).

#### Genetic diversity

Genetic diversity represents the heritable variation within and between populations of organisms. Genetic variation enables both natural evolutionary change and artificial selective breeding to occur.

#### Species diversity

Very commonly biodiversity is used as a synonym of species diversity, and of 'species richness' in particular. Species richness describes the number of species in a defined area or habitat. There are a number of difficulties involved in this approach as (i) the concept of what represents a distinct species differs considerably between groups of organisms, (ii) organisms of a defined species which differ widely from each other in some respect by definition contribute more to overall diversity than those which are very uniform, (iii) the more different a species is from any other species the greater its contribution to any overall measure of global biological diversity and (iv) the ecological importance of a species within an ecosystem can have a direct effect on community structure, and thus on overall biological diversity.

#### Ecosystem diversity

The quantitative assessment of diversity at the ecosystem, habitat or community level remains problematic as there is no unique definition and classification of ecosystems at the global level. It is thus difficult in practice to assess ecosystem diversity other than on a local or regional basis and then the assessment is based largely on their vegetation. Ecosystem diversity is often measured indirectly through measures of the diversity of the component species, using a variety of approaches. However, there is no one authoritative index for measuring ecosystem diversity. Additionally ecosystems are different from genes and species in that they explicitly include abiotic components, such as soils and climate. For this reason the impact of agriculture on soil and water resources will also be assessed in this chapter.

#### Biodiversity - its meaning and measurement

The differences between these conceptual perspectives on the meaning of biodiversity, and the associated semantic problems, are not trivial. Management intended to maintain one facet of biodiversity will not necessarily maintain another. For example, a timber extraction programme which is designed to conserve biodiversity in the sense of site



species richness may well reduce biodiversity measured as genetic variation within the tree species harvested. Clearly, the maintenance of different facets of biodiversity will require different management strategies and resources, and will meet different human needs. Even if complete knowledge of particular areas could be assumed, and standard definitions of diversity be derived, the ranking of such areas in terms of their importance with respect to biological diversity remains problematic. Much depends on the scale that is being used. Thus, the question of what contribution a given area makes to global biological diversity is very different from the question of what contribution it makes to local, national or regional biological diversity. This is because, even using a relatively simplified measure, any given area contributes to biological diversity in at least two different ways - through its richness in numbers of species and through the endemism (or geographical uniqueness) of these species. The relative importance of these two factors will inevitably change at different geographical scales, and sites of high regional importance may have little significance at a global level. Neither of these factors include any explicit assessment of genetic diversity. Although the word biodiversity has already gained wide currency in the absence of a clear and unique meaning, greater precision will be required of its users in order that policy and programmes can be more efficiently defined in the future' (WCMC, 1995).

#### **4.2.2. Agriculture and Biological Diversity**

Biodiversity changes in time and space. While the known changes over geological time are not relevant in the context of this study, agriculture's recent impacts on genetic, species and habitat diversity are at the core of its concern. Globally there is large-scale geographic variation in species diversity, the underlying reasons for which are not fully understood. Ireland's biological diversity has been strongly influenced by two factors. Firstly, after the last glaciation landbridges to Britain and the continent were severed before major recolonisation by some species groups could occur which left the island's flora and fauna considerably impoverished. Secondly agricultural land use has enriched aspects of the wildlife heritage over thousands of years due to large-scale ecosystem modification. For example the removal of a forest cover and its substitution with grassland or tillage gives light-demanding species larger areas in which they can survive and reproduce. Furthermore farmers have extended the range of a number of species by introducing species to areas that they probably would not have reached without human influence. The maintenance of existing levels of diversity would appear to involve the maintenance of those landscapes which are, at least in part, man-made along with adequately sized areas of natural ecosystems. It is commonly accepted that today a number of species and species communities in Ireland are dependent upon the continuation of certain specific agricultural practices for their survival.

#### **4.2.3. Genetic Diversity in Agriculture**

Farming activities have contributed to genetic diversity of domesticated species through cultivation, selection and breeding over millennia. This genetic diversity is central to a number of applications in agriculture, i.e. livestock breeding, adjusted varieties, food and fibre production and medicinal plants. The loss of biodiversity in crop varieties and livestock breeds is of almost negligible significance in terms of overall global diversity, but genetic erosion in these populations is of particular human concern in so far as it has implications for food supply and the sustainability of locally-adapted agricultural practices. 'For domesticated populations, the loss of wild relatives of crop or timber plants is of special concern for the same reasons. These genetic resources may not only underlie the productivity of local agricultural systems but also, when incorporated in breeding programmes, provide the foundation of traits (disease resistance, nutritional value, hardiness, etc.) of global importance in intensive systems and which will assume even greater importance in the context of future climate change. Erosion of diversity in crop gene pools is difficult to demonstrate quantitatively, but tends to be indirectly assessed in terms of the increasing proportion of world cropland planted to high yielding, but genetically uniform, varieties' (WCMC, 1995). From an anthropocentric point of view the variety of genes found in nature thus represents a resource of enormous significance. At the same time 'the genetic variability contained in wild species is essential for their very survival' (Wilcox, 1982, see Vida, 1978).

#### **4.2.4. Agricultural Impacts on Genetic Diversity**

Genetic diversity, as represented by genetic differences between discrete populations within wild species, is liable to reduction as a result of the same factors that impact on species diversity, i.e. direct (hunting, collection and persecution) and indirect (habitat destruction and modification) factors (WCMC, 1995).

A Country Report on the needs and opportunities in the field of agricultural plant genetic resources has been submitted to the UN Food and Agriculture Organisation (Department of Agriculture and Food, 1995a). However, this report does not include an analysis of the status of current agricultural plant genetic resources.

Due to the lack of baseline data no quantitative assessment can be made of the loss of genetic variability in either wild or domestic species in Ireland. The intensification of agricultural production, desired economies of scale which demand high levels of uniformity, and market pressures would appear to have led to the abandonment of a number of Irish breeds, strains and landrace varieties. As a result these have died out or become rare; some to the point of near extinction with an inadequate gene pool remaining. Some cereal varieties are held in national and international ex-situ collections. Table 4.1. gives an overview of rare animal breeds, their overall status and their status under the REPS supplementary measure 'Rearing animals of local breeds in danger of extinction'.

The REPS offers incentives to breeders of some of these breeds. To be eligible, a farmer must be a participant in REPS and must be a member of a relevant breed society or conservation organisation and must keep relevant records.

**Table 4.1 Irish rare breeds, status and incentives provided under REPS Supplementary Measure 3**

Rare Breeds		Status (where known) 23	Incentive provided under REPS	
			Yes	No
<b>Cattle</b>	Kerry	340 ( in herdbook (1994) minimally endangered	X	
	Irish Maol (Moiled)	?	X	
	Tory Cow	?		X
	Dexter	> 1000 (British Isles)	X	
<b>Equines</b>	Connemara Pony	1750 ( in herdbook (1994) not endangered	X	
	Irish Draught	1458 ( in herdbook (1994) not endangered	X	
	Kerry Bog Pony	22 (1995)		X
<b>Sheep</b>	Galway	204 ( in herdbook (1994) critically endangered	X	
	Roscommon	(?)		X
<b>Goats</b>	Irish Goat	700 ( in herdbook (1994) potentially endangered		
<b>Pigs</b>	Large White	340 ( in herdbook (1994) critically		X

		endangered		
	Irish Landrace	420 ( in herdbook (1994) critically endangered		X

With regard to threatened domestic plant species there is very little information available. The Irish Genetic Resources Conservation Trust together with the Irish Seedsaver Association and the Trinity College Botanic Gardens are currently engaged in the in-situ and ex-situ conservation of traditional Irish cereal varieties. The Small Grains Collection (US) donated samples of wheat and oat landraces in 1996 which have been cultivated in Kilkenny. The collection will probably be enlarged by donations from the Russian Vavilov Institute in the near future and will bring the collection of heritage cereals to about forty varieties (Miklas, 1998). Small-scale traditional rotational tillage on the Aran Islands may have preserved a rye landrace. However, the genetic characteristics of this rye have not yet been determined (Waldren, pers. comm. 1997). The Irish Seed Saver Association in collaboration with University College Dublin are also involved in the re-discovery and preservation of old Irish apple varieties. Their collections in Dublin and Scariff, Co. Clare now contain 140 varieties, many of which had been considered extinct.

Information on other crop species could not be obtained.

#### 4.2.5. Agricultural Impacts on Species and Habitat Diversity

The loss of biological diversity can take many forms but at its most fundamental and irreversible it involves the extinction of species. While species extinction is - over geological time - a natural process which occurs without the intervention of man, it is beyond question that extinctions caused directly or indirectly by man are occurring at a rate which far exceeds any reasonable estimates of background extinction rates (WCMC, 1995).

In the context of this study it is primarily habitat destruction and modification and their indirect effects on species diversity which are of relevance. Virtually any form of sustained human activity results in some modification of the natural environment. This modification can affect the relative abundance of species. It can increase diversity but in extreme cases may also lead to species extinction. This may result from the habitat being made unsuitable for the species or through habitat fragmentation. Habitat fragmentation divides previously contiguous populations of species into small sub-populations. 'If these are sufficiently small, then chance processes lead to raised probabilities of extinction within a relatively short time' (WCMC, 1995). There is a general agreement amongst scientists that habitat protection is central to species protection (SRU, 1985; Plachter, 1991).

#### Endangered species and the Red Data Lists

The Red Data Lists or Red Data Books identify the status of species in terms of their risk of extermination within a given area, usually on a national basis. Such lists have been drawn up for various groups of fauna and flora, but rarely for habitat types. One of the criticisms of Red Data Lists is that they merely monitor the final phases of species decline, i.e. species have to become rare before they are considered threatened and therefore worthy of protective measures (Bauer, 1989). Furthermore it is usually only a fraction of the total fauna and flora that is assessed in a formal manner. Little is known about the status of most invertebrates and lower plants. In Ireland Red Data Books have been prepared for vascular plants (Curtis & McGough, 1988), Characeae (Joint Nature Conservation Committee (JNCC), 1992) and vertebrates (Whilde, 1993).

Rarity can only be defined with reference to a particular area. In taking a European perspective it is worth noting that a number of species which are still relatively common in Ireland are rare, threatened or extinct on the Continent. This aspect has been taken into account in the drawing up of Irish Red Data Books.

The known status of Red Data List species in Ireland is summarised in Table 4.2.

**Table 4.2 Red Data Lists in Ireland**

Species Group 25	Extinct	Endangered No.	Vulnerable No.	Rare	In det .N o./	Int.	r	T o t a l N
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	ct No. /	%	./ %	Int. /	%	p. No. /	./ %	o. /
<b>Mammals</b>	n.a.	-	-	1/18	2/3 .6	10/18	r.a.	13/23
<b>Birds</b>	n.a.	7/?	2/?	2/?	6/?	6/?	r.a.	41/?
<b>Reptiles</b>	n.a.	-	-	-	-	-	r.a.	-
<b>Ambibians</b>	n.a.	1/50	-	-	-	1/50	r.a.	2/100
<b>Fish</b>	n.a.	-	-	8/?	-	1/?	r.a.	9/?
<b>Invertebrates</b>	?	89/?	?	?	?	?	r.a.	89/?
<b>Vascular Plants</b>	100/108	6/0.5	44/3.4	7/100	6/0.5	n.a.	160/122	

Indet. = Indeterminate; nt. = species which are not now rare/or threatened (applies to vascular plants only);

Int.Imp. = Internationally important; % refers to percentage of total number of species in the respective group, where known; n.a. = not applicable.

#### Reasons for species decline - habitat destruction

The prevailing causes of the decline and loss of species are habitat change and habitat loss, while direct persecution, wilful destruction, trapping, collection and sale is of minor importance for most species.

Ireland still hosts important populations of mammals such as a number of bat species, otters, pine marten and badgers which have become rare or threatened on the continent and which are vulnerable to habitat changes which can be induced by changes in agricultural land use such as for example a loss in habitat diversity, the drainage of wetlands or the loss of nesting sites for bats.

With regard to birds it can generally be said that bird species of upland habitats, wetland habitats and granivore species in the western regions have been negatively affected by changes in land use in recent decades. Table 4.3 shows that twenty-nine Red Data Book bird species, representing nearly 70 % of the total list are in some way dependent on agricultural land use for the maintenance of their habitats. The degree of dependence on certain agricultural land uses varies between species. The corncrake (*Crex crex*), for example, breeds almost exclusively on agricultural land in Ireland, i.e. in meadows cut for hay or silage (see Case Study 5.7). The black-tailed godwit (*Limosa limosa*) nests on lowland wet pasture and its breeding success is directly linked to very low livestock densities (see Beintema et al., 1982).

A number of Ireland's wintering birds such as greenland white-fronted geese (*Anser albifrons flavirostris*), whooper swans (*Cygnus cygnus*) or barnacle geese (*Branta leucopsis*) use agricultural grassland for winter feeding. The chough (*Pyrrhocorax pyrrhocorax*) is dependent on grazed coastal swards usually alongside cliffs. Other species such as quail (*Coturnix coturnix*) and grey partridge (*Perdix perdix*) make use of both grassland and crops but also need hedgerows and patches of unutilised vegetation for cover and breeding. Important habitats for many of Ireland's upland bird species have been severely damaged as a direct result of excessive sheep stocking densities. The bird species affected most were red grouse (*Lagopus lagopus*), dunlin (*Calidris alpina*), golden plover (*Pluvialis apricaria*) and hen harrier (*Circus cyaneus*) (Murphy, 1995).

**Table 4.3 Red Data List of bird species dependent on agricultural practices**

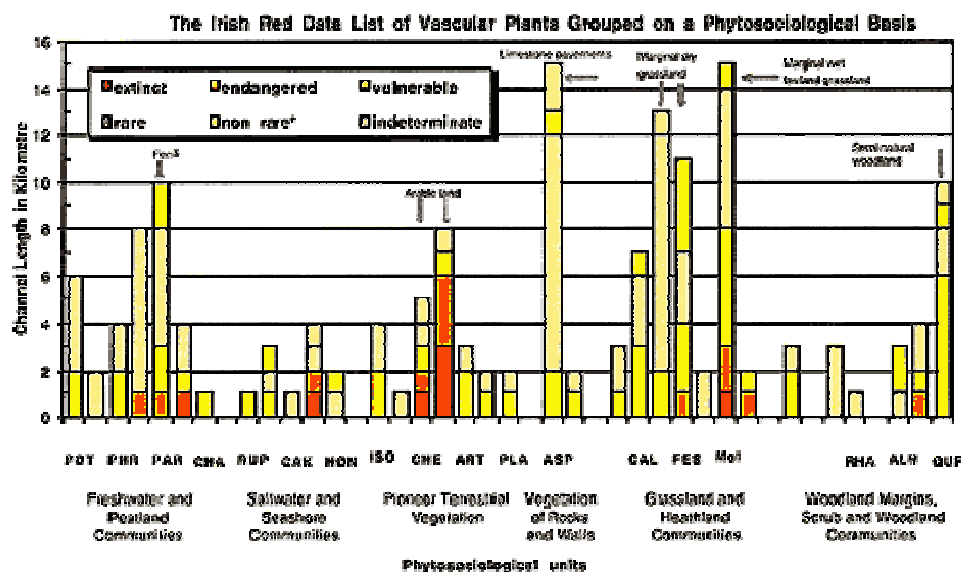
<b>Land Use Type / Habitat</b>	<b>Red Data Book Species</b>
Lowland Farmland incl. Tillage	Whooper Swan Grey Partridge Quail Corncrake Barn Owl Turtle Dove Corn Bunting Tree Sparrow
Lowland Wet Grassland (Breeding)	Garganey Pochard Black-tailed Godwit
Lowland Wet Grassland Barnacle Goose (Wintering)	Whooper Swan Black-tailed Godwit Gadwall Shoveler Pintail Hen Harrier Short-eared Owl Red-necked Phalarope Greenland White-fronted Goose
Uplands 26	Golden Plover Greenshank Hen Harrier Merlin Peregrine Falcon Short-eared Owl

	Ring Ouzel Chough Twite Dunlin
Upland Woodlands	Redstart
Lowland Heaths	Nightjar

Sources: Whilde (1993), RSPB (1991), Peterson (1983), Nairn et al. (1988)

Species listed in the Red Data Book for vascular plants are grouped together on a phytosociological basis in Figure 4.1. There are obvious concentrations of extinct, rare or threatened species in phytosociological units (classes) which represent agricultural habitats. These concentrations occur in the phytosociological class Secalinetea (arable weeds which are associated with cereals) and in the phytosociological class Chenopodietea (arable weeds which are associated with root crops) and generally in anthropo-zoogenic grasslands and heaths. A further large group of Red Data List species occurs in the 'wall-fern class' (Asplenietea) which includes open vegetation of rock crevices, such as limestone pavements and walls. Within the anthropogenic meadow and pasture communities most Red Data List species can be assigned to wet marginal grasslands (Molinietalia communities) as opposed to the drier grasslands of the Arrhenatheretalia type, which are usually more intensively managed (Figure 4.1, Appendix III). Other important grassland types, which host concentrations of Red Data Book plants, are sandy dry grasslands, mostly coastal dune grasslands (Koelerio-Corynepherea), and the dry limestone grasslands (Festuco-Brometea) found principally in the Burren of Co. Clare (see Case Study 5.1) as well as on calcareous eskers and moraines in the Irish midlands.

Figure 4.1 The Irish Red Data List of vascular plants grouped on a phytosociological basis



Source: based on Curtis & McGough (1988). An explanation of the abbreviations for the phytosociological units is given in Appendix III.

A number of factors which contribute to the decline of Irish Red Data Book plant species have been identified by Temple Lang & Hickie (1992) and these are listed in Table 4.4. However, the direct contribution of agriculture to species decline as opposed to that caused by other land uses has not been quantified for Ireland. Such an analysis has been carried out by Sukopp (1981) for Germany in which he concluded that 38% of plant species losses could be attributed to agricultural land use. While the environmental problems faced in Ireland and Germany are not of the same order of magnitude, similar trends can reasonably be expected for Ireland.

Table 4.4 The Irish Red Data Book: Endangered, vulnerable and extinct flowering plants and ferns in Ireland

Habitat group	No. of listed species	Threats
Coastal (estuaries, salt marsh, sand dunes, cliffs, shingle)	26	Land reclamation, Spartina, commonage division, overgrazing, recreational pressure
Grassland (pastures, meadows, heaths, eskers, mountains)	49	Agricultural intensification, quarrying, overgrazing
Wetland (rivers and lakes, marsh/fen, lakeshore, damp places)	56	Drainage, afforestation, turf extraction
Woodland (acid and limestone woodland, scrub, hedges)	16	Clearance for agriculture
Artificial habitats (walls, arable farmland)	12	Abandonment of traditional tillage

Source: Temple Lang & Hickie (1992)

#### **Agricultural activities leading to habitat destruction**

A number of factors which are directly or indirectly linked to agriculture have led to habitat loss and habitat change in Ireland. These include:

- Arterial and field drainage
- Commonage division
- Land reclamation including the removal of small scale farmland habitats such as trees, hedges, dry-stone walls, remnant woodlands and scrub
- The substitution of silage-making for hay-making
- The abandonment of small-scale rotational cropping
- Increasing sheep numbers and overgrazing of marginal grasslands and heaths
- Increasing use of fertilisers, increasing stocking densities and increased nutrient inputs through supplementary feeding
- Increasing use of pesticides

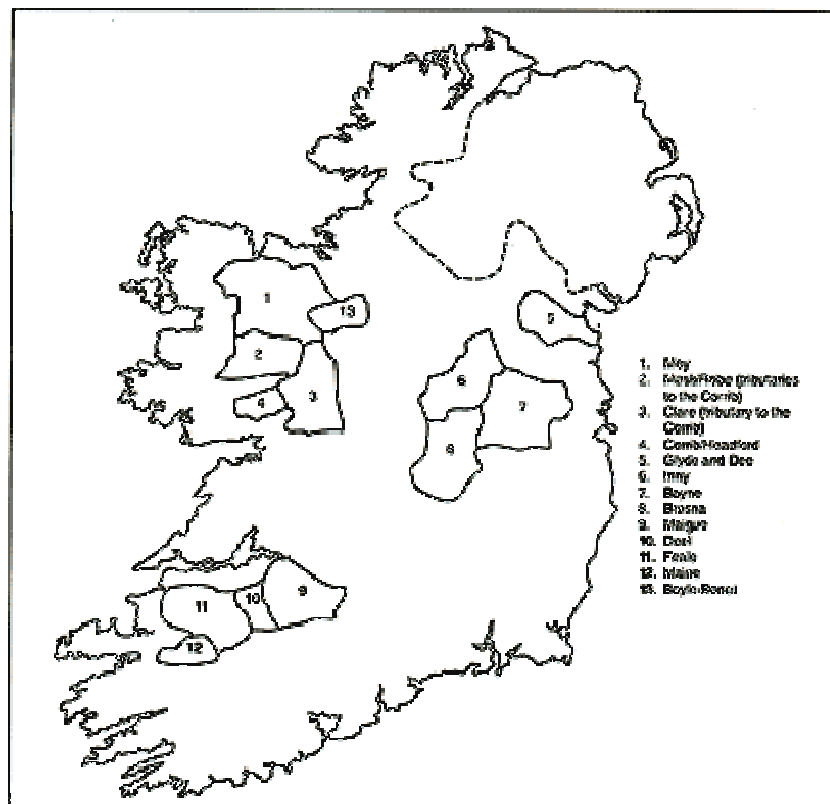
The origins of some of these factors, particularly drainage practices, can be traced back to the last century (Ryan, 1986), but most changes would appear to be associated with the entry of Ireland into the EU and the various farm support schemes and special aid schemes that have been subsequently available (see Chapter 1).

### Arterial drainage

From the middle of the last century until the passing of the 1945 Arterial Drainage Act, 203,600 ha land had been drained. Under the 1945 Act thirteen major catchments and at least 25 small catchments have been drained (Figure 4.2.) affecting 262,800 ha of land (Burdon, 1986). The last schemes were carried out into the mid 1980s in the Boyne, Maigue, Corrib-Mask and Boyle-Bonet catchments.

State investment in drainage construction works has fallen considerably since the mid-eighties (Temple-Lang & Hickie, 1992) and it seems unlikely that schemes such as the Finn-Lackey or the Shannon will go ahead.

**Figure 4.2 Arterial drainage schemes in Ireland**



Source: Keldersch et al (1984)

### Field drainage

Arterial drainage has paved the way for field drainage schemes. National grant aid for field drainage was given under the Land Project 1949, which led to the drainage of 1,168,000 ha. Within the framework of the CAP further schemes were enacted which grant-aided field drainage. Work was carried out under the Farm Modernisation Scheme 1974-1985 (202,350 ha) (Burdon, 1986) and the Western Drainage Package 1979-1988 (182,540 ha) (Minister for Agriculture and Food, 1989). The suspended Farm Improvement Programme of 1986 only provided for minor drainage works in conjunction with field reclamation and no figures are available for the extent of works of this nature. As with arterial drainage, the extent of grant-aided field drainage has declined substantially through the 1980s. No data are available as to the extent of non-grant aided works.

The total area drained under the various Acts and schemes is 2,022,590 ha or almost thirty per cent of the total area of Ireland. (Burdon, 1986). Temple Lang & Hickie (1992) listed a number of sites which had been designated as Areas of Scientific Interest and which had been damaged or destroyed since their designation. State and EC funded arterial drainage schemes were responsible for much of the damage. Drainage has also resulted in damage to fisheries (Balduck, 1990).



One particular rare form of wetland, the turlough was particularly affected by arterial drainage schemes, primarily during the last century (Coxon & Drew, 1986). For example, the Rahasane turlough in eastern County Galway, which forms part of the Dunkellin river catchment, was drained as recently as 1992. This turlough is a wetland of international importance for wintering wildfowl. It had been designated an Area of Scientific Interest of international importance by the Wildlife Service and was recognised as meriting the status of a Special Protection Area (SPA) under the EU Wild Birds Directive. Nevertheless the drainage operation could proceed, as no grant aid was provided, which in turn ruled out any consultation between representatives of the Department of Agriculture and Food and the National Parks and Wildlife Service of the OPW on the matter. The site is now a proposed Candidate Special Area of Conservation.

The drainage and improvement of wet meadows has been implicated in the decline of the marsh fritillary (*Euphydryas aurinia*), now one of the most rapidly declining butterfly species in Europe (Thomas & Lewington, 1991). The species is listed in Annex IIa of the Habitats Directive as a priority species of community interest the conservation of which requires the designation of Special Areas of Conservation (EC, 1992).

### **Commonage division**

Commonage division has been carried out by the Land Commission in the western areas, affecting 23,412 ha in 248 commonages between 1982 and 1989. Nearly half of the land subject to division was situated in County Mayo (Temple-Lang & Hickie, 1992; Minister for Agriculture and Food, 1991). Commonage division often provides the individual farmer with the incentive to manage the divided areas more intensively, i.e. by way of higher stocking rates or fertiliser inputs. Mountain and hill pasture improvement in Less Favoured Areas was eligible for grant-aid under the Farm Modernisation Scheme (1974-1985), the Farm Improvement Programme (since 1986) and the Programme for Western Development (1981-1990). The conditions governing the approval of farm improvement and development plans under these programmes would appear to have favoured individual as to group applications. This was demonstrated by the relatively small number of group applications sought for commonage improvement under the Programme for Western Development. According to Temple Lang & Hickie (1992) a number of sand dune and machair sites has been affected by commonage division. Habitat damage can be caused by the improvement of heather-moorland through drainage, fencing, fertilising and possibly reseeding, all of which are designed to increase the carrying capacity of these areas. This may in turn lead to overstocking on the remaining undamaged areas of rough grazing on holdings or commonages (NCC, 1990). Certain breeding waders of open moorland (e.g. golden plovers) shun enclosed areas (Ratcliff, 1976).

### **Land reclamation**

Depending on the individual circumstances, land reclamation can involve the removal of scrub, trees, hedgerows and other small-scale farmland habitats, boulders and unnecessary fencing, and may also involve minor drainage operations. Within the framework of farm improvement plans, land reclamation was grant-aided under the now suspended Farm Improvement Programme with capital grants providing 30% and 20% of the capital costs in LFAs and other areas respectively. Aid had also been made available for lowland reclamation in the disadvantaged areas under the Programme for Western Development. Between 1981 and the end of 1990 more than 25,000 approvals for intensive lowland reclamation had been issued and payments of almost £20 million had been made. No figures for the extent of the areas affected are available.

The number of approvals issued for farm development plans peaked in the mid-eighties and declined subsequently. The rate of hedgerow loss and possibly that of other small-scale habitats has probably also declined. It was estimated by Webb (1988) that approximately 16% of all hedges have disappeared since 1938. Hedgerow removal appeared to be localised and concentrated on the larger farms irrespective of the farm type. The greatest losses were noted in the south County Laois and south County Kildare area, i.e. intensive tillage areas. Under the REPS hedgerows have to be maintained as part of the agri-environmental plan for each farm.

Speculation that on some farms hedgerows as well as other small-scale habitats were removed before entry into REPS in order to avoid the maintenance work required under the scheme was re-enforced by the issue of a circular from the Department of Agriculture and Food to REPS planners stating that they had received a complaint from the NPWS to this effect and that such practices were unacceptable (Department of Agriculture and Food, 1995b).

Land reclamation has been intensively studied in the Burren region of Counties Clare and Galway. Two separate surveys found that more than 1,600 hectares of land had been reclaimed in the 1980s and early 1990s and this has impacted on habitats of international importance such as limestone pavements and orchid-rich limestone grasslands in former Areas of Scientific Interest (ASIs), proposed NHAs and proposed CSACs. Details on the reclamation studies and the intensification of agricultural management in the Burren are outlined in Case Study 5.2. In the early 1990s almost three kilometres of hedgerows and dry-stone walls had also been removed in the process of reclamation (Drew, 1996). Under the European Communities (Natural Habitats) Regulations, 1997/30 reclamation in the Burren has become a 'notifiable action' in the pCSACs and requires the consent of the responsible Minister.

Land reclamation and re-seeding have also been implicated in the decline of the chough (Whilde, 1991).

### **Substitution of silage for hay**

The increasing substitution of silage for hay has already been noted in Chapter 3.1.8. Since 1970 there has been a steady increase in silage production, accelerated by a series of wet summers in the mid-eighties. The production of silage has increased from 0.3 million tonnes in 1960 to over 20 million tonnes in 1990 (Government of Ireland, 1997). Silage making is generally associated with more intensive management than hay production. The intensity of management varies. The number of cuts per year can vary between one and four, with fertiliser or slurry being applied between cuts and there may be frequent reseeding with monodominant high yielding grasses such as rye grass (*Lolium perenne*) (see Mayes & Stowe, 1988). The switch from hay to silage production has been facilitated by investment aid for the installation or upgrading of fodder storage facilities provided under the Programme for Western Development (1981-1990), under the Farm Improvement Programme (since 1986) and the currently suspended Control of Farmyard Pollution Scheme (since 1989).

In recent years the decline of the internationally threatened corncrake (*Crex crex*) has been linked to the increase in grass silage production. Further reasons for the decline of this species include the conversion of hay meadows to closely grazed sheep pasture, encouraged by the introduction of the Ewe Premium in 1980 (Mayes & Stowe, 1988) and possibly the early grazing of grassland, which is subsequently closed off for silage production (Duff, pers. comm. 1992). This would reduce habitat availability during the early nesting season. Details on the Irish Corncrake Conservation Scheme and the role of the REPS in the conservation of the corncrake population are given in Case Study 5.7.

#### Abandonment of Small-Scale Rotational Cropping

The traditional agricultural practice of small-scale rotational cropping, the maintenance of a local seed supply with no or only occasional crop cleaning and the lack of herbicide use have ensured the survival of a number of rare or threatened arable weed species, which were discovered by National Parks and Wildlife Service botanists in 1987 (Curtis et al., 1988). Two of these species, darnel (*Lolium temulentum*) and cornflower (*Centaurea cyanus*), had previously been considered extinct in Ireland and the other two species, the bristle oat (*Avena strigosa*) and smooth brome (*Bromus racemosus*) have become very rare. All these species apart from the bristle oat are listed in the Irish Red Data Book.

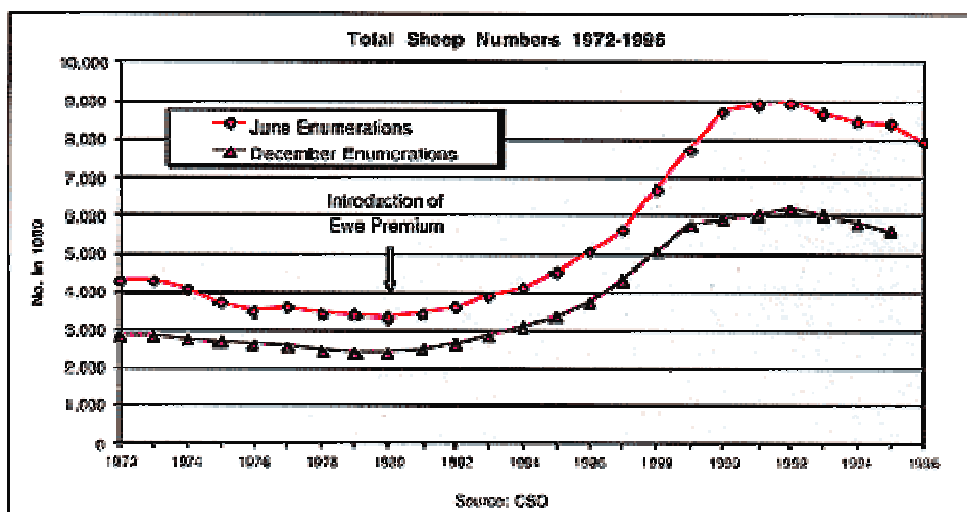
No particular agricultural support scheme can be held responsible for the abandonment of small-scale rotational cropping. This development is part of the general trend towards intensification and specialisation.

#### Overgrazing

The problem of overgrazing by sheep in the upland regions in the west of Ireland was first highlighted by the Salmon Research Agency in 1990 when it reported damage to important game fisheries in the west, due to run-off of excessive quantities of peat silt from eroding peatlands. Bleasdale & Sheehy Skeffington (1992) found that there was little remaining heather moorland in Connemara and concluded that this was due, at least in part, to the high grazing pressure in the region. While overgrazing can negatively affect a number of vegetation types attention is currently primarily focused on the damage done to blanket bog and wet heath communities.

On heathlands overgrazing reduces the cover of heather and leads to increases in grass species such as purple moorgrass (*Molinia caerulea*) and mat grass (*Nardus stricta*). Severe cases of overgrazing lead to soil erosion, particularly in the winter months. In the late 1980s this was still a localised phenomenon. By the mid-1990s the situation had become so serious that it had reached the attention of the popular media. In recent years a number of studies have been carried out which have assessed the extent of the damage and its impacts (see case study 5.1.). The high stocking rates are a direct outcome of the sheepmeat regime of the EU and the headage payments in the LFAs. Following the 270% growth of the national flock (June enumeration) between 1980, i.e. the year of the introduction of the Ewe Premium, and 1992, there has been a decline from 1992 onwards, which appears to be attributable to market forces. The uptake of the supplementary measure 'Degraded Commonages' under the REPS was very limited up to 1997 and therefore does not seem to have been a factor in the decline of the national flock in recent years. The problem of overgrazing and its causes are discussed in more detail in case study 5.1.

**Figure 4.3 Total Sheet Numbers 1972 – 1996**



### Increased nutrient inputs

The excessive use of fertilisers, particularly nitrogen and phosphorous, has a number of indirect effects on habitats. Nutrient enrichment of agricultural as well as non-agricultural habitats (the latter being caused by run-off, leaching or drift) impacts on the competitiveness of species that are adapted to nutrient-poor conditions such as those which are prevalent in heathland, calcareous grassland or oligotrophic waterbodies. An example of this type of impact has been demonstrated by a study of the effects of fertiliser application on the Burren limestone grasslands (An Foras Forbatha, 1972). It was shown that fertilisation resulted in an increased yield and percentage cover of most grasses, white clover (*Trifolium pratense*), compositae and 'agricultural weeds', while the 'non-weed species' that were abundant in the limestone sward, were reduced in yield, variety and percentage cover. The latter group includes a number of rare and threatened species for which the Burren is renowned. Calcareous dry grasslands are severely threatened habitats in Europe. Fertilisation is one of the main factors in their decline (Council of Europe, 1981).

The eutrophication of waterbodies, e.g. through phosphate run-off and leaching, can lead to excessive growths of algae and other water plants<sup>31</sup> and may cause deterioration of water quality to the point of the 'collapse' of the ecosystem through oxygen depletion. However, some habitat types have such a low nutrient status that even very minor eutrophication can disrupt or eliminate plant and animal communities. This would be true for many western oligotrophic lakes and has been demonstrated, for example, by the collapse of the arctic charr populations in Lough Conn and Lough Corrib in the early 1990s (EPA, 1996). The problem of eutrophication will be further discussed in the following section on water quality.

It has been shown in the discussion of the intensification of Irish agriculture in Chapter 3.1.8 that there has also been a dramatic increase in the production and consumption of compound feeds which - together with the increase in overall livestock numbers and increased fertiliser inputs - is likely to have led to a major increase in nutrient inputs per unit area with repercussions for biodiversity as outlined above.

### Increased pesticide use

Data on pesticide use in Ireland have been given in Chapter 3.1.8. The extinction of some arable weed species is linked, at least in part, to herbicide use in tillage production. An indirect effect of a changing vegetation structure and composition following herbicide applications is the loss of invertebrates, such as carabid beetles or lepidoptera (butterflies and moths) which are often dependent on the presence of particular plant species. The maintenance of conservation headlands in tillage crops, i.e. marginal strips which do not receive fertiliser or pesticides, has been shown to have a positive effect on both floristic and faunal diversity (Raskin et al., 1992). Furthermore, organic production techniques, which do not permit pesticide usage, have been shown to be particularly beneficial to the preservation of rare arable weeds and to the maintenance of general plant species diversity (Friebe, 1992) as well as to increased species numbers of birds, lepidoptera and arthropods. A compilation of recent comparative research in Europe on biodiversity on organic and conventional farms is included in Appendix IV. Following the introduction of the REPS there has been a very significant growth in the number of certified organic farms in Ireland which might be expected to have a positive impact on biodiversity. Evaluation reports on the implementation of the EU agri-environmental measures in other Member States have highlighted the proven environmental benefits of organic farming on soil and water quality and on biodiversity (CEC, 1997).

Despite the massive growth of the national sheep flock since 1980 there does not appear to have been a corresponding increase in the use of insecticides, according to available figures (see Chapter 3.1.8). Sheep are dipped to control a range of ectoparasites, including scab and blowfly. Apart from having serious human health implications sheep dips are toxic to aquatic life. Recent statistics indicate that the majority of sheep dip pollution in Scotland is now caused by pyrethroid dips which are replacing the more traditional organophosphate ones. While the pyrethroid dips are thought to be less harmful to human health than the organophosphate based preparations, they are 100 times more toxic to aquatic life (Scottish Environmental Press Agency (SEPA), 1997). Information on the relative amounts of the different types of dips used in Ireland and on potential damage to aquatic life from non-point source pollution by sheep-dip could not be obtained for this study.

### **The protection of semi-natural habitats in Special Areas of Conservation**

Under the EU Habitats Directive of 1992 Ireland is under an obligation to designate and maintain or restore, at a favourable conservation status, natural and semi-natural habitats and species of wild fauna and flora of Community interest as defined in the Annexes of the Directive. The designated sites will contribute to the NATURA 2000 ecological network across the EU. Where it is deemed necessary the state can further encourage the management of linear features in the landscape which are essential for the migration, dispersal and genetic exchange of wild species, such as rivers with their banks or traditional field enclosures (EC, 1992).

In March 1997 the Minister for Arts, Heritage, Gaeltacht and the Islands notified the transposition into Irish law of the EU Habitats Directive and the designation of proposed Special Areas of Conservation. 'The areas involve over about 550,000 hectares in some 400 sites. Many of these valuable sites are contained in the western part of the country. The most extensive areas involve blanket bog, heath and uplands, covering about 200,000 hectares; lakes and rivers, approximately 100,000 hectares; estuaries, mudflats and cliffs, about 90,000 hectares; a further 40,000 hectares of shallow bays and 54,000 hectares of saltmarsh, machair and sand dunes. Other habitats include 30,000 hectares of limestone pavement, 10,000 hectares of raised bogs, 15,000 hectares of fens and 3,000 hectares of turloughs.' (Higgins, 1997). Ireland hosts sixteen priority habitat types and a further 42 non priority habitat types of Community importance under the terms of the Habitats Directive. Out of a total of 400 sites to be designated, 214 host priority habitat types (NPWS, 1995). According to the Deputy President of the Irish Farmers' Association (IFA), Mr Michael Slattery about 500,000 ha, i.e. 90% of the candidate SAC lands are owned by 'up to 10,000 farmers.

The maintenance of the favourable conservation status of many of the habitats covered by the Habitats Directive and included in the SACs is directly (through active management, e.g. grazing) or indirectly (through the absence of negative impacts, e.g. nutrient inputs) dependent on sustainable agricultural practices. Farmers who have some or all of their lands in SACs are being supplied with a map of the area being proposed for designation, a description of the site indicating the for its designation, a list of notifiable actions, and information on procedures for objections and appeals as well as on compensation. A compensation package has recently been agreed with the European Commission. Agreed sets of management prescriptions are still outstanding for a number of the habitat types.

## **4.3. Impacts on Ground and Surface Water**

Agricultural impacts on water resources in Ireland include point source pollution from farmyard run-off, silage run-off, slurry tanks and pesticide spills, as well as wider problems resulting from nitrate and phosphate leaching and run-off.

### **4.3.1. Impacts on Ground Water**

Ireland's groundwater quality and pollution risks to groundwater have been reviewed by Daly (1992). Since there is no nation-wide or systematic groundwater quality monitoring in Ireland, there is a paucity of information on groundwater quality. Only drinking water sources are monitored on a regular basis by the local authorities. The existing information suggests that the main problems arise from point source pollution (e.g. farmyards, septic tanks, accidental spillage) rather than from diffuse sources. However, in the more intensively managed agricultural areas background nitrate levels have risen.

An investigation of groundwater nitrate concentrations in the south and north-east of the country in the early 1990s showed that 97 per cent of samples had nitrate concentrations which were less than the maximum admissible concentration (MAC) set by the Drinking Water Regulations. The information gained in the study suggests that nitrate contamination occurs in individual boreholes and wells, probably due to the proximity of waste sources such as silage and slurry pits, but that the general bodies of groundwater are relatively free of this contamination (EPA, 1997).

A study carried out by Thorn & Coxon (1992) attempted to relate land use and soil management characteristics to the quality and chemistry of borehole waters in Counties Kildare and Carlow. The results suggest that fertiliser use and the proportion of arable land in the vicinity of the boreholes impacts upon groundwater quality. However, difficulties in the interpretation of the study results arise as a consequence of the rotation of arable land and grassland and as a consequence of point source pollution arising from poor agricultural waste management and improper siting of wells.

Studies in a number of karst areas in Ireland have shown that in most places surveyed more than fifty percent of wells and springs were contaminated - usually by septic tank effluent or wastes from farming activities - with the most intense pollution occurring following rainfall (Thorn, 1991).

Water quality problems in the Burren region have been studied by Drew (1990). The characteristics of the karst aquifer make the groundwater resources in the region particularly vulnerable to contamination. Silage effluent and septic tank overflow bacterial contamination were identified as the most widespread form of pollution. Increasing use of artificial fertilisers was indicated by Drew (1990) as being a possible source of increased nitrate levels in a spring draining part of a hill in the central Burren.

Further details on water quality problems in the Burren region are included in Case Study 5.2.

While in areas such as the Burren with its thin and patchy soils pollutants very quickly reach the karst aquifer, in other regions with thicker soils and a different underlying geology the time taken for pollutants to reach groundwater may vary and can take up to 20-30 years (CEC, 1996). Thus the full impact of the increase in nitrogenous fertiliser use (see Chapter 3.1.8), particularly in the more intensively managed regions, may take some time to emerge.

#### 4.3.2. Impact on Surface Water

Overall the surface water quality in Ireland is good, particularly if compared to many continental European countries. In the 1991-1994 EPA survey period the bulk (71 per cent) of river and stream channels surveyed were in an unpolluted condition. However, since long-term water quality monitoring of rivers began by An Foras Forbatha in 1971, overall water quality has deteriorated. The following overview is based on the report on 'Water Quality in Ireland 1991-1994' by the Environmental Protection Agency (EPA, 1996).

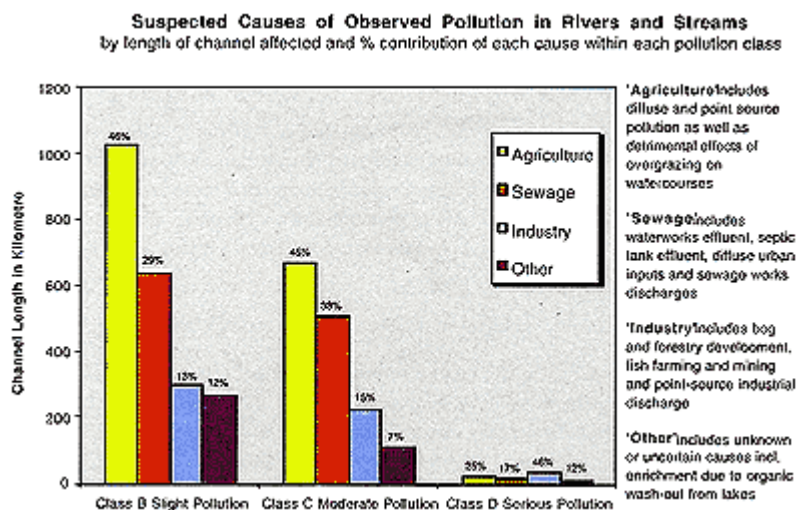
The analyses of long-term (since 1971) and recent (since 1987) trends up to and including the survey period 1991-1994 for rivers and streams shows that there has been:

- A reduction in unpolluted channel length from 84 percent to 57 percent of the total surveyed since 1971
- A five-fold increase in the extent of slight pollution since 1971
- A three-fold increase in the extent of moderate pollution since 1987
- A reduction from 6 percent to approximately 1 percent in the extent of serious pollution since 1971 (EPA, 1996)

The gradual decrease of channel length affected by serious pollution is largely attributed by the EPA to the installation or improvement of sewage treatment facilities while the upward trend in eutrophication is largely attributed to diffuse agricultural sources, i.e. organic and inorganic fertilisers, and to a lesser degree to point source sewage and industrial discharges.

The suspected causes of all observed pollution in the channels surveyed is given in Figure 4.4. The category 'Agriculture' includes the adverse effects of overgrazing by sheep in the western regions (such as scouring, siltation and substratum instability with the ensuing loss of biodiversity and damage to salmonid productivity), as well as the eutrophication caused by diffuse and point sources of agricultural waste.

**Figure 4.4 Suspected Causes of Observed Pollution in Rivers and Streams**



The EPA report attributes almost half of the observed slight and moderate pollution and a quarter of the observed serious pollution of rivers and streams to agriculture with the great bulk of serious pollution being chronic as opposed to 'once-off' pollution incidents. 'Once-off' type pollution events, as for example those caused by waste spillages or releases of short duration, are unlikely to be accurately reflected in the EPA data due to the nature of the survey (EPA, 1996).

### **Eutrophication**

The on-going eutrophication is now the main problem affecting inland waters. Therefore the key physico-chemical parameters of interest are nitrates and phosphates, particularly the latter, which is considered to be the limiting nutrient in freshwaters. Most of the nitrate and phosphate found in natural waters comes from external organic and inorganic sources, principally sewage and industrial waste discharges, and from the run-off from agricultural land of artificial fertiliser and slurry (EPA, 1997).

Diffuse agricultural sources of phosphorus (P) are a major cause of eutrophication in Ireland's surface waters and rainfall-induced run-off from intensive agricultural lands is considered to be responsible for a very large proportion of phosphorus inputs into certain lakes in Ireland (EPA, 1997). Of particular concern is the land-spreading of volumes of pig and poultry slurry from intensive animal rearing facilities which exceed the assimilative capacity of the land available for their disposal (see Case Study 5.3).

Tunney (1990) estimated the P balance for the whole country for 1988 and found that there was an annual surplus of 46,000 tonnes, equal to 60% of total P inputs and that significant reductions in P applications could be made without reducing production. A recent joint Irish-UK study (Poulton et al., 1995) noted that current recommended phosphorus application rates in Ireland are two to three times higher than those issued by the Ministry of Agriculture, Food and Fisheries in the UK.

The built-up of soil P levels has been demonstrated by Carton et al. (1996). Between 1950 and 1991 the average P level of soil samples analysed at the Teagasc soil laboratory has increased more than ten-fold to 9.3mg/l. Since 1991 the level has dropped to about 8mg/l and stabilised. The authors also showed that soil samples received from farms which were about to enter the REPS had significantly lower P levels than non-REPS farms. This would suggest that on average the farms with excess soil P levels are not entering REPS at the same rate as those with low and medium soil P levels. Carton et al. (1996) conclude that farmers with high soil P levels (i) probably ignore the P contribution of slurry applications and (ii) probably do not follow Teagasc P recommendations. A Teagasc campaign was launched in the autumn of 1997 in response to a government target of reducing phosphate inputs to soil by 10% per year for five years, with a view to halving application rates. Teagasc recommendations for grazing and silage have recently been revised (see also Chapter 5.3.11).

Excessive levels of nitrate in rivers are usually associated with the higher applications of artificial fertilisers on arable land and the relative ease with which nitrate is leached from arable land. The EPA water quality survey figures clearly highlight the contrast between the relatively unimpacted rivers of the west and those in the east and south-east of the country where a higher proportion of land is used for tillage. While the bulk of the surface waters surveyed in the 1991-1994 period had nitrate concentrations below the EU guideline value, this value was exceeded in some rivers during the winter months for short periods and the highest concentrations were measured in south-eastern rivers. Nitrate concentrations in surface waters continue to increase in many rural areas and the rate of increase is greatest in the south-east region (EPA, 1996).

### **Overgrazing**

Serious water quality problems result from overgrazing by sheep in the western regions. The EPA report categorised the observed effects on rivers as follows:

- I.** Scouring effects and increased instability of substrata: in severe cases of hillside erosion sand and gravel washed down the river system has a very severe impact on river biota by increasing the impact of normal flash floods and by encouraging the movement of substrata downstream.
- II.** Peat siltation: peat from the surface layers of overgrazed hillside blanket bog permeates the gravel of many river beds

in the western regions, particularly where there is a reasonably thick cover of peat and in areas which are still in the early stages of damage. Siltation and clogging of stream beds as well as localised increases in acidity impact negatively on fish egg survival and macroinvertebrate communities.

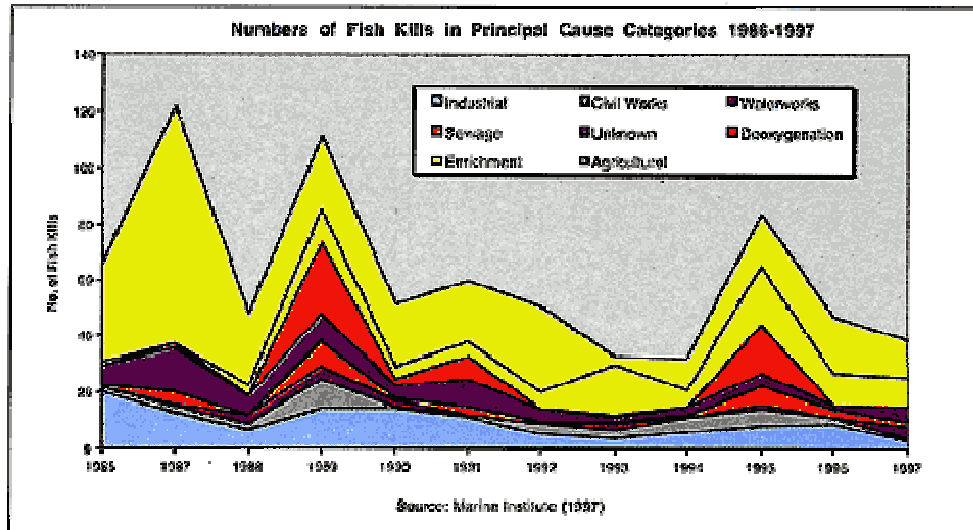
- III.** River bed peat and algal mats: this effect may be indicative of a certain degree of eutrophication resulting from the overgrazing-induced erosion, but the precise impacts on biotic communities have not, as yet, been determined.
- IV.** High bacterial counts and eutrophication impacts: the rapid run-off and leaching of nutrients from sheep droppings to streams and rivers may account for signs of eutrophication in remote catchments affected by overgrazing.
- V.** Increased peat staining and reduced light penetration: a consequence of soil erosion, peat staining leads to reduced littoral production with possible adverse impacts on biodiversity in affected rivers and lakes.
- VI.** Impact on upland water balance: the disruption of the surface peat layer reduces the water retention capacity of the bogs which may reduce the productivity and biodiversity in salmonid streams as a consequence of reduced summer flows.

The problem of overgrazing is further addressed in case study 5.1.

## **Fish kills**

Fish kills are a symptom of extreme environmental disruption caused by a variety of factors including 'once-off' incidences such as spillages as well as diffuse pollution exacerbated by climatic factors. The number of fishkills by principal cause categories from 1986 to 1997 is shown in Figure 4.5. There has been a marked overall decline in fish-kills since the 1980s which is indicative of the considerable efforts by central and local government and by the Central and Regional Fisheries Boards in tackling the problem. The introduction of the Control of Farmyard Pollution Scheme in 1989 would appear to have been a significant factor in reducing agriculture-related fish kills. The number of fish-kills due to silage effluent has also decreased considerably in the past decade - apart from a peak of nine incidences in 1996 - which is probably attributable to the widespread change from the use of silage clamps to baled silage. However, agricultural sources remain the single biggest cause of documented fish kills in Ireland with thirteen incidences or one third of the total, followed by eleven incidences caused by eutrophication which may also partly attributable to diffuse agricultural pollution sources (Marine Institute, 1997a-c). The relatively high number of unexplained fish kills and those attributed to deoxygenation and eutrophication of unknown cause may reflect the considerable proportion of river stream channel which is subject to slight and moderate pollution (EPA, 1996).

**Figure 4.5 Numbers of Fish Kills in Principal Cause Categories 1986-1997**



## Pesticides

Quantitative data on the presence of pesticides and other trace organics in water resources are very limited. Improper storage, handling, use and disposal of pesticides can result in pollution.

In 1996, the EPA published the results of a country-wide preliminary survey (December 1995 to December 1996) of pesticide residues in water supplies. Samples were taken in 26 counties from water supplies serving 1.8 million consumers. From 3,300 analytical samples only 5 samples contained levels of pesticides which were above the statutory drinking water quality standards. 'On re-testing, the supplies with positive results were shown to be clear' (Government of Ireland, 1997).

In the period 1994 to 1997 six fish kills were attributed to pesticides with the causes given as 'crop spraying', 'fungicide', 'herbicide', 'pesticide', 'sheep dip' and 'agri-chemical' (Moriarty, 1996; Marine Institute 1997a,b).

The recommended method of disposal for sheep dip residues is land spreading either mixed with water or mixed with farm wastes such as slurry. The releasing of these moderately persistent and highly toxic organo-phosphate (OP) dips or the new synthetic pyrethroid (SP) dips into watercourses, soakways or drains would be an offence under the Water Pollution Acts. Land spreading of diluted pesticides renders them subject to run-off risks similar to those of fertilisers. The fact that almost 60% of the national sheep flock is kept in the western regions<sup>36</sup> where a large percentage of soils are categorised as being high in run-off risk (Sherwood 1992) gives rise to concern. Furthermore the risk of leaching in areas with thin soils and poor aquifer protection must be considered. Land spreading of diluted sheep-dip is permitted on lands under the REPS, subject to defined landspreading precautions and maximum volumes. In SACs the 'use of any pesticide or herbicide' is a notifiable action, but the disposal of diluted sheep-dip is not explicitly prohibited.

## 4.4. Impacts on Soils

Agricultural effects on soils include physical impacts such as soil erosion and soil compaction, and impacts on soil chemistry induced by the use of organic and inorganic fertilisers and biocides. A detailed analysis of the impacts on biological, physical and chemical properties of soils has been given elsewhere (SRU, 1985).

### 4.4.1. Soil Erosion

Soil erosion as a consequence of overgrazing has already been discussed in relation to peatlands, dunes and machair grasslands. A further problem has been identified by Gardiner & Burke (1983), namely the erosion of cultivated steeply sloping land in conjunction with heavy rainfall. These latter effects appear not to have been quantified to date. However, due to the small percentage of agricultural land under tillage and the very limited area of cultivated sandy soils susceptible to wind or gully erosion these impacts would appear to be very limited in extent (see Morgan and Rickson, 1988).

### 4.4.2. Micropollutants



Land spreading of organic waste can have undesirable effects on soil chemistry. Copper, used as a growth promoter in pig production, can accumulate in soils on which slurry generated in intensive pig production is spread. If applied to grassland, this can render the vegetation unsuitable for sheep grazing as sheep are sensitive to copper. Morgan & O'Toole (1992) have estimated that there has been a 32% increase in the volume of slurry generated from housed pigs between 1975 and 1990. The pigmeat sector was not targeted by the 1992 CAP reform and further expansion has taken place in recent years (see Chapter 3.1.7).

The use of phosphate fertilisers can also lead to accumulations of heavy metals in soils. Inorganic phosphate fertiliser contains cadmium (Cd), zinc (Zn), mercury (Hg) and other heavy metals as impurities. The considerable overuse of phosphorous fertilisers in Ireland has already been discussed and this may pose a risk of trace metal enrichment of soils. The application of sewage sludge to agricultural land must be viewed with even greater caution due to its high content of heavy metals (see O'Riordan & Dodd, 1992) and dangerous organic compounds (Lee, 1995). Long-term spreading of metal-rich sludges leads to topsoil heavy metal enrichment, particularly on grassland. It must be borne in mind that this process is irreversible. Excessive heavy metal intake is detrimental to both animal and human health.

Research conducted by Teagasc (McGrath, 1994) has shown that measurements of concentrations of organochlorines, pesticide residues and PCBs in Irish soils were indicative of low pollutant levels, reflecting a relatively low level of pesticide usage by EU standards. It was noted, however, that DDT and its breakdown products were still present at significant levels, especially in soils in fruit growing enterprises. Levels of heavy metals in soils were also indicative of low pollutant levels (Lee, 1995).

#### **4.5. Impacts on Air Quality and Global Climate**

Intensive livestock production gives rise to increased emissions of nitrous oxide (N<sub>2</sub>O), ammonia (NH<sub>3</sub>) and - especially in the case of ruminants - methane (CH<sub>4</sub>). Land application and storage of slurry and manures are other important sources of ammonia emissions. Ammonia contributes to the acidification of soils and water through acid rain and methane and nitrous oxide are greenhouse gases. Nitrous oxide has been implicated as contributing to ozone depletion. Measured on the basis of their global warming potential CH<sub>4</sub> and N<sub>2</sub>O emissions contributed 46% of Ireland's total emissions of primary greenhouse gases in 1990. CH<sub>4</sub> and N<sub>2</sub>O emissions were 811,000 t and 29,400 t respectively with approximately 80% of emissions each resulting from agriculture. N<sub>2</sub>O emissions primarily arise from soils as a natural process of nitrogen circulating in the environment, but the use of nitrogen fertilisers, slurries and manures enhances this effect. Methane originates predominantly from enteric fermentation by ruminants - other sources are slurry and manures. While there has been a minor upward trend for methane in provisional data for 1995, nitrous oxide emissions decreased to approximately 26,000 t with 73% coming from agricultural sources. Stabilising animal populations and improved feed quality is expected to contribute to the stabilisation of direct livestock CH<sub>4</sub> emissions (Government of Ireland, 1997; Department of the Environment, 1997).

Gaseous emissions of ammonia amounted to 123,000 t in 1994 and resulted almost entirely from agriculture. Thus, ammonia emissions from livestock were equivalent to almost 30% of fertiliser N usage in that year. The landspreading of fertiliser N can also result in nitrous oxide emissions and it is estimated that 'an annual average of 5% of applied fertiliser N is emitted as N<sub>2</sub>O' (Lee, 1995).

The overall contribution of agriculture to CO<sub>2</sub> emissions is very low (European Commission, 1997). However, grassland, and 'especially low input grassland, is believed to act as a sink for carbon dioxide and nitrous oxide. Conversely ploughing of grassland releases large amounts of carbon dioxide through the decay of organic matter, for up to fifty years' (Lee, 1995).

Peatlands, with which Ireland is well endowed, are an effective carbon sink. The average residence time for carbon in peat is approximately 10 times longer than in vegetation (Hickie, 1990). Drainage and cultivation of peatlands, be it for agricultural purposes or for afforestation, releases large amounts of carbon dioxide into the atmosphere and destroys their capacity to act as carbon sinks in the future. Thus peatland reclamation for agricultural purposes also contributes to the greenhouse effect.

Odour nuisances arise temporarily in association with the spreading of slurry or more permanently in connection with large animal production units, particularly in the pig and poultry sector.

#### **A note on climate policy**

The Kyoto Protocol under the United Nations Framework Convention on Climate Change, adopted on 11 December 1997 sets, inter alia, a legally binding target for the member states of the EU to reduce emissions of a basket of six greenhouse gases including carbon dioxide, methane, nitrous oxide, by 8 per cent below 1990 levels in the period 2008-2012. The protocol does not set separate targets for each gas and it is a matter for each party to achieve its target by the emission limitations and reductions considered most appropriate overall. In March 1998 the Department of the Environment received the results of a major consultancy study which identifies and evaluates the scope for intensifying existing policies and measures to limit and/or reduce greenhouse gas emissions and to make recommendations for the ongoing development of Ireland's greenhouse gas emissions abatement strategy, continuing adaptation and review of

policies, actions and lifestyles. This study addresses all greenhouse gases, including HFCs, PFCs and SF6 and all sectors of the economy. The consultancy study, together with inventories and projections compiled by the EPA will facilitate the putting in place of the necessary measures to limit and/or reduce these emissions (Dempsey, 1998).

A report on greenhouse gases compiled by the Economic and Social Research Institute in November 1997 advocates the application of the polluter-pays-principle and of fiscal measures, such as a carbon tax to all sectors. With regard to the farming sector the ESRI states that it should not be insulated from policy changes and that that the sector's contribution to could be reduced by shifting market supports away from livestock (Irish Times 13/11/97).

#### 4.6. Summary and Conclusions

- I.** Agricultural management has created a range of cultural landscapes. Its influence on the natural components of the landscape has enriched aspects of Ireland's wildlife heritage as has also enriched agricultural genetic resources over the millennia. A substantial number of species of flora and fauna of national and international significance and their habitats are dependent on the continuation of specific, usually low-input, agricultural practices for their survival.
- II.** The main problem in assessing the impact of agriculture on biodiversity and on natural resources is the paucity of baseline data and an absence of monitoring programmes specifically designed to assess its positive and negative effects. There is, as yet, no comprehensive land use monitoring system which allows changes in the landscape over recent decades to be investigated. Habitat inventories are largely confined to areas of special conservation concern such as NHAs or SACs. Little is known about the status of most invertebrates and lower plant species or about wild and agricultural genetic resources. The Red Data Book on vascular plants requires updating. While a comprehensive monitoring system exists for surface waters, there is no nation-wide or systematic groundwater monitoring programme. Hence, information on the presence of nitrates or pesticides in groundwater is limited. The same is true with regard to soil pollutants.
- III.** Existing studies suggest that the intensification of agricultural production as expressed in higher input levels as well as general structural change has led to reduced species diversity and to habitat loss. However, the type and magnitude of these effects vary strongly between regions and in many areas traditional low-input agricultural practices have preserved species and habitats that are rare in the European context. Many bird species listed in Vertebrate Red Data Book are dependent to a greater or lesser extent on agricultural habitats and hence can be affected by impacts arising from agricultural land use changes. A high percentage of vascular plant species listed in the Red Data Book are concentrated in agricultural habitats. Of particular importance in this regard are low-input cereal and root crop production areas, unimproved grasslands and fens.
- IV.** Water quality in Ireland has declined in recent decades. Groundwater pollution problems appear to arise mainly from point-sources. In regions with a high tillage component, groundwater nitrate levels from diffuse sources have risen. Point-source pollution problems affecting inland surface

waters diminished rapidly from the late 1980s onward but these problems have been gradually replaced by those caused by eutrophication. Diffuse agricultural sources of phosphorus and run-off from intensive agricultural land are the major cause of enrichment in surface waters. Occasional excessive nitrate levels in rivers are associated with tillage areas. In the western regions serious water quality problems result as a consequence of overgrazing by sheep.

Overgrazing leads to soil erosion in blanket peatlands. Erosion problems in other soil types appear to be of little significance.

**V.** Existing information suggests that the level of micropollutants, including heavy metals is low in Irish soils. Persistent pesticide residues, however, are detectable in soils under permanent crops.

**VI.** The agricultural sector is responsible for a significant proportion of Ireland's emissions of primary greenhouse gases as well as for almost all of its ammonia emissions.

**VII.** The complexity of the influences of agricultural policy on farming practices make it difficult, in many instances, to assign the observed changes in the rural landscape to particular agricultural schemes or payments. Many of the impacts on biodiversity and natural resources are the long-term outcome of agricultural structural changes. While most structural changes in the agricultural sector would appear to be associated with the entry of Ireland into the EU and the various farm support schemes and special aid schemes that have subsequently become available, the Common Agricultural Policy (see Chapter 1) now also makes provisions for the maintenance of genetic, species and habitat diversity in cultural landscapes.

## References

- Alexander, R (1989): *Wildlife in the Countryside*. - in: Gillmor, D (ed.)(1989): *The Irish Countryside - Landscape, Life, History, People*. Wolfhound Press, Dublin, p.49-82.
- An Foras Forbatha (1972): *An investigation into the effects of fertiliser application on limestone grassland in the Burren, Co. Clare*. unpubl.; Dublin.
- An Foras Forbatha (1981): *Areas of Scientific Interest in Ireland*. Stationary Office, Dublin
- Baldock, D (1990): *Agriculture and Habitat Loss in Europe*. WWF International CAP Discussion Paper Number 3. London.
- Baldock, D., Hermans, B., Kelly, P., and Mermet, L (1984) *Wetland Drainage in Europe: The Effects of Agricultural Policy in four EEC countries*. Institute for European Environmental Policy and Institute for Environment and Sustainable Development.
- Bauer (1989): *Grenzen des 'Rote Liste Instruments' und Möglichkeiten einer alternativen Bewertung von Biotopen*. - in: Blab & Nowak (1989) 95-106 *Zehn Jahre Rote Liste gefährdeter Tierarten in der Bundesrepublik Deutschland*. Schr.R.f. Landschaftspflege und Naturschutz. BFANL. Bonn-Bad Godesberg.
- Beintema, A J & deBoers, T F (1982): *Verstoring von Weidevogellegfels door weidend Vee*. - in: *Mitteilungen der LOELF* (3) 35-55
- Buckwell, A (1989): *Economic Signals, Farmers' Responses and Environmental Change*. *Journal of Rural Studies*, Vol. 5, No. 2, 149-160. Great Britain.
- Burdon, D J (1986): *Hydrogeological Aspects of Agricultural Drainage in Ireland*. - in: *Environmental Geological Water Sciences*, Vol. 9, No. 1, 41-65. New York
- Cabot, D (1985): *The State of the Environment*. An Foras Forbatha, Dublin
- Carton, O T, Ryan, M & W L Magette (eds) (1996): *Phosphorus Recommendations for Grassland Good Agronomic Practice*. Teagasc, Johnstown Castle, Wexford. December 1996.
- CEC (1996): *Commission of the European Communities. Communication from the Commission. Progress Report on*

implementation of the European Community. Programme of Policy and Action in relation to the environment and sustainable development 'towards sustainability'. COM(95) 624 Brussels, 10.1.1996

CEC (1997): Commission of the European Communities. Report from the Commission to the Council and the European Parliament on the application of Council Regulation (EEC) No. 2078/92 on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside. Brussels, 4.12.1997. COM (97) 620 final.

Council of Europe (1981): Dry grasslands of Europe. Nature and Environment Series 21. Strassbourg.

Council of Europe (1987): Management of Europe's Natural Heritage - twenty-five years of activity. Environment Protection and Management Division. Strasbourg.

Coxon, C & Drew, D P (1986): Groundwater flow in the lowland limestone aquifer of eastern Co. Galway and eastern Co. Mayo, western Ireland. -in: Paterson, K & Sweeting, M M (eds.)(1986): New Directions in Karst. Proceedings of the Anglo-French Karst Symposium; September 1983. Geo Books, Norwich, UK, p 259-279.

Curtis, T & McGough, H N (1988): The Irish Red Data Book I Vascular Plants. Wildlife Service, Dublin.

Curtis, T G F, McGough, H N & Wymer, E D (1988): The Discovery and ecology of rare and threatened arable weeds, previously considered extinct in Ireland, on the Aran Islands, Co. Galway. - in: Irish Naturalists Journal, Vol. 22, No. 12.

Daly, D (1992): A Review of Development, Quality and Pollution Issues. - in: Feehan, J (ed.) (1992): Environment and Development in Ireland. Proc. of a Conference held at University College Dublin, 9-13 December 1991, pp 476-482. The Environmental Institute UCD, Dublin

Dempsey, N (1998) Response to Question No. 10531/98 by D. Spring. Dail Debates 6/5/98.

Department of Agriculture, Food and Forestry (1995a): International Conference and Programme for Plant Genetic Resources: Country Report - Ireland. Dublin.

Department of Agriculture and Food (1995b) Circular 9/95 To each approved REPS Planner. 21.2.95

Department of the Environment (1997): Second National Communication under the United Nations Framework Convention on Climate Change.

Drew, D (1990): The Hydrology of the Burren, Co. Clare. - in: Irish Geography 23(2) 69-89

Drew, D (1996): A Survey of Recent Reclamation in the Burren. Unpubl. report. Heritage Council, Dublin 1996

EAAP (1997): European Association For Animal Production (EAAP) Database. Commission of Animal Genetics at the Department of Animal Breeding and Genetics, School of Veterinary Medicine Hannover, Germany. URL [http://www.dainet.de/genres/genreadk/tgr/tgr\\_i2.html](http://www.dainet.de/genres/genreadk/tgr/tgr_i2.html)

EC (Council of the European Communities) (1992): Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. Official Journal NO. L 206 , 22/07/1992

EPA Environmental Protection Agency (1997): State of the Environment - Inland Waters. Extracts from 'State of the Environment 1996' URL: <http://www.compass.ie/epa>

EPA Environmental Protection Agency (1996): Water Quality in Ireland 1991-1994. Wexford.

European Commission (1997): Agriculture and Environment. Working Notes on the Common Agricultural Policy. Directorate General for Agriculture, Brussels

Feehan, J (ed.) (1992): Environment and Development in Ireland. Proc. of a Conference held at University College Dublin, 9-13 December 1991. The Environmental Institute UCD, Dublin.

Friebe, B (1990): Bedeutung des organischen Landbaus für den Erhalt von Ackerwildkräutern. - in: Natur und Landschaft, 65. Jg. (1990) H7/8, 379-382. Stuttgart

Gardiner, M J & Burke, W (1983): Soil erosion and conservation measures in Ireland. - in: Prendergast, A G (ed.; 1983): Soil erosion. CEC Report EUR 8427 EN; p 53-57

Government of Ireland (1997): Sustainable Development - A Strategy for Ireland, Department of the Environment, Dublin

Hickie, D (1990): Forestry in Ireland- Policy and Practice. An Taisce Publication, Dublin.

Higgins, M D (1997): Dail Motion of Designation of Special Areas of Conservation Dáil Eireann, Wednesday 13 March 1997 by Minister Michael D. Higgins, Dublin.

Irish Times 13.11.97 'ESRI report calls for tax on greenhouse gases'

IUCN (1980): World Conservation Strategy - Living Resource Conservation for Sustainable Development; IUCN/WWF/UNEP/FAO/Unesco. Gland/Switzerland

JNCC Joint Nature Conservation Committee (1992): Red Data Book of Britain and Ireland. Peterborough.

Lee, J (1995): Some Aspects of Sustainability as Applying to Agriculture in Ireland. Presented at the National Sustainability Indicator Forum, University College Dublin, April 18-19, 1995. Johnstown Castle, Wexford

Marine Institute (1997a): Fish kill summary data 1983 to 10/12/97. Data Sheet. Fisheries Research Centre, Abbotstown, Dublin

Marine Institute (1997b): Fish kills 1997 - Reports received by 10/12/97. Data Sheet. Fisheries Research Centre, Abbotstown, Dublin

Marine Institute (1997c): Fish kills 1996. Data Sheet. Fisheries Research Centre, Abbotstown, Dublin

Mayes, E & Stowe, T (1989): The Status and Distribution of the Corncrake in Ireland 1988. - in: Irish Birds 4, 1-12. IWC Dublin.

Murphy, J. (1995) Sheep, forestry and turf saving take toll on upland birds. IWC News, Vol. 82, Spring 1995.

McGrath, D (1994): unpublished data, Johnstown Castle, Wexford. - cited in Lee, J (1995): Some Aspects of Sustainability as Applying to Agriculture in Ireland. Presented at the National Sustainability Indicator Forum, University College Dublin, April 18-19, 1995. Johnstown Castle, Wexford

McNeely, J A (1988): Economics and Biological Diversity - Developing and Using Economic Incentives to Conserve Biological Resources; IUCN, Gland/Switzerland

Miklas, M (1998): Recovering Traditional Irish Cereal Varieties. Irish Seedsaver Association Newsletter, Spring 1998. Scariff.

Minister for Agriculture and Food (various years): Annual Report, Stationary Office, Dublin.

Morgan, R P C & Rickson, R J (eds.)(1988): The EC network: a catalogue of institution research workers and research projects concerned with soil erosion and soil conservation in the European Community. CEC Report EUR 11388 EN.

Moriarty, C (1996): Fish kills in Ireland in 1994 and 1995 - Reports received by 10/12/97. Data Sheet. Fisheries Research Centre, Abbotstown, Dublin

Nairn, R G W & Sheppard, J R (1985): Breeding waders of sand-dune machair grasslands in north-west Ireland. *Irish Birds* 3 (1): 53-70

Nairn, R G W, Herbert, I J & Heery, S (1988): Breeding Waders and other wet grassland birds of the River Shannon Callows, Ireland. - in: *Irish Birds* (3) 521-537.

NCC (1990): Nature Conservation and Agricultural Change. Focus on Nature Conservation Series No.25. Peterborough.

NPWS National Parks & Wildlife Service (1995): Development of management plans and emergency actions aimed at candidate SAC's. (LIFE95 NAT/IRL/000822), NPWS, Dublin.

O'Donnell, C (1996) Pesticides in Drinking Water: Results of a Preliminary Survey December 1994 - December 1995. Environmental Protection Agency, Wexford. Cited in: Government of Ireland (1997): Sustainable Development - A Strategy for Ireland, Dublin

O'Riordan, E G & Dodd, V A (1992): Sludge - its management and disposal. - in: Feehan, J (ed.) (1992): Environment and Development in Ireland. Proc. of a Conference held at University College Dublin, 9-13 December 1991, pp. 303-311. The Environmental Institute UCD, Dublin.

Peterson, R (1983): A Field Guide to the Birds of Britain and Europe. Collins, London

Plachter, H (1991): Naturschutz. G. Fischer Verlag, Stuttgart

Poulton, P R, Tunney, H & A E Johnson (1995): Comparison of Teagasc (Ireland) and MAFF (England and Wales) fertiliser P recommendations. - in: Phosphorus Loss to Water from Agriculture, International Workshop 27-29 September, 1995, Johnstown Castle, Wexford. Quoted in: EPA (1996).

Raskin, R, Glück, E & Pflug, W (1992): Floren- und Faunenentwicklung auf herbizidfrei gehaltenen Agrarflächen - Auswirkungen des Ackerrandstreifenprogramms. - in: *Natur und Landschaft*, 67. Jg. (1992) H 1, 7-14. Stuttgart

Ratcliff, D A & Thompson, D B A (1988): The British Uplands - their ecological characteristics and international significance. - in: Usher, M B & Thompson, D B A (eds.; 1989): Ecological Change in the Uplands. Blackwell Scientific Publ. (Spec. Publ. No. 7 of the Brit. Ecol. Soc.), 9-36.

Ratcliff, D A (1976): Observations of the breeding of golden plover in Great Britain. - in: *Bird Study* 23, 63-116

RSPB - Royal Society for the Protection of Birds (1991): A Future for Environmentally Sensitive Farming. RSPB Submission to the UK Review of Environmentally Sensitive Areas 1991. Sandy, Bedfordshire, UK.

Ryan, T D (1986): Agricultural Drainage Practices in Ireland. - in: *Environmental Geological Water Sciences*, Vol. 9, No. 1, 31-40. New York.

SEPA Scottish Environment Protection Agency (1997): SEPA Warns of Environmental Dangers of Sheep Dip. Press release 23/97.

Sherwood, M (1992): Weather, Soils and Pollution from Agriculture. AGMET; Teagasc, Wexford.

SRU (1985): Sondergutachten des Rates von Sachverständigen fuer Umweltfragen (1985): Umweltprobleme der Landwirtschaft. Drucksache 10/3613; Deutscher Bundestag; Bonn. ('Comprehensive and detailed global review on agriculture and the environment')

Sukopp, H (1981): Veränderungen von Flora und Vegetation. - in: *Beachtung ökologischer Grenzen bei der Landbewirtschaftung - NF Sonderheft*, 197, 255-264

Temple-Lang, J & D Hickie (1992): The Wildlife Act and European Community Conservation Measures - An Up-to-date Review. - in: Feehan, J (ed.) (1992): Environment and Development in Ireland. Proc. of a Conference held at University College Dublin, 9-13 December 1991. The Environmental Institute UCD, Dublin.

Thomas, J. & Lewington, R. (1991). *The Butterflies of Britain and Ireland*, London: Dorling Kindersley.

Thorn, R & C. Coxon (1992): Nitrates, Groundwater and the Nitrate Directive. - in: Feehan, J (ed.) (1992): Environment and Development in Ireland. Proc. of a Conference held at University College Dublin, 9-13 December 1991, pp 483-486. The Environmental Institute UCD, Dublin

Thorn, R (1991): Comments on the water supply and liquid waste disposal aspects of the proposed visitor centre in the proposed Burren National Park, Co. Clare, Ireland. - in: The case for an independent and comprehensive impact assessment of a visitor/interpretation centre at Mullaghmore for the Burren National Park in Co. Clare, Ireland. Submitted to DG XI by the Burren Action Group, Plantlife, An Taisce, World Wide Fund for Nature, 19.7.1991.

Tunney, H (1990): A note on a Balance Sheet Approach to Estimating the Phosphorous Fertiliser Needs of Agriculture. *Irish Journal of Agricultural Research* 29, 149-154. Quoted in Carton, O T, Ryan, M & W L Magette (eds) (1996): Phosphorus Recommendations for Grassland Good Agronomic Practice. Teagasc, Johnstown Castle, Wexford. December 1996.

Vida, G (1978): Genetic Diversity and Environmental Future. - in: *Environmental Conservation*, Vol. 5, No.2, 127-132. World Conservation Monitoring Centre (1995): Biodiversity: An Overview. World Conservation Monitoring Centre, Cambridge, UK, December 1995

Webb, R (1988): The Status of Hedgerow Field Margins in Ireland. - in: *PARK* (ed.; 1988)

Whilde, A (1991): Farming in the Republic of Ireland. - in: Curtis D J et al. (1991): *Birds And Pastoral Agriculture in Europe*. Proceedings of the Second European Forum on Birds and Pastoralism, Port Erin, Isle of Man, 26-30 October 1990

Whilde, A (1993): Threatened mammals, birds, amphibians and fish in Ireland. *Irish red data book 2: vertebrates*. HMSO, Belfast.

Wilcox, B A (1982): In Situ Conservation of Genetic Resources: Determinants of Minimum Area Requirements. - in: McNeely, J A & K R Miller (1984): *National Parks, Conservation and Development (The Role of Protected Areas in Sustaining Society)*. Proc. of the World Congress on National Parks, Bali, Indonesia, 11-22 Oct. 1982. IUCN. Washington D.C.

Wildlife Service (1989): Index to Areas of Areas of Scientific Interest; unpublished. Personal Communication

Waldren, S., Trinity College Botanic Gardens, pers. comm. December 1997

Duff, N., IWC Corncrake Field Worker, pers. comm. 1992

## 6. Agri-Environmental Schemes in Other European Countries

In this chapter, a number of important agri-environmental schemes from other EU countries are reviewed and we focus particular attention on the Environmentally Sensitive Areas (ESA) scheme operating in Northern Ireland and the Countryside Stewardship Scheme (CSS) operating in Britain. Some brief information on agri-environmental schemes in the Netherlands, in Lithuania and in the Biosphere Reserve Rhön, Germany, is also included.

A basic deficiency in the REPS is the lack of monitoring and evaluation. Chapter 6 includes a review of monitoring and evaluation which has taken place in other countries and a brief description of the general approach that may be taken for monitoring and evaluation. We consider that this is particularly important considering that the REPS will continue for a further fifteen years at least, from 1998.

Chapter 6 comprises:

- 6.1. A review of the Environmentally Sensitive Areas (ESA) Scheme in Northern Ireland
- 6.2. A review of the Countryside Stewardship Scheme in Britain
- 6.3. A brief review of examples of agri-environmental schemes in the Netherlands, Lithuania and Germany
- 6.4. A review of monitoring and evaluation of agri-environmental schemes in other EU countries

### 6.1. The Environmentally Sensitive Areas Scheme in Northern Ireland

The ESA Scheme was launched by the Department of Agriculture in Northern Ireland (DANI) in 1986. Its aim was to encourage farmers to help safeguard areas of the countryside where the landscape, wildlife or historic interest is of national importance. Currently, there are five ESAs, covering 20% of the agricultural land area in Northern Ireland. The scheme has a high farmer uptake, with 54% of the eligible land area (over 119,000 ha) already under ESA agreements.

The ESA Scheme consists of tiered payments. The rate of payment increases depending on the quality of the wildlife habitat and the resulting management restrictions which apply. Participants are expected to farm in sympathy with the special environment of the designated area. Farmers must ensure that no pollution occurs by following the Codes of Good Agricultural Practice as well as following the ESA guidelines. Precision nutrient management is not a requirement for an ESA agreement. As ESA participants farm within Less Favoured Areas (LFAs) they are thought unlikely to contribute excess nutrients to the environment. Prescriptions include a freeze on stocking rates at 1992 levels. Reclamation, drainage, ploughing and reseeding of unimproved land, deposition and extraction is precluded.

The tiering system, offering higher payments for quality habitat land, discourages farmers from removing features before they enter the scheme as these attract higher payments. Farmers are also aware that the Countryside Management officer is active in the area and that such activity would be noted and taken up with the farmer if he subsequently applied to the scheme. In the Republic, although there is no definitive evidence that habitats or features are removed before participants enter the REPS, there is anecdotal evidence from REPS planners that this happens quite regularly.

The ESAs have two tiers of entry which attract annual payments over a ten year period. All farmland must be entered into Tier 1. The prescriptions contained in Tier 1 apply to all of the land covered by the ESA agreement. The rates of payment vary depending on the types of land present on the farm, namely, improved land, unimproved grassland, and rough moorland grazing. Tier 2 attracts higher rates of payment and applies to particular features on the farm such as hay meadows, limestone grassland etc. In addition there are grants for capital works undertaken as part of an Enhancement Plan. Over 70% of ESA participants have taken out an Enhancement Plan to carry out enhancement works on their farms. In contrast, there are no capital grants for enhancement in the REPS.

#### 6.1.1. The Countryside Management Division (CMD)

The CMD has a staff of 43, including officers, advisers, and management who run the countryside management schemes. The CMD has 10 years experience of countryside enhancement measures. DANI therefore has an experienced team of agriculturalists and environmentalists advising farmers on environmental measures. The latest recruits are either environmental graduates with a farming background or agricultural graduates with a postgraduate environmental qualification. There is no section with similar ecological expertise in the Department of Agriculture and Food in the Republic.

The ESA scheme is promoted by the division through local and national media and through free advisory visits. ESA newsletters are posted out to participants thrice yearly. Fliers are also sent at certain critical times of the year to remind participants of prescribed cutting and grazing dates, etc. Farm walks, demonstrations and training days are also held to

encourage participation in the scheme and to give practical experience of enhancement works e.g. hedge laying. Information sheets are provided for all of the enhancement works and habitat management prescriptions.

### **6.1.2. Monitoring of ESAs in Northern Ireland**

All farms are inspected at the end of the first year. The visit facilitates further discussion of the scheme and provides support and motivation. There is at least one follow up visit over the next four years. Also, 10% spot checks are carried out on targeted habitats. Those farmers in difficulties are offered an advisory visit. ESA payments are withheld until the problem is solved.

Quality control of ESA agreements is the remit of ecologist Andrew McMullin who is a CMD adviser. He visits with the officers at least twice a year. In a recent recruitment drive for CMD advisers 'people with good environmental knowledge but with a farming background were sought'. Of the four new highly qualified recruits, three were ecologists.

To justify public expenditure, scientific monitoring of progress and regular evaluations take place. The CMD contracted out this work to Queen's University a year after the launch of the first ESA scheme. The environmental effects of ESA schemes are being monitored under three headings: ecology, landscape and invertebrates. It takes time for such schemes to deliver. Invertebrates are early indicators of progress, followed by plant diversity and populations. Good monitoring may also show inadequacies of schemes and pit falls (Irish Farmers' Journal, 3 February, 1996, Page 32). There are major reviews of ESAs at intervals of five years and minor reviews, including rates of payments, every two years. These may be loopholes that are being exploited or ecological problems showing through in the scientific monitoring e.g. infringement of heather onto moorland.

Socio-economic monitoring of the Mourne Mountains and Slieve Croob ESA scheme found that there was a noticeable shift towards farming and conservation amongst participants took place over the five year period (Chilton 1997). The findings from farmer focus groups suggested that there was still an important role for education of farmers if the stewardship ethic is to be taken seriously, given the fact that some hostility existed over the fact that grants for drainage and reclamation were not included in the scheme. To many farmers a good environment and 'good, well kept' farmland seem inextricably linked. Many farmers still feel rough, wet undrained farmland is an environmental 'bad' whilst neat, green and drained fields are an environmental 'good'.

### **6.1.3. Proposed Countryside Management Scheme in Northern Ireland**

The Habitat Improvement Scheme in Northern Ireland has not been a success and it is proposed that a new Countryside Management Scheme (CMS) should take its place (DANI, 1997). The proposed scheme is similar to the Countryside Stewardship Scheme in England, and has been broadly welcomed as a new wider countryside scheme for Northern Ireland (RSPB, 1996). An Environmental Audit for each farm is proposed, as well as a Code of Good Environmental Practice (RSPB, 1997). However, the final scheme document is not yet available. For the purposes of this study it was thought best to compare the Countryside Stewardship Scheme in the U.K. with REPS and the protection of the wider countryside in Ireland.

### **6.1.4. Comparison of the ESA Scheme with the REPS**

The ESA scheme in Northern Ireland is one of the most successful in the U.K, with over 50% of the target areas under management. Very high rates of participation have been achieved. The REPS is also successful in terms of farmer uptake, considering that the scheme was the first of its type in the Republic.

The ESA scheme follows the whole farm approach which is also advocated in the REPS. Participants in ESAs must follow a Code of Good Agriculture Practice, which ensures that pollution does not occur. Nutrient management plans are not required as the farms are considered to be less intensive and therefore have a lower risk of nutrient loss. In the REPS, the farmyard is central to the scheme and nutrient management plans must be prepared.

In the ESAs, farmers receive tiered payments for different land categories. In the REPS, farmers receive the same payment regardless of the habitat quality. Tiered payments discourage reclamation of land prior to participation and highlight the environmental importance of the different land types. Countryside Management Advisors must mark the habitat status of each field on the map. Joint visits are carried out each year with an ecological expert, weaknesses in habitat identification can be addressed. The level of management required under the scheme prescriptions is reflected in the optional tiered payments. Farmers in ESAs therefore associate the higher payments with higher quality habitat areas. However, in the REPS, there have been constant criticisms of the lack of habitat identification skills of some planners, especially in relation to unimproved grassland.

The comprehensive monitoring programme for ESAs provides justification for public expenditure. DANI recognises that the scheme is not just about the numbers of farmers participating. The success of the ESA schemes will be measured in terms of the quality of environmental management and the maintenance and enhancement of the province's biodiversity. A good data base with scientific monitoring of progress and regular evaluations should provide this information. In contrast, there was no baseline ecological or socio-economic research carried out before the REPS was introduced. There has been no scientific monitoring of the impact of the REPS on biodiversity since its introduction of

the scheme. Considerable compliance monitoring has been undertaken but this will not provide information on the environmental impact of the schemes in the long term.

## 6.2. Countryside Stewardship Scheme (CSS)

The Countryside Stewardship Scheme (CSS) is operated by the Ministry of Agriculture, Fisheries and Food (MAFF, 1997) in England. The scheme aims to make conservation part of farming and land management practice, and offers payments for changes in management which will improve the natural heritage.

Its objectives are to:

- Sustain the beauty and diversity of the landscape
- Improve and extend wildlife habitats
- Conserve archaeological sites and historic features
- Improve opportunities for countryside enjoyment
- Restore neglected land or features
- Create new habitats and landscapes

The CSS operates through annual payments that support the enhanced management of existing areas of each landscape, or their restoration or recreation. Supplementary payments are offered for more costly and sophisticated regeneration of landscapes and for the provision of new or improved public access. Finally, capital funds are provided for a wide range of landscape improvements and other work related to the specific landscape types.

### 6.2.1. Analysis

The CSS is operated throughout England, but is focused on priority areas in each county. These areas are agreed at liaison meetings attended by representatives of all those organisations with an interest in local conservation issues. The CSS is the main incentive scheme for the management of the countryside outside ESAs. In contrast to ESAs, where any farmer inside a designated area qualifies, entry into the CSS is left to the discretion of MAFF. MAFF focused on bringing sites which are already known to be of conservation value into the scheme. Tim Allen, CSS leader, commented that 'we are buying the service on behalf of the taxpayer and we only pay when applicants convince us that what they propose will give value for money' (Davies, 1995). Thus, agreements are flexible to suit local circumstances and specific environmental needs.

Landowners can claim £100 towards the cost of professional help in preparing an application, and £300 towards any detailed survey work or the preparation of management plans, which may be required for some types of agreement. Local conservation organisations often act as agents to plan farmers into the scheme, and the payments provide an incentive for their involvement. The RSPB has noted that the environmental effectiveness of CSS agreements relates to some degree to the quality of technical advice delivered as part of the agreement package (RSPB, 1995).

The scheme is limited by the budget allocated to each region in any one year. In 1995/6, the total grant available for the CSS was £5 million. Independent assessment of the scheme has concluded that the CSS has been successful in targeting its resources to landscape types and geographical areas that offer potential for environmental improvement (CEAS, 1995). The Royal Society for the Protection of Birds (RSPB) stated that the scheme is 'an impressive achievement by any yardstick. The habitats and landscape features targeted are all of high conservation priority and the Countryside Commission has proved flexible and open to new priorities and technical input' (RSPB, 1995). Land Use Consultants three year monitoring and evaluation report shows that the scheme has been able to target a fraction of the total area of many priority habitats, including calcareous grasslands (12%), salt marshes (10%), lowland heath (17-26%) and lowland wet grassland (7%) (Environmental Resources Management (ERM), 1996).

The CSS is still a relatively new scheme and, as yet, there is not sufficient data to provide a clear indication of its impacts on biodiversity and the landscape. There is not much monitoring information for the CSS compared with that for ESAs, although baseline survey data are available for many of the sites. This is because the local or national wildlife organisations have an inventory of most of the important wildlife areas based on surveys they have carried out in the past. MAFF will be monitoring the scheme in the future, which will provide a valuable opportunity for monitoring landscape change on a national scale. Monitoring needs to place greater emphasis on measuring the success of the scheme in terms of set targets for enhancing biodiversity rather than just on management prescriptions undertaken. Specific environmental performance indicators need to be applied, as they are now being applied to ESAs. MAFF CSS advisors are now beginning to carry out care and maintenance visits which have more of an ecological monitoring role.

The proportion of holdings and agricultural land in the CSS is small related to the area of all agricultural land. For example, of the total number of farms in Cheshire (4397) 1.73% have agreements. This represents 0.61% of the total agricultural area of Cheshire (Morris and Young, 1997). The major problem with the scheme is that there is insufficient budget available to offer agreements to all of those who wish to enter in a given year. Many schemes have to be deferred and there have also been delays with grant payment delays (Alison Cox, Devon Wildlife Trust, pers. comm.).



The scoring system for the assessment of applications means that it may not be possible to get an agreement on small grassland sites which are already in good condition. This is because there needs to be a clear benefit to wildlife, landscape and/or historical features on the site. In addition, greater priority is often given to sites which include a number of features, i.e., old meadows and pastures, hedgerow restoration, traditional orchards etc. Other factors which are taken into account include whether the site is visible from the major road, whether there is any public access, proximity to other sites already in Countryside Stewardship, threat to the site and County Wildlife status. The budget needs to be increased to include all of the sites available for inclusion into the scheme.

As the scheme develops, there is likely to be a stronger emphasis on recreating and restoring habitats, as well as land management. The management of existing sites is a necessary first step to greater participation in conservation work by farmers.

A criticism of the scheme is that there may be a potential 'halo effect' where parts of the farm are managed for conservation, but the remainder is still used intensively or perhaps even more intensively. The CSS only encourages environmental management on a limited number of farms. For the majority of farmers, CSS is not contributing to the development of 'greener' ways of farming (Morris & Young, 1997). This suggests that CSS is therefore not a suitable vehicle to promote sustainable agriculture in the future as has been suggested by the British government at present participation levels.

### 6.2.2. Conclusions

- I. Whereas the REPS follows the whole farm approach to environmental management, the CSS targets those habitat areas known to be of high value in the wider countryside. The CSS has been suggested as the type of scheme which could be introduced into Ireland for intensive farmers who do not wish to join the REPS.
- II. The CSS is based on targeting known habitat areas of high conservation value. This was facilitated by the baseline survey data which is available in most English counties. This survey work has been undertaken by local conservation organisations and government agencies. It is clear that considerable survey work would be required in Ireland to facilitate the targeting of habitats which would benefit most from a CSS-type scheme. This survey work would also be required to establish a baseline for the future monitoring of the scheme, and would also provide a platform for action on threatened species and habitats under the National Biodiversity Plan (currently in preparation).
- III. Target areas for inclusion into the scheme could be agreed at liaison meetings attended by representatives of all those organisations with an interest in local conservation issues. The effectiveness of any new agri-environmental scheme would also depend on the quality of technical advice delivered as part of the agreement package.
- IV. In order to avoid a possible halo effect, where the rest of the farm may still cause some environmental damage, a Nutrient Management Plan combined with a Pollution Risk Assessment would also have to be undertaken as part of the scheme. A provision could be included for payment for professional advice as an incentive to join the scheme

### **6.3. Examples of Agri-Environmental Schemes in the Netherlands, Germany and Lithuania**

This brief overview of selected European schemes is based on more detailed case studies drawn up as part of this study. The consultants felt that it was not absolutely necessary to include such detailed information in this report. While reinforcing some of the more general recommendations made in this report the approaches outlined are not necessarily directly applicable in the Irish situation. The more detailed case studies can be made available to the Council upon request.

#### **6.3.1. Less Favoured Areas and Environmentally Sensitive Areas in the Netherlands**

The Netherlands recognised the environmental objectives contained in the Less Favourable Areas Directive and made use of the relevant provisions in their implementation of the as part of their policy on agriculture and nature conservation from 1975 onwards. The proposals in the Agenda 2000 aiming at gradually transforming the LFA support scheme into a basic instrument to maintain and promote low-input farming systems and the closer integration of the LFA scheme and the agri-environmental schemes in the future rural policy would appear to support the Dutch approach.

There is a considerable amount of experience, both positive and negative, in combining basic environmental cross-compliance in LFA with the achievement of more specific environmental objectives through agri-environmental programmes under Reg. 2078/92 and planning controls.

Since 1975 the Relatienota Policy Document has aimed at redressing existing conflicts between agriculture and nature conservation by means of management agreements and land acquisition. Following the introduction of the Nature Policy Plan in 1990 a strong emphasis is also being placed on the rehabilitation and development of natural and semi-natural areas. The Policy Document and the Nature Policy Plan were further developed and consolidated into the Regulation on Management Agreements and Nature Development (RBON) which was approved as an agri-environmental programme under Regulation 2078/92 in October 1993.

Voluntary management agreements are offered to farmers in designated areas. The agreements take the form of coherent packages of measures based on regionalised objectives. Compensatory payments for management agreements are combined LFA payments and elaborately fixed payments under Reg. 2078/92. By September 1996 about 6000 farmers had entered into management agreements covering about 40,000 hectares. The accompanying monitoring programme indicates a positive effect on both species diversity in grasslands and abundance of targeted meadow birds.

Further improvements of the scheme are under discussion and include incentives for positive results of agri-environmental management, field margin management, extensions of designated areas in which management agreements are available to include buffer zones and conservation management of land withdrawn from production through landowners.

#### **6.3.2. Groundwater Protection Against Pollution and Sustainable**

##### **Agriculture Development in the Gypsum Karst of Northern Lithuania**

In order to combat severe groundwater pollution problems the Lithuanian government initiated a pilot programme for the development of sustainable and organic agriculture in the gypsum karst region of northern Lithuania in 1993. The programme is implemented by a non-profit organisation, funded by the exchequer and by foreign aid, with a membership consisting primarily of farming enterprises. Strict management prescriptions apply in the most sensitive zones of the karst region. Financial incentives for the conversion to organic farming are provided for local farmers. Some of the funding is likely to be re-couped through taxation on the use of natural resources such as water.

In parallel a wide range of Lithuanian and Swedish NGOs, academic and government institutions have been working successfully together since 1995 on promoting organic farming, research, certification and marketing in the whole of the country.

The concentration of organic farms in the karst region as well as the dependence of the certification organisation EkoAgros on state funds shows that government funding is indispensable in promoting the conversion to organic farming.

A combination of top-down (imposition of restrictions on land use) and bottom-up (involvement of and close co-operation with NGOs, farmers, agricultural partnerships and interested individuals) approaches has been taken in the implementation of the pilot programme for the development of sustainable and organic agriculture in the karst region.

### **6.3.3. Integration of Agri-Environmental Schemes, LIFE Funding and Structural Funding in the Biosphere Reserve Rhön, Germany**

In 1991 the Rhön region, which covers parts of Bavaria, Hesse (Objective 5b regions) and Thuringia (Objective 1 region) in central Germany, was recognised as a biosphere reserve by UNESCO to serve as a model region for sustainable regional development. The cultural landscape is marginal agriculturally and suffered from rural decline. The region harbours many habitats and species of international conservation importance which are dependent on low-input agricultural management.

In the context of a Framework Management Programme and a zoning system containing protection, maintenance and buffer zones, rural development and nature conservation policies are implemented with close-cooperation between the three governments of Bavaria, Hesse and Thuringia, local communities, farming, conservation, tourism and other business interests. The integration of agricultural and environmental objectives as well as a 'bottom-up' approach to rural development are central to the development of the region.

Conservation management for priority habitats in the core zone is predominantly funded through the EU LIFE fund. Management agreements are funded under Reg. 2078/92 by the EU and the Federal Governments. Structural Funding under LEADER I and II is drawn down to finance a variety of rural development schemes such as regional marketing schemes for agricultural products from the Biosphere Reserve and tourism initiatives.

The implementation of the trilateral LIFE project placed major emphasis on the optimal integration with other EU support programmes in the areas of environmental, agricultural and regional development policies and also aimed at maximising socio-economic benefits.

Major progress has been made in the region with substantial areas under management agreements, 300 new jobs created and 300 rural projects initiated in the past five years, improved financial security and diversification of incomes for farmers and upward trends in rural tourism supported by a revived regional identity in a region which had been cut in two by the iron curtain for forty years.

### **6.4. Monitoring and Evaluation of Agri-Environmental Schemes in Other EU Countries (adapted from the report by the IEEP for this study)**

The EU stresses the importance of adequate monitoring procedures and comprehensive scheme evaluation. This is particularly relevant where there is no experience with previous schemes and their effectiveness is not known. New agri-environmental schemes can be improved and provide value for money if sufficient data are collected on their environmental and socio-economic effects. The following basic considerations should be taken into account for monitoring and evaluation, and these are particularly relevant to the anticipated new REPS :

- I.** Early and careful planning is essential.
- II.** The main purpose of monitoring is to obtain information on the success of a given programme or scheme in achieving its principal objectives. Indicators of progress (as are used for Operational Programmes in the Structural Funds) are useful but must relate directly to the objectives of the particular scheme. This is only possible if the objectives are clearly defined. There are three basic categories of objectives:
  - Operational objectives (e.g. uptake targets)
  - Specific objectives (e.g. concentration of nutrients in run-off, botanical diversity, etc.)
  - General objectives (protection of biodiversity, financial viability of less intensive farming systems)
- III.** Independent, experienced evaluators should contribute substantially to this work, alongside officials responsible for the scheme. This allows a more objective and detached view, thus making evaluation as objective and comprehensive as possible.
- IV.** Links with other policies should be examined, such as the link between REPS and the Afforestation and Premium Scheme, or

## REPS and the Ewe Premium Scheme.

### 6.4.1. Monitoring Methods

The following procedures could be used for a REPS monitoring programme:

- II.** Selection of indicators should be made with simplification, quantification and communication as primary objectives. The data sources on which monitoring and evaluation are based should be made explicit.
- III.** The results of indicators and monitoring are only meaningful if they can be compared with certain standards. Three different types of standards are commonly used:
  - Baselines - the situation before the start of a scheme
  - Benchmarks - measures by which performance can be assessed in terms of expected outputs, results and outcomes, such as good agricultural practice, better protection of certain habitats
  - Control farms can be used to measure performance
- IV.** Ideally, where control farms are used, both participating and non-participating farms should be monitored. The selection should be as representative and reliable as possible. Both samples should have similar socio-economic, agricultural and environmental characteristics so that comparative data are made available for the evaluation of the impact of the scheme. Where no control sample is available, general trends in farm management cannot be detected early and changes due to the scheme's effectiveness are difficult to identify. Not many countries have followed this route.
- V.** Experiences in the UK have shown that monitoring data may only demonstrate trends but are not sufficient to explain causal links with scheme conditions or farm management. This means that additional academic research is often required. Ideally, the academic research programmes should be integrated into the monitoring and evaluation of an agri-environmental scheme.

### 6.4.2. Scheme Improvements

Monitoring and evaluation should have a practical orientation and lead to suggestions as to how the scheme may be improved. The basic standards of success should be analysed:

- Relevance - To what extent are the scheme's objectives still important (e.g., does the scheme fulfil the requirements of the forthcoming National Biodiversity Plan?)
- Effectiveness - How far have the scheme's impacts contributed to achieving its specific and general objectives?
- Efficiency - How economically have the scheme incentives and administrative resources been converted into outputs and results? Are the payment levels still appropriate?

### 6.4.3. Examples of Monitoring in Other Countries

1. United Kingdom: a monitoring programme has been initiated for each ESA (Environmentally Sensitive Area) scheme at the time of its designation and is continually refined. Botanical monitoring occurs in all 22 of the English ESAs, with grassland comprising the largest component in 16 ESAs. Rough grazing is monitored in five and the conversion from arable to grassland in a further three. Heather grazing surveys are being carried out in six upland ESAs. Bird monitoring is undertaken in 13 ESAs. Invertebrates are monitored in two ESAs. A combination of aerial and ground surveys are used for land cover data. Some comparison of ESA and non-ESA farms is conducted. In 1995-96, the ESA monitoring programme cost £3.56 million, of which 93% was spent on environmental monitoring and the remainder on socio-economic surveys and compliance checks. The effectiveness of each ESA is reviewed every five years and prescriptions may be adjusted as a result. The monitoring programme was reviewed by the National Audit Office (NAO, 1997). The equivalent in Ireland would be a report commissioned by the appropriate Dáil Committee or the Controller General.
2. Denmark has instigated a relatively comprehensive monitoring and evaluation programme of its ESA scheme. The Ministry of Agriculture has commissioned independent researchers to develop a monitoring system. Part of the development process involved an evaluation of the scheme thus far, which included an interview of 290 farmers, around three-quarters of which had joined the ESA scheme. The evaluation methodology enables a comparison of changes to land under current ESA agreements, land formerly under ESA agreements and neighbouring non-ESA land. The preliminary results indicate that virtually no negative changes occurred in the land under current ESA agreement, whereas about 10% of lapsed ESA land and 10% of non-ESA land has undergone negative changes, although this is now considered to be an under-estimate.

#### 6.4.4. Conclusions

A number of examples of monitoring and evaluation have been reviewed. In the light of the absence of a monitoring and evaluation scheme for the REPS, it is important that the above-mentioned methods be considered by the Department of Agriculture for future agri-environmental schemes. So far, few questions have been asked about the value for money and environmental effectiveness of the REPS, but we consider that it is only a matter of time before the Department of Agriculture is asked to be accountable. The best examples of monitoring and evaluation of agri-environmental schemes would appear to be provided by Northern Ireland, Britain and possibly Denmark.

### References

- Chilton, S. M., and Moss J. E. (1997) A Socio-Economic Evaluation of the Mourne Mountains and Slieve Croob Environmentally Sensitive Area Scheme. Centre for Rural Studies, The Queens University of Belfast.
- DANI (Department of Agriculture Northern Ireland) (1997) Environmentally Sensitive Areas in Northern Ireland Explanatory Booklets. DANI, Belfast.
- DANI (Department of Agriculture Northern Ireland) (1997) Northern Ireland Countryside Management Scheme: A Consultation Document. Department of Agriculture for Northern Ireland, Belfast.
- ERM (Environmental Resources Management) (1996) Effects of CAP Accompanying Measures on Biodiversity and Landscape in Northern Member States: Case Study. Country Stewardship. Report for the European Commission, DG XI.
- MAFF (Ministry of Agriculture, Fisheries and Food) (1997) The Countryside Stewardship Scheme Application Pack. MAFF, U.K.
- Morris, C., and Young, C. (1997) Towards Environmentally Beneficial Farming? An evaluation of the Countryside Stewardship Scheme. *Geography*, Vol. 82(4), pp 305-316.
- National Audit Office (NAO, 1997) Protecting Environmentally Sensitive Areas. Report to the House of Commons National Audit Office, London.
- RSPB (Royal Society for the Protection of Birds) (1995) Environmental Land Management Schemes in England. Comments by the Royal Society for the Protection of Birds. RSPB, Sandy, Bedfordshire.
- RSPB (Royal Society for the Protection of Birds) (1997) Northern Ireland Countryside Management Scheme Consultation Document: Comments from the Royal Society for the Protection of Birds. RSPB, Belfast.
- RSPB (Royal Society for the Protection of Birds) (1996) DANI's Proposal for a Northern Ireland Wider Countryside Scheme: Preliminary Submissions from the Royal Society for the Protection of Birds. RSPB, Belfast.

## 7. Socio-Economic Aspects of Agricultural Schemes and Premia Payment

Much has been written on the socio-economic aspects of Irish agriculture, and a complete review and analysis is beyond the scope of this study. A particular aspect which has so far not received much attention: the pattern of distribution of agricultural payments within the farming community and the significant contribution to farmers' incomes. Society is beginning to accept the idea that farmers are custodians of the countryside, and the government is beginning to appropriate to reward farmers accordingly, through for example, the Rural Environment Protection Scheme (REPS). It has been the policy of the government to limit the maximum numbers of farm families on the land (however poorly this may have been defined and put into practice). Environmentalists have argued that natural habitats and landscapes can best be managed by farmers. Therefore, if farmers are regarded as custodians of the countryside, and the government land, how they are supported by public money should be of vital importance to policy makers. A question of particular interest is: how are agricultural supports being delivered to farmers in the lower income groups and/or in Disadvantaged Areas who are practising low-input farming in areas of high environmental value?

Before proceeding to an account of the research carried out specifically for this study (see Section 7.4 below), it is worth reviewing a few key

aspects of agricultural payments, which are included in 7.1, 7.2, and 7.3 below.

## 7.1. Evaluation of Compensatory Headage Scheme (Headage Payments) for the Department of Agriculture

Kearney et al. (1996) evaluated the Compensatory Headage Scheme in terms of its objectives (the specifications of the scheme are detailed in a comprehensive report, and we have solely highlighted the conclusions and recommendations relevant to the socio-economic aspects of this report). The objectives are to maintain the farming population in areas disadvantaged for farming and to support farm incomes; in so doing, the scheme aimed to counteract the effects of rural depopulation. Kearney et al. concluded that :

- I.** The scheme seems to have made a significant contribution to maintaining relative farm incomes in Disadvantaged Areas.
- II.** Although the scheme may have helped to slow down the rate of population decline, rural depopulation in Disadvantaged Areas continues. The population is ageing and younger people continue to move to urban centres outside Disadvantaged Areas.
- III.** The scheme had positive and negative environmental effects: to the extent that it slowed the rate of population decline, it contributed to maintaining farming practices and farms which are important to society as a whole; on the other hand, the scheme has contributed to widespread environmental damage through overgrazing (see Case Study 5.1).
- IV.** In 1993, over 103,000 farmers were involved in headage schemes, costing £111 million. The majority of farmers received relatively small payments: about 80% of recipients of the Sheep Headage Scheme received less than £1,360 in 1993, and 60% of recipients of Sheep Headage received less than £500.
- V.** It appears that the distribution of headage payments is relatively more equitable than other agricultural subsidies (e.g. Ewe Premium, beef premiums).
- VI.** Cattle farmers appeared to be the most heavily dependent on headage payments, with over 40% of family farm income, while around 30% of family farm income was contributed by the scheme to sheep farmers.
- VII.** Headage payments are relatively progressive in terms of farm size, in that on farms with high stock numbers, the contribution of headage to family farm income is much more important than on farms with low stock numbers. However, this is not so apparent when all subsidies are considered.
- VIII.** Headage contributes more to income support than to development, and could be viewed as a barrier to development because it slows 'structural adjustment'. In other words, farm sizes remain relatively undeveloped because older, more conservative farmers tend not to enlarge their farms to a more economically viable size and tend not to intensify and improve their land.

Kearney et al. recommended that :

- I.** If changes were to be made, the scheme could be biased towards younger farmers who are more likely to develop; or that it could take the form of support for farm-related activities or activities related to mainstream agriculture so as to diversify away from core farming.
- II.** The objective of maintaining population in rural areas needs to be amended, in favour of the ability of headage payments to support the incomes of low-income households; income support should be made to farmers in the greatest need, which would involve adjusting the parameters of the scheme and changing the terms of entitlement to payments. The new ceiling on headage payments of £4,000 announced by the government in 1998 appears to be an acknowledgement that the current scheme needed to be better targeted. The IFA was reported to be critical of this new 'ceiling' (The Irish Farmer Journal, 7 Feb. 1998).

- III.** The consultants suggested that a threshold of total household income could be used for payments, and which would encompass, among other things, the off-farm labour income of the farmer and partner and could be considered as an alternative.
- IV.** Environmental cross-compliance, in order to overcome the problem of environmental degradation, including modifications to the REPS (referred to in Chapter 4.1). This appears to be a recommendation taken on board by the Department of Agriculture. The consultants also suggested that stocking levels could well be the recommended management practice for severely degraded land.

## 7.2. Review of Compensatory Headage Scheme (Headage Payments) by the ESRI

The Economic and Social Research Institute (ESRI), a state-sponsored body, published its mid-term review of the Community Support Framework (CSF) 1997, in which it examined the Compensatory Headage Scheme (described in Chapter 1.3).

The Compensatory Headage Scheme accounts for almost 50% of the total EU Structural Funds allocated to the Operational Plan for Agriculture (OPARDF): £448.98 million. The average annual headage payment comes to about £1,300 per farm, equivalent to 30% of the farm income. The ESRI report suggests that headage payments may have slowed the decline in farm population by a small amount, but found it hard to argue that they had any developmental function. The ESRI report states that 'the headage scheme must be seen as a redistributive scheme, and a rather arbitrary one at that'. The ESRI report mentions the conflict in objectives between the headage scheme and the Retirement from Farming Scheme. The former is seen as having no developmental function, while the latter is viewed as encouraging more investment in the farm 'because some of the areas where income supports are needed happen to be in areas that are environmentally vulnerable, production grants are more likely to be delivered in these areas, and the headage scheme delivering income support. They should be replaced by transferring some of the funds to support environmentally desirable objectives or to support investment in the farm.'

## 7.3. Distribution of Direct Payments

Keeney et al. (1997) observed that direct payments to farmers have become the single most important source of farm income, contributing 40% of total farm income. Before the CAP reforms in 1992, direct payments were explicitly redistributive, designed to compensate low income farmers. After the CAP reforms, direct payments were targeted at bigger, better-structured and higher-income farms. The authors state that the notion of farmers being compensated for price cuts in the past is no longer valid and that farmers have to find other ways to support farmers. Linking direct payments to explicit conditions on the way farming is practised (i.e. 'cross-compliance') is a way of supporting the EU to support farmers in the future. Keeney et al. observed that in the next World Trade Organisation round scheduled to begin in 1999, direct payments will be vulnerable to attack, because of the extent to which they are linked to production. If direct payments become no longer related directly to production, they suggest, 'the argument that they should be seen as social policy instruments financed by national governments will gather force elsewhere'.

## 7.4. ESRI Study of Distributional Pattern of Direct Payments to Farm Households

(See full text and tables in Appendix II)

Since direct payments play such an important part in maintaining farmers' incomes, the consultants wanted to look at how agriculture payments are distributed. A study was undertaken by the ESRI for this report to examine the distributional pattern of direct payments to farm households. The aim was to determine whether the distribution of agriculture schemes and payments is progressive or otherwise. A subsidy scheme is said to be progressive if it leaves low-income households better off as a result.

To date, analyses of direct payments have only been able to view them in relation to Family Farm Income, which is but part of the total income of the household. Using data gathered in the National Farm Survey 1995 and the Household Budget Survey 1994-95, direct payments can now be viewed in relation to total household income. This was recommended in the recent report on the EU Structural Funds (Honahan, 1997). The main findings are:

### Taking all direct payments together:

Looking at the value of receipts by income group of direct payments as a whole, it is seen that these payments increase strongly with higher income groups. In the lowest income group the increase is over threefold, from about £50 to over £150 per household per week.

Splitting the total number of farm households in half, with lower incomes in the one half and higher incomes in the other half, it is found that the lower half receives 38 per cent of the total direct payments disbursed as direct payments, the upper half receiving the remaining 62 per cent.

It is only when viewed as relative contributions to income that direct payments could be called progressive in distributional terms. Direct payments are a larger share of income of the lower income groups. This share declines steeply from the lowest income decile, where it is 80 per cent of Disposable Income, to the top three deciles the share is still some 20 per cent.

### Schemes with distributional aims:

Only a few of the schemes, however, were set up with the intention of alleviating low incomes. These are the three measures, Cattle Headage

Premium and perhaps also, to the extent that the limit on eligibility is higher in disadvantaged areas, the Ewe Premium. These four schemes go to the lowest income group, rising to about £60 per week for the highest income group.

Excluding the Ewe Premium, the three distributional measures (Cattle Headage, Sheep Headage and Suckler Cow Premium) give about £20 per week to the lowest income group, rising to some £30 per week in the highest income group. Hence, even these schemes give more to the better off.

Only Sheep Headage, which is one of the smallest components of direct payments at less than 4 per cent, gives more in value terms per household in the lowest income range.

Taking the three distributional schemes again and looking at their contributions to income expressed in relative terms, they constitute some 4 per cent of income for the lowest income group falling to some 4 per cent of income in the highest income group. Therefore they do indeed aid low-income households considerably. The ESRI report on the Structural Funds observed that the Headage payments were broadly progressive when viewed as a proportion of FTE income. This is still the case when viewed as a proportion of total income, though as mentioned the actual amount paid per household in higher income groups is much smaller.

### Other Observations:

Analysis by Farm Type shows that households which gain most from direct payments are those involved in producing Field Crops, through the Ewe Premium and Sheep Compensation. Next, farms in the category 'Other' and Sheep farms receive sizeable payments in the form of Ewe Premium (Figure 3, a and b).

A possible yardstick for measuring the extent to which direct payments can be called distributional is to compare them with 'Total State Transfers' which would give a correct income distribution within society. Compared with this yardstick, direct payments give lower support to low-income households, and higher support to high-income households. This applies in both value and percentage terms. However, unlike with State Transfers, the actual value of direct payments per household rises with income. State Transfers, which are partially means-tested, decline with higher incomes.

In sum, the regime of direct payments pays more to those with high incomes. It does not exhibit a good distributional pattern by reference to the correct income distribution generally, though this of course is not the objective of many of the components of direct payments. However, even if the aim is to pay more to higher income groups, with the exception of the relatively small Sheep Headage scheme.

Where alleviation of need is the aim, more integration of the farming sector into the Social Welfare system might be worth considering as an alternative. If, as an issue, the question which is increasingly asked in order to justify continued transfers from the rest of society (in mainland Europe or Ireland) is 'What is obtained in return for taxpayers' outlays?' Fair treatment of a section of society which has suffered a change of regime can be a justification, but the only route. The incentive effects of such a route were under-estimated, as frequently happens. Incentive effects, combining taxation of harmful activities with direct payments, need to be considered in devising the solution.

The full text of this study, including supporting figures and tables, is contained in Appendix II.

## 7.5. Conclusions

- I.** The Compensatory Headage Scheme has been reviewed in two reports by or for state (see Sections 7.1 and 7.2). In both reports, the scheme has been shown to contribute to environmental objectives, but the payments are linked to production.
- II.** Since the 1992 CAP reforms, one report has indicated that compensatory payments are going to bigger, better-structured and higher-income farms (see Section 7.3). This report also indicates that compensatory payments directly linked to production remain vulnerable to attack in a World Trade Organisation round in 1999.
- III.** The ESRI study for this report (see Section 7.4) indicates that higher income farmers receive proportionately more direct payments than lower income farmers. This does not therefore represent an ideal distributional pattern. The ESRI study proposes that greater integration with the Social Welfare system might be worth considering, and also refers to the need to justify the spending on direct payments according to the benefits to society, including social and environmental benefits.
- IV.** The changes proposed in Agenda 2000, if agreed, should allow the Government to target direct payments to specific social and environmental objectives in Ireland. A measure of the Government's commitment to both these objectives would be the extent to which disadvantaged farms and their natural value are supported under this proposed new regime.

## References



Honahan, P (Ed.) (1997) *Mid-Term Review of the Community Support Framework*. Economic and Social Research Institute, Burlington Road  
Kearney, B., Boyle, G., and Walsh, J. (1996) *Evaluation of Compensatory Allowances Scheme in Ireland*. Final Report to the Department of Agriculture, Fisheries and Food. Unpublished.  
Keeney, M., Matthews, A., and Frawley, J. (1997). *The distribution of direct payments in Irish agriculture*. Paper read to the Economic Policy Group at Kenmare, October 17-19, 1997.

## 8. Evaluation of Current Agricultural Schemes and Premia Payments Open to Competition

The scope of this study does not allow us make a detailed evaluation of all the schemes described in Chapter 2. The consultants decided to evaluate only those schemes and payments for evaluation, based on their potential and actual influences on the natural heritage. These are included in 8.1 below.

In order to place agriculture schemes and payments in their proper context, we have included mention of other influences, including price and income support, de-regulation and environmental policies, discussed in 8.2 and 8.3 below.

The consultants did not have time to examine the influence of other policy instruments such as taxation policy. However, we consider that the influence of other instruments in Chapter 8 is set out as follows:

8.1 Evaluation of selected agriculture schemes and payments

8.2 Other agricultural policies which affect the natural heritage

8.3 Evaluation of environmental policies relating to agriculture

### 8.1 Evaluation of Selected agriculture Schemes and Payments

The literature review and case studies highlighted the very considerable negative impact of sheep payments on the ecology and landscapes in the western parts of Counties Mayo and Galway. It has been clear for a number of years that the Ewe Premium, supplemented latterly by the REPS, has had a significant influence on the overstocking of commonages in disadvantaged areas. Sheep headage payments also encourage overstocking when combined with other payments (see 8.1.2 below).

The Ewe Premium is an EU-wide system for the support of the sheepmeat sector. As such, Member States are not given much room to make adjustments to national or regional situations. Centralised planning in Brussels meant that the stocking rates were set to the lowest common denominator to meet the payment limit of 500 ewes outside Less Favoured Areas (LFAs) and 1000 ewes within LFAs is an EU-wide limit which is unable to address the needs of different farming systems throughout the Union.

The crudity and inflexibility of the Ewe Premium Scheme is further illustrated by the refusal by the European Commission to make amendments to the scheme, including Ireland, made requests for such amendments. In its recent review of the EU Sheepmeat Regime, the Commission states that it does not intend to amend the existing basic regulation. In 1996, the Department of Agriculture requested clearance to introduce environmental cross-compliance or other measures to address serious overgrazing in western commonages encouraged by the payments. This was rejected on the basis that payments may be made under the Ewe Premium would be conditional on farmers joining the REPS (see also Chapter 9).

The environmental conditions in the Ewe Premium Regulation allow Member States to refuse or reduce premium payments to farmers if the conditions are not met. Ireland chose not to enforce these conditions. The economic vulnerability of hill sheep farmers and the power of the farm lobby in opposing official action to curb overgrazing has been stalled for so long (see also Chapter 7, which examines the socio-economic aspects of payments to farmers).

The introduction of environmental cross-compliance in degraded commonages is described in Chapter 5.1. From 1998, sheep farmers in the Ewe Premium and sheep headage payments if they agree to enter the REPS and abide by measures designed to reduce grazing pressure on commonage.

Although the primary incentive for farmers to overstock sheep originates from Brussels, the Irish government's response remained inadequate until an environmental cross-compliance measure was introduced. Overgrazing has been a serious problem since the late 1980s, and it has taken a long time to introduce measures to counteract this problem. The State could have introduced a national scheme to compensate farmers for removal or reduction of stock, but was free to do this under European policy. Indeed, the Departmental policy review of 1990 (Government of Ireland, 1990) recommended adapting the REPS for this purpose, but no action was taken at the time. The slowness of the Department of Agriculture and Food to begin to address the problem was due to the widespread environmental damage that has occurred in the meantime. Finally, it must be mentioned that farmers themselves bear some responsibility. There has been a tendency for farming representatives to be reactive rather than pro-active in addressing the problem.

#### 8.1.2. Compensatory Headage Allowances (Headage Payments)

Headage payments are a very important source of income for farmers in the lower income categories, especially in Disadvantaged Areas. Cattle farmers are heavily dependent, followed by sheep farmers. The vast majority of more than 100,000 farmers in the scheme receive relatively small payments. The scheme is explicitly social in purpose, and has been partially successful in achieving its aim of maintaining rural populations in marginal areas. The scheme is explicitly linked to production, and are additional to Ewe Premium payments, the scheme has encouraged environmental conditions. It seems to be the case mainly for hill sheep, when combined with the greater influence of the Ewe Premium.

The headage payments scheme has been criticised in several recent policy assessments (see Chapter 7) for being poorly targeted and environmentally unfriendly. The ESRI Review (ESRI, 1997) suggests that payments should ideally be replaced by a scheme more related to environmental objectives or at least one that is. The Kearney Report recommended that environmental cross-compliance be introduced. We are in agreement that cross-compliance and de-coupling should emphasise the importance of supporting farm incomes in Disadvantaged Areas, and this is borne out by the study described in Chapter 7. Coupling support (such as a modified headage payments scheme or equivalent, and social welfare payments) to less well-off farmers should be main components of the total package of support, it should include sustainable agricultural management as a primary objective. Many of the more marginal farms also have low value. Supporting these farms with environmental conditions as a primary requirement could help to alleviate the pressure on wildlife habitats.

In the EU's proposed Rural Development Regulation (European Commission, 1998), headage payments will be paid on a per hectare basis for environmentally compatible. This proposal has yet to be agreed by the EU Council of Ministers and is likely to meet with resistance. If agreed, cross-compliance measures in degraded commonages, could contribute to reducing the incentive to overstock. However, the experience of agricultural based payments must still be explicitly linked to environmental objectives if they are to be of benefit in conserving habitats and species.

### **8.1.3. Beef Payments (Suckler Cow, Special Beef and Extensification Premiums)**

These payments were increased since the CAP reforms of 1992 to compensate farmers for falls in market support, and unlike headage payments are for income farmers. Currently, they have no environmental conditions attached. Payments are based on the forage area of each farm and subject to a cap, and are directly linked to animal numbers. The eligible forage area is the utilised agricultural area, and excludes non-agricultural land such as scrub and wetland. The larger the forage area, the greater the number of stock for which payments may be claimed, since payments cannot be made if stocking levels are exceeded. Suckler Cow and Special Beef Premiums.

The Extensification Scheme would appear at first sight to make a useful potential contribution to the environment. As a generalisation, low stocking levels benefit wildlife and maintain traditional agricultural landscapes. However, there are no environmental conditions attached to the Extensification Scheme, which discourage an increase in production by maintaining relatively low intensity cattle farming. In order to obtain the Extensification Premium, stock levels must be reduced. We conclude that the Extensification Premium has and little or no positive environmental benefit in its current form.

The combined effects of the current compensatory payments may provide an incentive to farmers to expand their utilised agricultural area to include non-agricultural land such as scrub, wetland, etc. There are some indications that this may be the case in the Burren, where a considerable area has been reclaimed in recent years. However, eligibility for compensatory payments may be only one of a number of incentives for reclamation (see Chapter 5.2). In countries that the current Extensification Scheme has not been effective in supporting the least intensive producers, who are also likely to be marginal. The Agenda 2000 proposals, if agreed, will allow area-based payments to be made under the Extensification Scheme and the eligibility rules (European Commission, 1998). This may result in more positive environmental benefits.

Agenda 2000 also provides for an increase in the Suckler Cow and Special Beef premiums (European Commission, 1998). It is therefore possible that cross-compliance conditionality is built into the all the new payments. This is discussed further in Chapter 9.

### **8.1.4. Arable Aid Scheme**

As with the beef compensatory payments, the arable payments are designed to control cereal production and compensate farmers for reduced output since the CAP reforms. The scheme is an especially important source of income for specialist cereal growers and represented 83% of output value in 1996. If farmers choose not to enter the scheme, in practice, it would not be economically worthwhile because of the reduced cereal prices.

Payments are conditional on eligible land, which means that the area under cereals on each farm effectively cannot be increased beyond the area currently on set aside. In EU policy terms, the current set aside scheme is strictly a means of controlling output, and the attached environmental conditions are not. The management of set aside observed in the case studies is not beneficial for wildlife, and the poorest land on the farm is usually allocated for set aside, which is then re-seeded, managed by topping and followed by taking a crop of silage in September. On the farms visited, there were few areas of high conservation value (5.4). Most wildlife habitats have been removed during the 1970s and 1980s, funded by the Farm Modernisation Scheme and the Farm Improvement Scheme.

Since 1996, transfer of eligibility rules allow farmers to plough up and re-sow areas previously ineligible under the Arable Aid Scheme. Our study found that the highest conservation value (such as low intensity pasture) is the first to be converted to intensive cereal production.

Although cereal farming occupies only 308,800 ha, of which 33,000 ha are at present in set-aside, most of this land is farmed intensively, and is in the country, which has the lowest biodiversity. It would clearly be of value to introduce some environmental incentives which could be incorporated into the scheme.

The farmers interviewed had no interest in the REPS; and habitat re-creation would have to be completely funded by grant aid before they would be considered. In typical, the prospects for introducing any form of nature conservation in intensive tillage farms would be extremely limited unless there were a significant change in policy.

The modified set aside measures proposed under Agenda 2000 would allow Member States to introduce five year set aside schemes so that the current scheme is enhanced. The compulsory element in set aside would be retained but the usual rate would set at 0% and small cereal farmers would remain eligible.

Commission, 1998).

### **8.1.5. Rural Environment Protection Scheme (REPS)**

The consultants take the view that the REPS is a very important scheme which has considerable potential to make a positive impact on the environment. The way the scheme operates in practice is therefore of vital importance. In this section, we have therefore decided to discuss the REPS in more detail than the other schemes.

The Department of Agriculture and Food has a target participation of about one-third of all Irish farmers (approx. 40,000). The REPS is targeted at organic farming, which occurs throughout the country, but more often exists in the Disadvantaged Areas. Chapter 2.2.2 describes the scheme and the uptake of the various supplementary measures. This study and others have noted that it is very difficult to give an accurate indication of the impact of the REPS on wildlife and reducing pollution, since the baseline information is poor and no assessment programme has yet been put in place. The Department has not published comprehensive statistics on the number of participants, the area in hectares under each measure, and the payments made. However, these statistics are essential to the scheme in meeting its environmental objectives. In the absence of monitoring data, we have to rely on anecdotal evidence from those who are involved in setting up plans and promoting the scheme. In citing this anecdotal evidence, the consultants are aware that there are no concrete data to back it up. Some of the aspects of the REPS are discussed among planners, the farming press and participants, these deserve mention, and could provide important lessons for improvements in the future.

#### **Significance of REPS for farm incomes**

At a REPS Conference in Johnstown Castle in October 1996, Tony Pettit, Teagasc Cattle Specialist, outlined the significance of the REPS for farm incomes. The average income of sheep farms is well below other farming systems on comparably-sized farms. Based on the Teagasc National Farm Survey of 1995, the average incomes of farms of different sizes in 1995 were: dairying, £250; tillage, £150; and cattle, £97. Direct payments accounted for 80-95% of overall income on cattle farms and on sheep farms. Drystock farmers make up the majority farm enterprise of those farmers entering REPS.

The high uptake of the REPS by drystock farmers is as a result of the current low beef prices. This means that low input systems which are encouraged by the Extensification Scheme offer greater returns for many drystock farmers. It appears that many farmers have been able to join the scheme with minimal investment. Indeed, there has been scope, on the advice of Teagasc and private consultants, to join the REPS and intensify production up to REPS levels. This has been seen by consultants as a cause for concern. Nutrient management planning has made significant cost savings for farmers and the evidence from the field suggests that this has probably decreased nutrient run-off to watercourses.

For many dairy farmers, the current profit levels from intensive production and CAP price support mean that joining the REPS would result in a loss of income. Farmers involved in intensive winter cereal production are also achieving high production levels. This level of production combined with cereal aid payments is a proposition, mainly due to the cut off level for payments at 40 ha.

In contrast the payment levels for existing organic farms and horticultural enterprises in REPS and for conversion to organic farming are attractive. This is due to the number of farms and the hectareage under organic management.

The consultants welcome the recent improved treatment of REPS payments under the 1998 Social Welfare Bill which provides for an extension of the £2,000 of REPS payments for means-testing purposes (Unemployment Assistance, Pre-Retirement Allowance, Old Age Non-Contributory Pension) for compliance with SAC conditions. However, we remain concerned about the imbalance in the treatment of afforestation and REPS payments. REPS payments being taxable and forestry payments being tax-free.

#### **Standards of REPS farm planners**

There has been criticism of the poor habitat identification and lack of ecological skills among REPS planners. Over 70% of REPS planners are agricultural graduates who have completed further courses in environmental management. The Department of Agriculture and Food has now introduced a training programme for planners; trainee planners now have to attend an intensive three day training programme and must complete three plans to the satisfaction of the Department for approval. However, in general, short environmental courses are unlikely to completely reverse years of training and experience in intensifying production. In some instances, consultants, some planners are reluctant to recommend retaining certain habitats to avoid constraining farmers from reclaiming or afforesting land. This also appears to miss habitats due to poor habitat identification skills.

A critique of the standard of REPS planners in the farming press was presented by Joe Hall (Countryside Management Expert, Teagasc). He noted that while many have an innate interest in the rural environment and submit excellent plans, some show willing and retrain in the agri-environmental field and others show a complacent ethos without due regard to its environmental remit. How many farms have been "straightened out" prior to a REPS application? Are the planners aware of the need for awareness or complacent?' (Irish Farmers' Journal, 5 July, 1997, Page 37).

In a report on the EU wide assessment of schemes operating under the Agri-Environmental Regulation 2078/92, BirdWatch Ireland noted that within the Department of Agriculture and Food, and also noted that some ecologists had complained that their services are used only to a very limited extent.

Because of commercial pressures, planners seek to attract the maximum number of clients into the REPS. Farmers tend to choose planners who offer the most favourable terms within the REPS rules. There is plenty of scope within the REPS for achieving minimum or maximum benefits for the environment. Environmental constraints and costs, and these can be minimised by the planner. Since the majority of planners are agricultural graduates, they have been trained to think in terms of profit for farmers. The REPS is often seen as just another income scheme for farmers and not as a change of direction in agriculture policy. Although environmental training, this is unlikely to provide all the necessary nature conservation skills.

The Department of Agriculture and Food requires that all plans drawn up in relation to SAC/NHA areas are signed by an environmentalist (D No. 9/98). In Teagasc, this role often falls on those members of staff who have completed a diploma course in environmental management. Environmentalists carry out this role. However, we understand that many of these environmentalists never walk the farms in question. They are advised by an agriculturalist, based on the guidelines provided by the Dúchas staff. However, since management plans are unavailable for most SAC sites, the actions list for the site. This does not insure that all of the required management is carried out by the farmer. The farmer does not usually manage the site, so that there is little opportunity for the farmer to become more aware of the environmental value of the site.

In contrast, the Department of Agriculture in Northern Ireland (DANI) employs mainly environmental graduates with a farming background. The agriculturalists that environmentalists would have a good enough grasp of farming in order to advise farmers. However, many of the advisers in Northern Ireland are environmental graduates, some with a farming background (DANI, pers. comm.).

### Farmers' attitudes towards the REPS

A striking example of the direction some farmers are being advised to take was given in the Irish Farmers' Journal in 1996. An article 'Transition: development of 'JJ's 90 difficult acres'. 'His 147 map acres, that were once mostly cutaway turf bog, are now adjusted to 118 by Christy Jones. Hymac eventually got the drains in and brought about an acceptable seed bed. He started with 10 acres in 1992, 20 acres in 1993, 28 in 1994 and continues amidst a plethora of development around the farmyard which has given him a modern efficient dairy farm. Grants are promised under the REPS Scheme for building work. This year JJ has joined REPS. With nitrogen use at about 110 units per acre, the REPS targets should be easily met. JJ's big handicap is now the shortage of milk quota.' (21 October, 1996, p.31). It is not possible to state how many farms have been re-structured. To practice this information would be difficult to obtain. Anecdotal evidence from some planners suggests that other such examples exist. The author stated in a personal communication that it is not aware of re-structuring of farms prior to entry into the REPS and that the above example is the rule. However, the consultants feel that this issue should be given greater attention. In the opinion of several Wildlife Rangers interviewed for the study, the reluctance to entering REPS was a significant problem.

A survey of 200 REPS farmers by Teagasc in 1995 revealed some interesting views about the scheme. The average farm size was just over 100 acres of farming and a large minority were part time farmers. Most farmers viewed extra income as the main benefit, followed by improving the appearance of the farm. Pollution control was regarded as the main benefit. However, the image of farm produce and the benefits for wildlife were not considered important. Pollution control was the major negative aspect, along with limitations on expansion. Most farmers interviewed felt that the REPS training course was good. Those who joined the course wanted more outdoor practical sessions and 45% wanted refresher courses. The training course is arguably one of the best. The real change occurs when farmers' attitudes change towards conservation (Source: REPS conference, Johnstown Castle, Co. Wexford, October 1995).

### University College Galway Survey of Farmers and the Environment (1997)

A recent study has presented a snapshot of attitudes to the environment following a survey of thirty-two REPS participants and eighty-one non-REPS farmers (Aughney, pers. comm.). The response to three of the questions posed is given in the Table 8.1.

It would appear from the survey that REPS farmers have no greater awareness of environmental issues than non-REPS farmers. This is why it must be to raise awareness of these issues among farmers. The main reasons cited for joining the REPS scheme are to tidy up the farm and to meet the objectives of REPS, to protect wildlife habitats and endangered species of flora and fauna, was given a low priority among those farmers interviewed. If the scheme was another income provider then it may have failed to meet its long term objectives.

**Table 8.1 Responses by 113 farmers to a survey conducted by researchers from the Environmental Science Unit, University of Galway**

Survey question	32 REPS participants	81 Non-REPS participants
Do you think that you have anything on the farm of nature conservation value?	Yes * No*	No data
	53%	47%
What is the purpose of REPS?:		
• To tidy and clean up farms	53%	43%
• Protection of habitats	12.5%	14.8%

• Provide income	6%	16%
Reasons for joining REPS?:		
• To improve the appearance of the farm	50%	No data
• To improve income for the farm	37.5%	No data
• To extensify	9%	No data
• For environmentally-friendly farming	3%	No data

It was widely thought that the scheme has had a positive effect on the consciousness of farmers towards the environment. However, the results indicate that there is little or no greater environmental awareness among REPS participants. This REPS approach is new to many farmers, and it is unclear how farmers who have received advice and support to increase production from the state bodies and the farming press over a generation. It will need to be accepted by farmers.

We believe that the REPS has contributed significantly to supporting the incomes of farmers in the sectors most badly affected by changing agricultural prices. The whole-farm management approach of the REPS is on paper one of the most advanced agri-environmental schemes in the EU, and Ireland has been the first to integrate environmental cross-compliance into a CAP compensatory payment scheme. Its chief problem is 'quality control'. If the standard of REPS participants is improved by employing more ecological expertise to complement the existing agricultural skills, the REPS could achieve very good results for protection of the environment. The Department of Agriculture and Food is conscious of the need for monitoring and evaluation so that the scheme may be improved. Since the existing scheme is being replaced by a new one, it is important to address these important concerns for the planned new scheme beginning in 2000.

#### 8.1.6. Early Retirement from Farming Scheme (ERS)

The scheme is described in Chapter 2.2.1. Our brief evaluation is limited to the personal experiences of several of the consultants and the results of field studies did not reveal any examples of farms that were transferred under the scheme and because field studies could not be undertaken.

On paper, the ERS is a mainly a developmental scheme. The Department of Agriculture, when interviewed in connection with this study, stated that the scheme is designed to provide elderly farmers to provide an opportunity for young farmers to practice farming. The objectives are to 'redress two of the main structural defects of the farming sector: the ageing profile of farmers' and 'the emphasis is on using the land released to increase and re-structure other holdings to make them viable'. The scheme was approved by the Government in 1996: by the end of 1996, over 5,000 farmers had been approved for payments and 169,000 ha were released to young farmers (see Chapter 2.2.1).

The EU environmental conditions state that 'released land transferred to farming transferees must be farmed ... in harmony with the requirements of EU and National legislation on environmental protection'. 'released land transferred to non-farming transferees must be used in a manner compatible with the protection or improvement of the quality of the environment'. The Irish scheme requires participating farmers to 'farm in harmony with the requirements of EU and National legislation on environmental protection'.

In the experience of the consultants, elderly farmers tend to be less development-minded and sometimes have more sympathy with the natural environment than younger, development-conscious farmers (for example, see Section 8.5.3 above). For this reason, habitats that have remained intact for generations are often transferred. This is quite understandable, and is similar to the changes that take place on non-farm properties in town and country transferred. However, it must be mentioned that this changeover does have potential negative environmental effects.

The environmental conditions in the Irish ERS state that farmers must comply with EU and national environmental legislation. However, the Wildlife Act, 1976, which is recognised to be inadequate in protecting species and habitats outside State ownership (see Chapter 1.3). The scheme also covers designated Special Protection Areas and Special Areas of Conservation, which cover less than 10% of the country. The Department of Agriculture and Food's monitoring of the ERS included an environmental assessment.

The ERS conditions also state that where no suitable farming transferee can be found, owners are allowed to re-assign land for non-agricultural purposes. We are unsure if there is information on how much such re-assigned land exists and how it has been used, but this could merit some further investigation.

#### 8.1.7. Control of Farmyard Pollution Scheme (CFP)

We include a brief evaluation of this scheme because, although it has been discontinued, the Government has indicated in early 1998 that it

Furthermore, the CFP is the only capital grant scheme with a specific environmental emphasis and had an important linkage with the REPS. The objectives are to reduce water pollution, enhance Ireland's 'green image' and provide better working conditions on farms.

The CFP was evaluated as part of the Mid-Term Review of the Structural Funds (Fitzpatrick and Associates, 1997). The report found that the objective of controlling farm pollution. It recommended that any future scheme should be far more wide ranging than improvements to order to achieve overall anti-pollution objectives. The report also suggested that the CFP should have been better targeted towards the farm

While the criticism in the Fitzpatrick Report is understandable, there was a reason for focus of the scheme on lower income farmers. In the must have effluent storage in their farmyards under control at all times. In order to achieve this, farmers availed of capital grants under the element into the control of farmyard pollution which was previously missing. Before the REPS was introduced (in 1994), the CFP merely provided storage on farms, but there was no follow-up in terms of monitoring the management of those upgraded farmyards. Since the REPS commenced, the Department of Agriculture considered that it was important to encourage as many farmers into the REPS as possible, and this could only be done by bringing them up to the standards specified in the REPS.

A survey of 92 randomly selected CFP participants in 21 Irish counties in August/September 1996 demonstrated that 77% of all slurry produced in August/September. Nineteen per cent planned to spread slurry after September 30. About 80% of the participants were complying with the REPS while 30% were actually participating in the REPS. This finding contrasts with the finding of the case study of dairy farming in Kilkenny, where compliance was unsatisfactory (see Chapter 5.3).

A study of the causes of pollution in Lough Conn (McGarrigle et al., 1993) found that although £5 million had been spent on winter housing to alleviate water pollution. Large amounts of slurry had accumulated in slatted sheds and the stored slurry was subsequently spread on land which washes into streams and rivers. Many farmers were reported to have waited for rain so as to wash the slurry in, rather than spreading it

This illustrates a more general problem with schemes operating in Ireland. Follow-up and monitoring of the consequences of schemes is given to farmers under the CFP and the FIP to upgrade farmyards and increase storage capacity so as to reduce the risk of run-off from farmyards. The CFP did reduce the risk of serious pollution arising from farmyards, and this is confirmed by an interview with the North-Western Regional Fisheries Board. One of the reasons why the CFP has reduced serious pollution incidents from farmyards is the gradual fall in recorded fish kills since the CFP came into operation in 1994.

This is only part of the story, however. The Control of Farmyard Pollution Scheme (and the Farm Improvement Programme which preceded it) do not address the need for adequate land area, soils, and good slurry management practices. In one sense, the CFP has been an aid to intensification of agriculture, since more cattle can be housed in winter compared with traditional out-wintering with associated low stocking rates. Increased silage production also requires more intensive fertiliser application. Large quantities of slurry have to be disposed on an inadequate area of land, and this is unsuitable. Slurry tanks which are designed for a particular volume of waste may have to be emptied in unsuitable weather conditions to avoid overflow. This is a regular occurrence.

The above may tend to contradict the assertions of some in the agricultural sector who claim that slurry management is under control. Our conclusion is that adherence to codes of good practice for farm waste management. Unless a future capital grant scheme for upgrading farmyards is strongly linked with adherence to codes of good practice, and curbs on accepting slurry from intensive pig units, the situation of water pollution in Ireland is likely to remain

We do not wish the above criticisms to give the impression that there are no positive aspects of the CFP. The scheme has certainly helped to upgrade farmyards, and thereby reduced the risk of slurry tanks overflowing, which has led to so many fish-kills in the past. But a capital grant scheme is not sufficient. A range of measures which are needed to reduce agricultural pollution. The CFP was a stand-alone scheme unrelated to stocking rates, fertiliser application, and soil nutrient status, and this was its Achilles heel. Future capital grants for pollution control will have to be strongly linked with nutrient management, tied in with stocking densities which reflect the carrying capacity of the soil to accept farm wastes. With this in mind, the link that had been established between the CFP and the REPS was a move in the right direction.

### **8.1.8. Other Schemes and Payments**

In this section, we make a brief evaluation of other schemes and payments which may have an influence on the management of the natural

#### **Afforestation and Premium Scheme**

The Afforestation and Premium Scheme was the subject of a review of Irish forestry policy commissioned by the Heritage Council in 1997. The results of this study. However, a number of key points need to be made in relation to the interaction of forestry with agriculture:

- I.** The consultants have noted a tendency for the least productive areas on farms to be converted to afforestation. These are often the most valuable areas for wildlife on farms, and include species-rich permanent pasture, wet grassland, peatland and heather moorland. Usually, when land is to be planted, it is with plantations of commercial conifers. This is likely to represent a loss of natural heritage.
- II.** It is argued by DG VI of the European Commission and the Irish forestry sector that afforestation is an environmentally compatible land use. We differ from this view because most afforestation

composed of fast growing, non-native conifers which generally do little to assist in the biodiversity.

**III.** The Afforestation and Premium Scheme has an important linkage with the REPS. It is a farmer to transfer land previously included in a REPS plan into forestry with no reimbursement. The payments received for these lands under REPS being required as had been the case in 1997. Since it is likely that the land to be transferred is often the most valuable in the catchment, the scheme may well represent a net loss to the natural heritage.

**IV.** Currently, there are insufficient environmental safeguards in the administration of the Afforestation and Premium Scheme to ensure that habitats of conservation interest (other than those designated as Special Areas of Conservation) are left unplanted.

**V.** Forestry interests are critical of the REPS because the scheme competes with the forestry interests for land. We contend that it is in the interest of nature conservation and sustainable agriculture to have a smaller area under the REPS. Currently, most afforestation consists of fast-growing, non-native conifers, and as this situation remains, the REPS is the better alternative for the long term well-being of the countryside.

**VI.** It has been suggested that a more environmentally friendly version of forestry should be introduced as a supplementary measure in the REPS (Irish Farmers' Journal, 23 May, 1998) in order to build on the momentum that the forestry industry has achieved. In principle, planting of native species could be beneficial to the environment, provided that wildlife-rich habitats are not affected and that existing woodland and scrub are retained.

### **Agenda 2000 proposals for forestry**

In the Agenda 2000 proposals, forestry is to be included as part of an overall rural development policy. The proposed new EU regulation on forestry (Commission, 1998) mentions sustainability in relation to forestry for the first time. The forestry proposals are similar to the existing EU forestry proposals. The new draft regulations state that in the case of 'fast growing species cultivated for the short term', support will only be given if 'the planting is compatible with the environment.' We are of the opinion that, in general, industrial plantations of fast growing, exotic conifers on agricultural land in Ireland are not compatible with the environment. However, the definition of a fast-growing species grown for the short term is not elaborated and no list of such species is provided.

### **LEADER and INTERREG**

These schemes are so-called 'Community Initiatives' and are directed at rural development rather than focusing specifically on agriculture. The impact on the natural heritage in comparison with CAP compensatory payments and CAP schemes under the 'Accompanying Measures'. The LEADER-funded project has impacted negatively on the natural environment, but this was a commercial turf extraction project, and not an agricultural project under the current INTERREG scheme which have had damaging environmental effects.

### **Erne Catchment Nutrient Management Scheme**

This cross border scheme was introduced as part of EU Special Support Programme for Peace and Reconciliation. Free advice by consultants in the Erne catchment is offered to farmers. The scheme was targeted on the Erne catchment because of a deterioration of water quality associated with agriculture.

To date, the scheme is more successful in Northern Ireland, with 690 plans completed, than in the Republic, with only 30 completed plans. The Department of Agriculture in Northern Ireland (DANI) has carried out a pollution risk assessment of up to 2,000 farms each year, which enabled DANI to target the most intensive farms. This enabled the consultants to focus on the farms with greatest pollution risk.

One reason given for the poor participation rate in the Republic was the existence of the REPS; however, the farmers to which the Erne scheme was targeted were not in the REPS. In addition, in the Republic there is no system of pollution risk assessment and the consultants were left to target the farmers themselves. The success of DANI was part of the reason for success north of the border. This brings into question the performance of the Department of Agriculture in the Republic. A good reason why there should be such a low participation rate south of the border.

## **8.2. Other Agricultural Policies which Affect the Natural Heritage**

Since this study is concerned with agriculture schemes and payments, we do not intend to make a detailed evaluation of other agricultural policies placed in the context of agricultural policy in general. We noted that agricultural schemes and payments are not the only influence on the way payments are of most relevance to small and medium farmers and less intensive farmers in the sheep and beef sectors, and to cereal farmers. A small role in the dairy sector, which is illustrated in the dairy case study (Chapter 5.5). Dairy farmers rely on price support, and the sector is on a levy system. (The situation of dairy farmers may change when the dairy cow premium is introduced under Agenda 2000). The pig and poultry sectors receive payments or price support under the CAP, and are essentially deregulated. The dairy, pig and poultry sectors represent the most intensive livestock sectors reflected in the policy of the Environmental Protection Agency (EPA): large pig, poultry and dairy enterprises will eventually be subject to tighter controls because of their high pollution risk.

### **Influence of market supports and de-regulation of markets**

Some European policy analysts have concluded that high artificial prices under the CAP encouraged farmers to expand and intensify, thus reducing margins. In the earlier decades of the CAP, there are indications that low prices may also encourage farmers to intensify, in particular in the dairy sector. The Agenda 2000 proposals include the eventual phasing out of dairy quotas in 2006, which is likely to result in a fall in the price of milk. This prospect was illustrated in the Farmers' Journal, 7 February 1998. Senior advisor Stanley Lyttle of the DANI Development Division in Fermoy stated that 'the first priority is to increase farm output - more quota and cows. Land is not limiting'. If this trend is followed, the implications for the environment of dairy quotas would appear likely to make it more difficult to reduce the impact of intensive farming on the natural environment.

The extreme intensification and concentration in the pig and poultry sectors illustrates the reaction of those sectors to the forces of the deregulation. From the environmental viewpoint, enterprises which generate huge quantities of farm waste pose a considerable pollution risk, particularly since there often are no quotas on production, the pig sector can expand to meet market needs, and Government policy is to encourage this expansion. Environmental regulations and IPCL are the only controls over the expansion of the industry. Most applications for pig installations are granted by local authorities, but there are clear problems posed by large volumes of slurry that must be disposed in areas already suffering from over-fertilised soils. The problems in Cavan and Monaghan respectively are illustrated in the case study (see Chapter 5.3), and provide an example of the impacts of deregulation. There is evidence from Ireland and abroad that deregulation forces smaller, so-called less efficient farmers to quit farming, while those enterprises that survive are specialised as a response to market pressures. The consequences are almost always negative for rural society and the environment.

### **Irish agricultural policies**

The last comprehensive review of Irish agricultural policy was produced by the Department of Agriculture in 1990 (Government of Ireland, 1990). It followed EU agricultural policy in recent years, with the Department of Agriculture and Food acting as the agent of the European Commission. As Irish governments have been to support the further integration of the country within the EU, it is not surprising that Irish agricultural policy is, to all intents and purposes, determined by Brussels. The CAP compensatory payments are administered centrally by Brussels and up until now, could not be adjusted to suit national circumstances. Some adjustment to national circumstances in the case of the Accompanying Measures and EU structural funded Schemes. This situation must be changed if an agreement is agreed: there should then be a greater degree of flexibility to adapt EU schemes to the Irish situation (see Chapter 9).

It is fair to say that agri-environmental initiatives applied in Ireland have come almost exclusively from Brussels. If the REPS was optional for Ireland and had been provided, it is highly unlikely that the scheme would have been put in place, at least on the present scale. Similarly, in terms of environmental policy, Ireland belatedly introduced the Natural Habitats Regulations, 1997 only because it was legally required to do so as part of its commitment to implement the EU Directive. It is true for the implementation of most other environmental legislation. Meanwhile, the Government has delayed enacting the amendments to the REPS. This could be attributed to the lack of pressure both from the Irish public and from Brussels, since it is a national matter and not subject to EU control. The Government could have taken action to curb overgrazing in commonages by introducing national measures instead of waiting at least eight years until EU funding became available.

We perceive several obstacles to progress in policy making for the harmonisation of agriculture with Ireland's heritage:

- I.** The government has not yet constructed a proper vision for the future of the countryside. The Sustainable Development Strategy (Government of Ireland, 1997) does not articulate a clear vision, but rather an uninspiring list of actions which are already taking place or about to be put in place. The current agricultural policy lacks coherence and lacks a feeling of commitment towards achieving a sustainable and an unpolluted countryside which is rich in wildlife.
- II.** It appears that there are no environmental specialists employed by the Department of Agriculture in Teagasc. We do not know if it is a policy to employ solely agricultural graduates with no environmental background in the agriculture sector. There may still be a body of opinion that believes environmentalists know nothing about farming. In any case, this de facto closed shop situation makes it difficult to reconcile agricultural objectives with environmental objectives. It also makes it difficult in terms of training and technical advice for farmers, and especially since the REPS has been introduced. We conclude that there is a need to employ people with environmental qualifications or backgrounds in the Department of Agriculture and in Teagasc. Such people should be working alongside agriculturalists in the formulation and administration of schemes and in training and technical advice.



### 8.3. Evaluation of Environmental Policies Relating to Agriculture

How much influence does environmental legislation have on the way that agricultural land is managed? Until the introduction of the Natural Habitats Regulations, environmental legislation had very little influence over the management of the rural environment. Since 1997, farmers in areas identified as Special Areas of Conservation (SACs) must manage their land in a way that conserves its biodiversity. Farmers are offered the option of joining the REPS and receiving a special top-up payment, or, if they can prove economic loss arising from restrictions on their business, they can avail of a special compensation scheme administered by the Department of Agriculture, Food and the Marine in the Gaeltacht and the Islands. The introduction of the cross-compliance measure for degraded commonages in 1998 (see Chapter 5.1) was still in force when the regulations were introduced. SACs are being damaged or threatened by overgrazing. Management plans for SACs are being formulated by Dúchas. The total area covered by SACs is 1.5 million hectares, of which a proportion is owned and managed by farmers. For the first time, farmers within SACs have had legal restrictions imposed on them. It is concluded that the introduction of the Natural Habitats Regulations has had a considerable impact on the farming community in these areas. It can be seen how this implementation of this legislation on the ground will affect habitats.

The loss of landrace varieties of cereal crops as well as the serious decline in Ireland's arable weed flora which appear to be a result of the introduction of rotational cropping have been noted in Chapter 4.2. No particular support scheme can be held responsible for the abandonment of traditional varieties. This development is part of the general trend towards intensification and specialisation. Two factors would seem to curtail the maintenance or re-introduction of these varieties.

I. Despite the fact that the Agri-Environmental Regulation (2078/92) makes provisions for a maximum of 250 ECU per hectare 'for the cultivation and propagation of useful plants and varieties under conditions and threatened by genetic erosion' this measure has not been incorporated in Ireland. There are, i.e. no specific payments for the cultivation of threatened native crop varieties or landrace varieties in REPS (see Chapter 4.2.4).

II. Only land that has been tilled other than for re-seeding into grass during the period from 1 January 1990 to 31 December 1991 is eligible for Arable Area Payments and the minimum area per eligible hectare is 0.5 hectares.

The Nitrates Directive has so far not had a significant impact on intensive farmers. However, the Code of Practice for Nitrates could result in a maximum of 250 kg/ha of organic nitrogen from receiving additional slurry and manures from pig and poultry enterprises. The implementation of the Directive is being monitored by the European Commission. An outline of the implementation of the Directive to date is given in Appendix V.

Planning legislation has had some effects on the pigs and poultry sector, in which large enterprises require planning permission and Environmental Impact Assessment (EIA). Spokespeople for the pig sector are regularly quoted in the farming press as stating that the establishment of new units is made more difficult by planning legislation. Planning permission and EIA became legal requirements in 1990 (see Chapter 1.3). However, it is rare that planning applications for pig units and slurry management are rarely properly enforced. In many cases where objections and appeals were made, the poor quality of EISs for pig units has conducted a majority of EISs for pig developments, as well as promoting the expansion of the pigs sector. As the case study of intensive pig farming illustrates (see Chapter 5.3), regulation of slurry management is, in practice, seriously inadequate. If local authority and An Bord Pleanála planning legislation could begin to have a significant effect on the expansion of the pigs sector. Since Integrated Pollution Control Licensing (IPCL) was introduced for agricultural enterprises, it is not certain how this will affect these sectors, but this will depend on the EPA's enforcement. We believe that enforcement of IPCL is labour-intensive, time-consuming and difficult to enforce. We conclude that planning legislation has had some impact on the intensive pig and poultry sectors and have curbed its expansion. We also believe that planning legislation is an inexact tool for controlling farm waste management. It is not yet clear how it will have an impact on waste management by pig and poultry enterprises, since the process has begun very recently.

### 8.4. Summary

- I.** The following schemes and payments have had a considerable influence over the management of agricultural land in Ireland: Ewe Premium, Compensatory Headage Allowances, Suckler Cow, Special Beef and Extensification Premiums, Arable Aid Scheme, Rural Environment Protection Scheme and Afforestation and Premium Scheme.
- II.** The above schemes and payments have had the most influence on sheep, beef and arable farming, and much less on large, intensive dairy farms. Pigs and poultry are deregulated and are not subject to any CAP supports.
- III.** All the current compensatory payments have some negative environmental effects. These payments were not designed with

sustainability or biodiversity conservation in mind. The Ewe Premium, accompanied by the Compensatory Headage Allowances, has had the most obvious negative effects. We have indicated that the beef payments and the Arable Aid Scheme have less obvious negative effects.

- IV.** The main reasons that compensatory payments have had negative effects arises from their design at EU level, especially their direct links to production, but also because the Irish authorities did not act sufficiently soon to introduce measures to counteract the influence of the payments.
- V.** The REPS is clearly successful from the viewpoint of farmer participation. The 'whole farm' approach is excellent. The problems arise mainly from the scheme's execution. There is insufficient ecological expertise, the scheme lacks a baseline study from which to make evaluations and the REPS planning process has some serious deficiencies. Evidence from several farmer surveys indicates that environmental awareness of REPS participants is not necessarily greater than that of other farmers. If these deficiencies could be remedied, the scheme has the potential to be a very useful instrument for conservation of biodiversity.
- VI.** The other 'Accompanying Measures' - the Afforestation and Premium Scheme and the Early Retirement from Farming Scheme also have some negative environmental effects. From our observations, farmers are often advised to afforest the least productive areas of the farm, which are often the best areas for wildlife, with fast growing conifers. Land released to forestry on REPS farms under the new dispensation could also be the best areas on the farm for wildlife. Our opinion is that many habitats of local value are being lost because of the targeting of afforestation on marginal areas.
- VII.** By its nature, the Early Retirement from Farming Scheme is a 'farm improvement scheme', with inadequate environmental conditions. The scheme might be contributing to removal of wildlife habitats because there are no incentives built into the scheme to counteract this tendency.
- VIII.** The Control of Farmyard Pollution Scheme falls at the last hurdle because it was a 'stand alone' measure, not sufficiently linked with whole farm management. Intensification could continue once a farmyard was upgraded, contributing to additional waste disposal problems. It is particularly important to rectify these deficiencies if and when the Government decides to re-introduce the scheme.
- IX.** The intensive dairy, pigs and poultry sectors are not 'payment driven', unlike the beef, arable and sheep sectors. Larger, more intensive dairy farmers tend to respond to prices and quotas, while the pigs and poultry sectors are de-regulated. The concentration and intensification of these industries as a response to market forces and EU milk policy gives an indication of the direction in which other farm sectors could take unless definite policy measures are introduced to counteract

this tendency.

- X.** The implementation of the EU Habitats Directive has had a very significant effect on small and medium farmers within SACs. The Habitats Directive has been the main stimulus to address the problem of overgrazing in SACs, which was exacerbated by agricultural payments. Planning legislation and IPCL have some effects on the development of new intensive farming units, but in their current form are not sufficiently influential to curb expansion in areas suffering from eutrophication.

## References

DoA (Department of Agriculture) 1997. *Annual Report, 1997*. Department of Agriculture and Food, Dublin. Web address: <http://www.irlgov.ie>

European Commission (1998) *Agenda 2000: The Future of European Agriculture*. Directorate-General of Agriculture (DG VI), Brussels. Web <http://europa.eu.int/en/comm/dg06/>

Fitzpatrick and Associates, Economic Consultants (1997). *Operational Programme for Agriculture, Rural Development and Forestry (OPARD)*. January 1997. Department of Agriculture and Food, Dublin.

Government of Ireland (1990) *Agriculture and Food Policy Review*. Stationery Office, Dublin.

Government of Ireland (1997). *Sustainable Development: A Strategy for Ireland*. Department of the Environment, Dublin.

McGarrigle, M., Champ, W., Norton, R., Larkin, P., and Moore, M (1993). *The Trophic Status of Lough Conn*. Mayo Co. Council, Castlebar,

## 9. Future Directions for the CAP

The CAP is woven from the threads of around 20 different commodity regimes of varying design and vintage as well as numerous other measures. Many of these are trimmed and retailed on a regular basis, either individually or in small batches. Occasionally, a more significant change in direction is signalled and the ungainly flotilla is hauled onto a new course, often with a few vessels in the lead, while others continue much as before. The MacSharry reforms of 1992 comprised the last such episode, with substantial changes in the cereals and livestock support systems and a new or reinforced role for three 'accompanying measures'.

A further wave of change is expected before the end of the century. After some initial debate and attempts to test the water in the Member States, notably at the Cork Conference in November 1996, the European Commission issued a set of relatively broad proposals in July 1997 in the form of Chapter 3 of Agenda 2000 (CEC, 1997a). This built on the December 1995 Agricultural Strategy Paper and picked up many of the same themes. In March 1998, the Commission published its detailed proposals for CAP reform (European Commission, 1998). The case for further reform, especially in the cereals, beef and dairy sectors, which are the main focus of attention, is founded on:

- I.** The anticipated gap between domestic supply and demand in all three sectors (the likely scale of which is disputed by several Member States) and the difficulty of exporting sufficient quantities without breaking Uruguay Round agreements.
- II.** The benefits to the European economy of being able to export at close to world market price levels, possibly even increasing exports. This implies lower institutional price levels within the EU.
- III.** The anticipated increase in pressure on current policies from trading partners as the next round of trade talks under the World Trade Organisation (WTO) begin in 1999 and the 'peace clause' with the USA expires. There is some tension between those who argue that the EU should undertake some reforms before the negotiations advance too far and others, such as the German government, which would prefer to maintain the status quo and offer changes in the CAP only if this becomes a necessity as talks progress. The duration of the next WTO discussions is not very clear at this stage.

- IV.** The pending enlargement of the EU to include up to 11 new members, primarily in Central and Southern Europe, where agricultural price levels are low, farmers do not receive compensation payments, and the price of applying the CAP in its present form would be high. New Member States could be joining the EU from around 2002/2003 but even then the impact could be cushioned by extended transition arrangements if these proved acceptable and workable.
- V.** The principal proposals in Agenda 2000 apply to the cereals, beef and dairy sectors and to rural development policy in a broad sense, spanning the accompanying measures as well as Objectives 1, 5a and 5b. All the proposals are of relevance to Ireland but the beef and rural development measures are of particular interest because of the significant changes envisaged. Both these proposals are considered below, together with a discussion of the dairy, cereals and sheep regimes. Amendments to the Structural Fund Regulations, due to be agreed in 1998 or 1999, will have implications for Ireland, not least with regard to rural development policy. In considering the implications of Agenda 2000, interactions between changes in the CAP and the Structural Funds should be borne in mind.

### 9.1. The Beef Regime

There is perhaps more consensus about the need to amend the beef regime than any other element of the CAP because of projections that supply will outstrip demand and surpluses will be difficult to dispose of on the world market without conflicts with GATT. The Commission's central proposal is to reduce the intervention price for beef by 30 per cent from its present level of ECU 2,780 per tonne to ECU 1,950 over the period 2000-2002. Compensation will be offered to producers in the form of increased suckler cow premium and special beef premium and new annual dairy cow premium of ECU 70 per annum. There is some pressure from more intensive producers, in Germany and Italy for example, to relax the conditions imposed on them by the 1992 reforms, including the livestock density limits on animals eligible for premia.

Of direct environmental interest is the Commission's proposal to 'reflect on how incentives to extensify production can be strengthened with a view to improving their effectiveness in relation to environmental objectives, without a major change in the global level of support'. The current extensification premium, which is payable on holdings where the number of eligible animals does not exceed the threshold of 1.4 LU/hectare, has not been an effective means of targeting support on the least intensive producers although these are the group most likely to be managing grazing land of high nature value. Research in the UK suggests that around 65 per cent of beef farmers receive extensification premia, ranging from 86 per cent for suckler producers in the LFA to 45 per cent for farmers with semi-intensive systems. Survey work suggests that only a third of applicants have had to make real changes in their system in order to claim the extensification premium (Winter and Gaskell, 1998). Observations by the consultants suggest that this would also be the case in Ireland. The Commission now proposes that the extensification premium be significantly increased, and that qualification for the premium would be made more rigorous. The final proposals are disappointing since it was hoped that the extensification premium might be linked more explicitly to environmental criteria.

The greater emphasis on headage payments and reduced market prices may encourage farmers to finish their stock earlier but to maintain the same number of animals as at present. It would be advantageous if the regime could be amended so as to increase the competitiveness of grass-fed beef animals relative to intensively produced stock but there will be stiff opposition to any such proposals from a powerful group of Member States.

A change in the way that beef payments are made is proposed. Approximately 30% of the budget could be used for area payments rather than headage payments. This increased flexibility could allow Ireland to target farmers in environmentally sensitive zones or in areas with special social problems. Alternatively, an additional premium could be available to certain categories of producer, such as those with small herds, those retaining traditional breeds of livestock, those entering agri-environment schemes, etc. The French government has indicated an interest in increasing its flexibility in this way and has a particular concern to support the income of suckler cow producers in the Less Favoured Areas of France. In this context, it may be appropriate for the Department of Agriculture and Food to consider how it might utilise such an opportunity to redirect a portion of the subsidies in the light of national environmental and social priorities.

### 9.2. The Dairy Regime

The current quota system for milk production is due for review in 2000 and, after a period of deliberation, the European Commission has decided to propose an extension of the current regime to the year 2006. Many Member States, including the Netherlands, now support this proposal and the opponents, such as the UK and Sweden, seem unlikely to succeed in assembling a majority to terminate the quota system earlier. A 10% decrease in dairy support prices will be phased in over the six year period. Compensation is to be in the form of a new annual premium for dairy cows of ECU 145, adjusted to average yield.

Headage payments will not be made according to the actual number of cows on the holding but by reference to standardised cow units

reflecting past average yield. Average or reference yields could be set at a national or more local level. This may work to the advantage of more extensive producers with lower yielding herds and may result in a freer market in milk quota than exists in some Member States.

Under the new regime, dairy cows will be eligible for two premia, with the compensation for lower milk prices being supplemented by a new premium of ECU 70 as part of the compensation arrangements for lower beef prices. The Commission is anxious to avoid any expansion in the overall size of the dairy herd and to limit the incentive for farmers to increase the number of calves born annually. The new headage payments represent a further entrenchment of this form of subsidy but few commentators seem to expect that they will prevent the process of intensification which is taking place throughout Europe. The trend of declining herd size and increasing both average milk yields and the output of farm-produced forage appears set to continue.

In principle, there is an opportunity to introduce environmental conditions or a form of cross-compliance on the new dairy 'headage' premia since these are direct payments, unlike the market price support mechanisms applied currently. At present, Member States are permitted by EU regulations to impose environmental conditions on CAP headage payments for sheep and cattle, provided that they notify the European Commission. It could be argued that a similar arrangement should apply to the new system of headage payments for dairy cows, even if they are not paid in relation to the actual number of animals on the holding. In both legal and political terms, it is easier to consider the introduction of environmental conditions on a new category of payments than on the existing system of quotas. In Sweden, farmers were asked to meet certain conditions concerned with the storage of livestock wastes when milk quotas were reintroduced following Sweden's accession to the EU. However, this is an isolated example and it is unclear whether it is permissible under existing EU legislation.

### **9.3. Cereals, Oilseeds and Protein Crops**

Reform of the cereals and related regimes was the principal component of the 1992 reforms. The Commission will pursue the same approach a step further from the year 2000, arguing that failure to intervene will result in an unacceptable rise in intervention stocks. Rejecting the use of set-aside on a larger scale, the Commission has opted for a single 20 per cent cut in the cereals' intervention price to take place in the year 2000. Compensation would be in the form of a non-crop specific area payment of ECU 66 per tonne, multiplied by the regional cereals' reference yields established under the 1992 reforms. This adjusted form of area payments is likely to be more compatible with the General Agreement on Tariffs and Trade (GATT) agreement than the present system. In contrast to the present arrangement, arable area payments could be reduced if market prices reach a higher level than anticipated. It is hoped that cereal prices can be brought down nearer to world market levels and to those prevailing in Central and Eastern Europe. Obligatory set-aside would be eliminated in most years, although a voluntary form would continue.

If these proposals are agreed, set-aside is likely to disappear on most farms other than in exceptional years. Marginal producers, including some in Ireland, might find voluntary set-aside attractive, however. Area payments will continue to provide farmers with a strong motive to re-claim their overall area of arable land and to inhibit those in grassland areas from moving into crop production. The system therefore reinforces the existing trend towards more specialised production and militates against initiatives to encourage mixed farming for environmental or social reasons.

Many commentators suggest that the current proposals will lead farmers in northern Europe to maximise wheat production at the expense of other arable crops, such as oilseeds. If so, it would be a further step towards the dominance of this crop and the significant degree of reliance on agrochemicals which accompanies monocultures of this kind.

The Commission's proposal will include powers for Member States to attach environmental conditions to area payments, both for arable crops and for set-aside. As in the beef and sheep regimes, these will be voluntary for Member States. Clearly, many will be inhibited from such an initiative through fear of disadvantaging their farmers in a competitive European market. Denmark has been in the lead in pressing for this change in the regulations, not least because a fierce national debate about effective means of reducing nitrate leaching from farmland. It would be appropriate for the Irish authorities to consider introducing a system of this kind within the Republic and, if so, which conditions might be suited for meeting environmental objectives.

The Commission proposes a ceiling on the level of direct payments that can be made to farmers under all the relevant CAP regimes. In effect there are already limits on the number of stock on which farmers can claim direct payments for sheep and cattle, and now cereals have been brought under the same discipline.

### **9.4. The Ewe Premium Scheme**

Agenda 2000 does not include any proposal to amend the sheep and goatmeat regime. It is generally considered that the amendments made in 1992 have succeeded in halting the increase in ewe numbers. In several Member States sheep numbers have declined since a peak in the early 1990s. However, the European Commission has been under pressure to react to relatively specific requests from a group of Member States including Ireland, Finland, Greece, Italy, Portugal and Spain, either for technical amendments to the basic regulation underlying the regime, or for derogations for individual countries. In a recent report, the Commission rejects most of the proposals made by these Member States; it states clearly that it does not foresee the need to make any changes to the existing basic Regulation. Nonetheless, the Commission has the power to negotiate with individual Member States relatively technical arrangements which are permissible within this framework (CE 1997b).

One of two Irish requests to the Commission was for clearance to introduce a positive form of cross-compliance on the ewe premium in the Republic; producers would qualify for a special compensatory payment if they agreed to reduce ewe numbers to comply with environmental stipulations. This request was presented in December 1996 but was rejected by the Commission in its recent report which points out that any

payments may be available to producers who reduce sheep numbers to desirable stocking levels under the REPS. In the Commission's view the amendment to the REPS provides the compensation mechanism sought by the Irish government without the necessity of changing the sheep regime. Payment of ewe premia is now conditional on farmers joining the REPS scheme.

This is a clear signal that the Commission does not want to allow positive cross-compliance within the framework of the sheepmeat regime with the costs falling wholly on EAGGF (European Agriculture Guidance and Guarantee Fund). It increases the pressure on the Irish government to resolve the overstocking issue through the REPS, and other national measures.

### **9.5. Rural Development Policy**

The rural development proposals in Agenda 2000 are still rather vague and require some interpretation. Although there are no entirely new initiatives, a substantial reorganisation in the funding mechanisms for rural development is proposed, especially for areas outside the existing Objective 1. This could be of some significance for Ireland since it is possible that the Republic may face a reduction in the area of land with Objective 1. Significant changes in the Less Favoured Areas policy are also proposed.

In Objective 1 regions, rural development measures will be organised in a similar way as at present, drawing on funds from the EAGGF Guidance Section, as well as the ERDF and ESF. However, it is clear that the geographical extent of Objective 1 areas will be diminished and there has been much speculation about the likelihood of a contraction in Ireland. If this occurs, it will have implications for other policies as well. Funding for several measures affecting farmland in Ireland, including large scale afforestation, has been provided from EAGGF and other Structural Funds in the past within the frameworks of Objective 1. The flow of resources for such schemes could be expected to be reduced. Furthermore, Objective 1 regions are eligible for a higher rate of reimbursement from EAGGF for certain CAP measures than is available elsewhere. Under Regulation 2078/92, the reimbursement rate is raised from the normal level of 50 per cent to 75 per cent in Objective 1 regions. Loss of Objective 1 status would therefore require the Irish authorities to meet a larger proportion of the cost of the REPS and any other schemes proposed under the Regulation. This could give rise to a cut in the funds available for the scheme and a possible contraction in the number of agreements offered to farmers.

Objective 5b regions is planned to be phased out. While there will be some continued support for poorer rural regions, this will be concentrated onto a smaller area than at present. A new series of Objective 2 areas will include both urban and rural regions with structural economic problems, including declining rural areas selected on stricter economic criteria than now apply to Objective 5b areas. Effectively, the existing Objectives 2 and 5b are being combined and applied more selectively to the areas of greatest need, covering a smaller proportion of the Community's population than the current Structural Fund regions. Whilst there are no Objective 2 or 5b regions in Ireland, because the whole country qualifies as Objective 1, this position could change after the year 2000. Certain rural areas which lose their Objective 1 status might become eligible for the new Objective 2. It should be noted that the EAGGF Guidance Section will continue to be one of the funds available for Objective 2 regions. The Commission has suggested that aid should be directed particularly at economic diversification, including support for small businesses, investment in human resources, training, environmental protection and better links between the countryside and local towns.

Outside the newly defined Objective 1 and Objective 2 regions, significant changes in the funding mechanisms for rural development are proposed. These may have only limited relevance to Ireland, depending on the extent to which the Objective 1 boundaries are redrawn. However, it is worth noting that a new system of regional programmes is proposed, bringing together the three accompanying measures, including the agri-environment Regulation 2078/92, the existing Objective 5a measures, including support for Less Favoured Areas and rural development measures of the kind now supported under Objective 5b. The only EU funding available would be from the EAGGF Guarantee Section. This already supplies the budget for the three accompanying measures, but in future would have to cover Objective 5a and rural development measures as well. It is not clear whether the rural development measures now dependent on resources from the European Regional Development Fund (ERDF) will qualify for aid from EAGGF in future or whether they would cease to apply outside the new Objectives 1 and 2.

Member States will be required to draw up multi-annual programmes for each of the relevant regions showing how funds would be deployed for the full suite of measures. Some of these measures are optional, as at present, whilst others will be compulsory, as Regulation 2078/92 is now. To some extent, Member States may be able to select measures which suit their own local circumstances from this menu of EU options, giving most weight to those which match local priorities. One important issue concerns the level of co-finance available from EAGGF for different measures. There has been discussion of different means of altering the level of EAGGF participation in line with cohesion principles, with support for some measures outside Objectives 1 and 2 falling well below 50%, for example. This is likely to influence the scale of any rural development programmes put forward by regions excluded from Objectives 1 and 2.

### **9.6. Less Favoured Areas and Agri-Environment Policy**

Agenda 2000 lays some stress on the importance of the environment and the role of farmers in maintaining the countryside. Over the last year or so, the European Commission has been inclined to stress the necessity of maintaining subsidies for agriculture in order to manage the rural environment without being very clear about the precise role of individual policies. However, Agenda 2000 does propose that agri-environmental instruments will be given a prominent role in supporting sustainable development in rural areas and meeting society's environmental demands and concludes that measures for maintaining and enhancing environmental quality should be reinforced and extended. The significant elements from the viewpoint of this study are as follows:

#### **Area payments to replace headage payments in Disadvantaged Areas**

Headage payments will be abolished and compensatory allowances will be made on a per hectare basis. This is likely to prove politically

controversial in Ireland, since the old system of headage has been in operation since 1975, and there are fears that farmers may lose out on the new system. The justification for the switch from headage to area supports is based on need to reduce environmental damage, e.g. from overgrazing.

### **Environmental conditionality in Disadvantaged Areas**

The new compensatory allowances will be made conditional on the need to safeguard the environment and preserve the countryside, in particular by sustainable farming. Sustainable farming is to be defined for different areas, and so the Department of Agriculture and Food will be given scope to make such definitions. One model for this approach is the 'prime l'herbe' scheme in France, which obliges farmers to maintain grazing, comply with limits on stocking density and manage certain features of the farm in order to receive a flat rate per hectare payment with minimum bureaucratic procedures.

### **Compensation for adhering to environmental legislation in Disadvantaged Areas**

The new compensatory allowances can take into account the costs to and income foregone by farmers resulting from their obligations under environmental legislation. In Ireland's case, this would be relevant to the possible impacts of restrictions on farming in Special Areas of Conservation and Special Protection Areas (see Chapter 1.3).

### **Differentiation of payments in Disadvantaged Areas**

The allowances will be differentiated to take into account the natural disadvantages of a particular region, its development objectives and its particular environmental problems. It appears that the Commission's intention is to provide a clearer environmental rationale for LFA payments and to distinguish general aid for low intensity systems from more targeted assistance for farms accepting relatively demanding conditions under the agri-environment measures.

### **Stronger agri-environment measures**

The agri-environment measures are to be reinforced and awarded an increased budget. It is likely that the Commission will encourage Member States with below average expenditure on agri-environment schemes to enlarge their programmes and this may be the first priority for the enlarged budget. There is an emphasis on targeted measures which call for an extra effort by farmers to deliver substantive environmental benefits, including the maintenance of semi-natural habitats and conversion to organic farming. There is a clear signal that schemes which make minimal environmental demands on participating farmers may not be appropriate for agri-environment funding in future. Indeed, Member States may be encouraged to transfer some schemes into a form of support for Less Favoured Areas.

### **Continued support for afforestation**

The Commission intends to continue its robust support for afforestation, justifying it on the basis of 'contributing to the diversity of rural areas and providing a sink for carbon dioxide. The proposed forestry measures differ little from the previous forestry regulation (EEC Regulation 2080/92), and there appears to be a lack of appreciation in the Commission of the need to promote environmentally sound afforestation rather than plantations of fast growing exotic species such as Sitka spruce, which dominates the Irish planting programme. Aid for afforestation should not be given to fast growing species cultivated in the short term unless it is adapted to local conditions. However, fast growing species are not defined, and presumably this is left to Member States to interpret. We suggest that the Heritage Council should devote some attention to the new forestry proposals, and particularly how they might be improved environmentally and made more harmonious with agri-environmental objectives.

### **Other measures**

The Commission intends to support some measures which could be regarded as contradictory to the new emphasis on sustainable rural development and environmental protection. 'Land improvement and re-parcelling' are proposed for support, as well as 'preservation of the environment and management of rural areas'. There should be some scope at national level to direct EU support away from potentially environmentally damaging activities and targeting support to environmental protection. This will depend on the imaginative input of policy makers, state bodies such as the Heritage Council and the various non-governmental interest groups (NGOs).

### **Programming**

EU support for rural development measures will be in the form of multi-annual programmes. In drawing up its rural development programme Ireland would have to make a prior appraisal of the economic, environmental and social impacts that the programme is likely to have. This should give the opportunity to further focus support towards environmentally beneficial activities. How this will succeed depends on the commitment of the Government to environmental sustainability and the involvement of Dúchas, the Heritage Council and the relevant NGOs.

## **9.7. Conclusions**

- I. The Agenda 2000 proposals represent a continuation of the 1992

CAP reforms, the central plank being the reductions in price support for the beef, cereals and milk regimes, compensated, at least in the short and medium term, by direct payments. The disjointed measures for rural development, agri-environment and forestry have been brought under one new rural development regulation, to be financed by the Guarantee section of the CAP.

- II.** The environmental elements in the package have been strengthened somewhat, but they fall short of expectations by environmentalists that substantial progress might be made. However, we believe there is scope in the next few years to devise rural development programmes that will include area-based payments conditional on a code of good environmental practice, a stronger and better focused REPS, afforestation composed of native species and managed for the long term as economic and environmental assets, and rural development projects which focus on habitat protection and restoration.
- III.** The Heritage Council has the opportunity to make recommendations on the final agriculture and rural development package arising from the Agenda 2000 proposals. The success of the final package in meeting environmental objectives will depend on the degree of involvement of State bodies and NGOs with conservation interests and the commitment of the Government to meeting its obligations under its strategy for sustainable development (Government of Ireland, 1997) and the forthcoming national biodiversity plan (in preparation).

## References

- Commission of the European Communities (1997a), *Agenda 2000: For a Stronger and Wider Union*, European Commission, Luxembourg
- Commission of the European Communities (1997b), *Report from the Commission to the Council on Sheepmeat: Second Commission Report to the Council on the Functioning of the Ewe Premium*, COM(97)679, European Commission, Brussels
- Commission of the European Communities (1997c), *Report from the Commission on the Application of Council Regulation (EEC) No 2078/92 on Agricultural Production Methods compatible with the requirements of the Protection of the Environment and the Maintenance of the Countryside*, COM(97)620 final, European Commission, Brussels
- European Commission (1998) *Agenda 2000: The Future of European Agriculture*. Directorate-General of Agriculture (DG VI), Brussels. Web address: <http://europa.eu.int/en/comm/dg06/>
- Government of Ireland (1997b) *Sustainable Development: A Strategy for Ireland*. Stationery Office, Dublin.
- Winter, M and Gaskell, P (1998) *From MacSharry to Cork and Beyond: CAP Reform*, Environmental Agriculture, Integrated Rural Development paper for RGS-IBG Annual Conference, Kingston, January 1998

## 10. Recommendations

The scope of this study does not allow the consultants to make recommendations on agriculture policy in general, and thus we have restricted the recommendations to agriculture schemes and payments. The recommendations are grouped as follows:

### 10.1 General Recommendations on Measures to Harmonise Agriculture Schemes and Payments with the Natural Environment

- I.** We suggest that decoupling all CAP compensatory payments partially or wholly from production should become a general principle. However, a move to area-based payments should not be regarded as a panacea.
- II.** The best way of ensuring that payments do not encourage environmental damage is by giving positive incentives to farmers to manage their land in line



with environmental objectives and phasing out incentives that encourage damage.

## 10.2. Sheep Payments

- I.** We support the environmental cross-compliance now required for Ewe Premium and Compensatory Headage in degraded commonages.
- II.** The proposed environmental cross-compliance measures for degraded commonages should be extended to include those unimproved coastal grasslands (sand dune systems and machairs) currently threatened by overgrazing.
- III.** The Irish government should insist on the amendment of the Ewe Premium so as to provide for compensation to farmers for de-stocking in degraded areas. Ultimately, it makes no sense to have two competing schemes: the Ewe Premium, which is linked to production, and the REPS, designed to counteract another CAP scheme.

## 10.3. Beef Payments

Member States should have more flexibility to relate beef payments (Special Beef Premium, Suckler Cow Premium and Extensification Premium) to environmental objectives if the Agenda 2000 proposals are agreed. If this is the case, then the rules governing the calculation of forage area need to be tightened, and area payments could be focused on low intensity farming systems such as the Burren, Shannon callows and coastal grasslands.

## 10.4. Arable Payments

- I.** Environmental standards should be introduced for tillage farmers through the introduction of a mandatory code of good environmental practice. This form of cross-compliance, in return for cereal aid payments, could apply to retention of existing hedgerows and habitat areas, nutrient management plans and management of set-aside areas for the benefit of wildlife.
- II.** Existing unimproved grassland and other areas of conservation value should be excluded from eligibility for cereal aid payments.
- III.** Our proposed new Farm Habitat Management Scheme could reward non-REPS arable farmers for environmental work which costs the farmers money (see Section 10.8). This scheme would offer linear and area payments for limiting pesticide and fertiliser use, hedgerow and habitat management and creation and the creation of buffer zones or wildlife corridors adjacent to hedges, habitats and watercourses.
- IV.** The Department of Agriculture and Food should fund research into methods of implementing these recommendations by establishing pilot schemes, and tapping into the large amount of research which has already been undertaken in the United Kingdom and other European countries.

## 10.5. Rural Environment Protection Scheme (REPS)

We believe that the REPS has the potential to be a very positive influence on the management of Ireland's heritage. For this reason, we would like to see its obvious strengths retained and its weaknesses rectified.

- I.** REPS planners should be required to identify the habitat value of all areas on the farm. For example, in the ESAs in Northern Ireland, grasslands are classified according to the cover of perennial rye grass in the fields and each grassland type is marked on the map. If planners had to account for the wildlife value of each area, then the current weaknesses in habitat identification could be rectified.
- II.** REPS planners should be required to mark all habitats on a field-by-field basis on the farm map. The current status of the habitat should be described along with the appropriate management practices. This should be entered on a computerised database, as in Northern Ireland.
- III.** Nominated environmentalists should have a greater involvement in the REPS planning process.
- IV.** REPS plans should have a larger section for habitat management.
- V.** Ecological experts should be employed by the Department of Agriculture and Food to monitor the environmental quality of REPS planning and offer advice to REPS planners.
- VI.** Ecological monitoring of a representative number of REPS farms should be undertaken to assess the effectiveness of the scheme. There should be regular evaluation to ensure that any weaknesses are identified and addressed. This is particularly important for the new REPS. A suggested approach is outlined in Chapter 6.3, which should give the Department of Agriculture and Food a good basis from which to prepare its monitoring and evaluation methods.
- VII.** The new round of REPS must begin with a baseline study of each farm, on a field-by-field basis, to be undertaken when each farm first enters the scheme. This will enable an assessment of the progress made in environmental management through the course of the scheme.
- VIII.** The provisions made in the Agri-Environmental Regulation (2078/92) for the support of 'the cultivation and propagation of useful plants adapted to local conditions and threatened by genetic erosion' should be incorporated into the next round of REPS in order to encourage cultivation of threatened native crop varieties or landraces.
- IX.** We recommend that the new REPS places greater emphasis on environmental enhancement, in order to increase biodiversity, and not just maintenance of existing habitats and features. The creation of new habitats should also be provided for in each REPS plan.
- X.** The focus of the new REPS on less intensive, small and medium farmers should remain. We believe that the new REPS would be undermined if the entry conditions were relaxed for more

intensive farmers.

- XI.** We support the role of REPS as an income supplement, but it should be primarily an agri-environmental scheme, with environmental objectives first and foremost.

#### **10.6. Early Retirement from Farming Scheme**

In its current form, the Early Retirement from Farming Scheme (ERS) could provide an incentive for habitat removal. There should be an incentive built into the ERS for environmental enhancement, in order to counter this possibility, which should benefit the transferee.

#### **10.7. Afforestation and Premium Scheme**

- I.** Habitat surveys undertaken by qualified ecologists should be a requirement for land released from a REPS plan to forestry under the Afforestation and Premium Scheme.
- II.** We refer the Heritage Council to its recent report on the impact of current forestry policy on aspects of Ireland's heritage for further recommendations on the Afforestation and Premium Scheme.

#### **10.8. A Proposed New Farm Habitat Management Scheme**

We note that less than 10% of Ireland has been identified as Natural Heritage Areas (NHAs) and their sub-sets, e.g. Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). In the remaining 90% of the country, there are many habitats of local interest which could benefit from positive environmental management or restoration by farmers. Approximately 40,000 farmers could eventually qualify for REPS, but two-thirds of Irish farms would therefore be without agri-environmental incentives. Our view is that area payments for the whole farm on intensive farms are not justified, in line with the 'polluter-pays-principle'. However, if the farmer is asked to carry out work which costs him/her money, then a financial incentive is justified.

- I.** We recommend that a new scheme, similar to the Countryside Stewardship Scheme operating in Britain, should be introduced to provide an incentive for habitat management on those farms which are unsuited to participation in the REPS, or where farmers do not wish to join the REPS. These could include those more intensive farms which nevertheless may retain habitats of interest or which have scope for habitat creation and restoration.
- II.** The new scheme should provide incentives not just for maintenance but also for restoration, and creation of new habitats.
- III.** A habitat survey of each county would be needed to identify habitats which could benefit from the scheme. In any case, such a survey is likely to be necessary in order to implement the National Biodiversity Plan (in preparation as of May 1998).
- IV.** The habitat survey should include areas which are not currently designated as NHAs or SACs in order to avoid duplication with areas already surveyed. Such a survey is likely to take a number of years, and could be undertaken on a phased basis. When each farm applies to join the scheme, a habitat survey should be carried out, and only those farms with the most to offer in terms of habitats and potential for habitat restoration and creation. This would enable the scheme to commence without having to wait until the entire survey had been completed.

- V.** The habitat survey would provide baseline ecological data through which the scheme could be monitored. Nutrient Management Planning (NMP) and adherence to a Code of Good Agricultural Practice on the whole farm would be required.
- VI.** Environmental experts must play a central role in the operation of such a scheme to ensure appropriate environmental management is followed.
- VII.** The scheme could be part-funded by the EU Structural Funds and national funds, in the same way as the Control of Farmyard Pollution Scheme and the Farm Improvement Programme.

### 10.9. Measures to Reduce Water Pollution From Agriculture

The contribution of agriculture to the deterioration of water quality appears not to have not decreased, despite the considerable capital investment in farmyards, efforts of the Regional Fisheries Boards and local authorities to enforce water pollution legislation, and the codes of practice for management of farm wastes. The problem is particularly acute in Cavan and Monaghan where there is a high concentration of intensive agricultural units, but large dairy enterprises also contribute in other counties. CAP payments do not appear to be a significant influence on the development of these intensive sectors, which depend more on price supports or are de-regulated.

- I.** Nutrient Management Planning (NMP) should be a requirement for all farms. At present, NMP is only required in the REPS. Since REPS farms are by definition less intensive, there is no reason why NMP should not also apply to intensive farms which are likely to have a higher risk of pollution. Properly applied, NMP is not onerous on farmers, and can assist in saving on input costs.
- II.** The Department of Environment and Local Government should issue planning guidelines for intensive agricultural enterprises. At present, we are of the opinion that planning applications and EISs do not receive proper scrutiny in the matter of slurry disposal on a catchment basis.
- III.** The Government target for expansion of the pig industry appears to be unsustainable. Pig numbers should be capped, and preferably reduced, in catchments already suffering from eutrophication. A similar approach should be made for the mushroom and poultry sector in affected water catchments.
- IV.** Expansion of intensive agricultural enterprises (pigs, poultry and mushrooms) must be restricted in sensitive areas and confined only to areas where the threat of nutrient enrichment of waters can be avoided. In terms of safeguarding and improving water quality, we do not believe that there is any further room for expansion of these sectors in Ireland without centralised waste processing, better physical planning by local authorities, EPA enforcement of IPCL, and mandatory nutrient management planning.
- V.** A centralised waste processing facility, which was already proposed for Monaghan (see Chapter 5.3), should now be put in place in Cavan and Monaghan to avoid further environmental damage.
- VI.** Pollution risk assessments should be carried out for all intensive

farms, including the larger dairy farms, as in Northern Ireland. The brief should be prepared not only by the Department of Agriculture and Food, but also by the EPA and the Fisheries Boards.

**VII.** A catchment management planning approach, such as in Lough Ree and Lough Derg, should become accepted practice throughout the country. This is the only practical way of balancing all of the pressures on water resources in each catchment, and may well become mandatory under the proposed EU Water Framework Directive.

**VIII.** If the Control of Farmyard Pollution Scheme is to be re-introduced, it must be strongly linked with Nutrient Management Planning and whole farm management. There must be some means of curbing further increases in stocking after capital works are completed, unless the farmyard facilities are again upgraded to match extra livestock numbers.

#### **10.10. The Burren**

- I.** Co-operation between government departments as well as an open information policy are of utmost importance in ensuring the success of agri-environmental schemes in the Burren.
- II.** A menu-type approach to the supplementary measures of the REPS may ensure a wider range of objectives to be achieved.
- III.** In order to achieve the set environmental objectives, particularly with regard to habitat protection both inside and outside Natural Heritage Areas, the co-operation of agriculturalists and environmentalists in the drawing up of agri-environmental plans should be enforced.
- IV.** The decoupling of compensatory payments from production could have a positive influence on the environmental quality in the region.

#### **10.11. Erne Catchment Nutrient Management Scheme**

The Department of Agriculture and Food should follow the strategy undertaken by the DANI in Northern Ireland: Farms in sensitive catchments should be subject to comprehensive pollution risk assessments. This would address the problems of point source pollution. Farmers could be required to undertake Nutrient Management Planning in sensitive catchments as part of a strategy to improve water quality.

#### **10.12. Corncrake Conservation Scheme**

This scheme is expected to be replaced by the REPS due to the obvious overlap between the two schemes. However, we recommend that Corncrake Conservation Scheme should continue until such time as there is confidence among conservationists that the REPS includes a measure which is as sufficiently well-focused to achieve the same results. Otherwise, we have doubt that the already critically low numbers of this endangered species will be maintained.

#### **10.13. Proposed Changes Under Agenda 2000**

The new framework for EU agriculture and rural development policy - Agenda 2000 - has been proposed by the European Commission in March 1988. The proposals are on the table for negotiation by the Council of Ministers, and the final package could be agreed by the middle of 1990. The Heritage Council has the opportunity to make recommendations to the government on how the new package may be shaped to benefit the natural environment. We have highlighted a number of issues that the Heritage Council might wish to pursue.

- I.** Environmental conditionality should be built in to all the agriculture and rural development schemes and payments proposed in Agenda 2000. This could take the form of a basic code of good environmental practice, involving protection of wildlife habitats, nutrient management and protection of heritage features. If farmers are required to meet more demanding environmental requirements, these can be addressed by the REPS, the SAC scheme and/or our proposed Farm Habitat Management Scheme. We recommend that all state and voluntary bodies with environmental responsibilities should be invited to make submissions to the Minister for Agriculture and Food regarding the Irish government's negotiating position on Agenda 2000.
  
- II.** There should be scope for the government to direct the new rural development package proposed in Agenda 2000 towards environmentally beneficial plans and projects. Submissions should be sought from state and voluntary bodies on plans and projects which can help to conserve biodiversity, advance sustainable agriculture (including organic farming) and sustain rural incomes and lifestyles

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## Appendix 1

### Concentration in Irish Agricultural Production in 1993

All farms	Cereal	General Cropping	Horti-culture	Fruit	Dairy	Cattle rearing + fattening	Cattle dairy	Sheep	Sheep + Cattle	Goats	Mixed livestock (grazing)	Pigs	Poultry	Mixed cropping	Mixed livestock mainly grazing
100.0	13	15	0.3	0.1	34.5	43.3	3.3	9.6	7.7	0.1	5.0	0.2	0.2	0.1	0.1
100.0	2.1	4.1	0.2	0.1	50.2	16.8	4.8		15.0			1.2		0.2	0.2
100.0	1.2	1.9	0.4	0.1	32.0	35.5	3.9		20.1			0.7		0.2	0.1
100.0	2.5	3.0	0.1	0.0	31.1	31.7	4.2		22.2			0.2		0.1	0.1
100.0	11.3	13.3	0.2	0.1	22.2	19.1	4.1		15.3			0.2		0.3	0.3
100.0	27.0	21.4	0.1	0.1	9.9	4.0	3.8		8.6			0.1		0.5	0.6
100.0	0.0	0.0		64.3	7.1	0.0	0.0		0.0					14.3	7.1
100.0	0.2	0.6	0.0	0.0	45.4	31.7	5.4		11.1			0.1		0.0	0.1
100.0	0.0	0.1			91.7	0.0	5.3		1.5			0.0		0.1	0.1
100.0	0.3	0.9	0.0	0.0	6.0	7.9	3.1		74.8			0.1		0.1	0.2
100.0	0.0	0.6	0.6		13.1	25.0	6.0		52.4			0.0		0.0	0.6
100.0	0.5	0.6	0.0		4.7	0.8	2.5		2.6			67.5		1.6	1.6
100.0	0.5	0.7			23.8	7.2	6.0		2.5			33.9		0.2	1.9
Agriculture Survey 1993															

## Appendix II - The Distributional Pattern of Direct Payments to Farm Households

This document contains large tables and images which may take several minutes to load

### Introduction

To date, the distributional impact of direct payments to farm households has not been adequately explored. The aim is to see if the distributional impact is progressive or otherwise. A subsidy scheme is said to be progressive if it leaves low-income households better off than high-income households as a result. There are several ways of measuring this. One way is to express the subsidy as a share of income, a progressive subsidy is then one which contributes a higher share to low-income households than to households with higher incomes. Another measure of the distributional impact is the comparison of the absolute level of subsidy going to a low-income household with that going to a high-income household. A third measure is simply the calculation of where most of the funds disbursed go, giving the split between those going to upper and lower income groups. In this assessment of the distributional impact of direct payments, we will be using all these measures.

Only partial studies have been undertaken to date. Expressed as a share of income, some components of the direct payments (the Sheep and Cattle Headage Payments, i.e. the Compensatory Allowances) were found to be broadly progressive but in a rather arbitrary manner. This was measured in relation only to "Family Farm Income" of farm households, that is, in relation to the income that was derived merely from the farm. As the data stood, this was the only analysis possible. However, on almost two thirds of farms, the farm holder and/or spouse has some off-farm income derived from another source and, on over a third of farms, the holder and/or spouse has an off-farm job (Teagasc, 1995). Therefore farm income is exceeded by total income, to a considerable degree in some cases, and it is in relation to this total income that progressiveness of direct payments should be judged.

This study aims to rectify the shortcomings of previous analyses by investigating the distribution of direct payments relative to total income of farm households. The following section outlines some of the main items of total income. Next, the distribution of direct payments to different income groups (or deciles, defined below) is presented, both in value terms and as shares of income. A further breakdown by farm type follows, after which a yardstick is used for judging the distributional pattern of direct payments. Finally some conclusions are drawn.

All figures in this chapter relating to money flows are expressed per household per week, unless otherwise stated.

### The Total Income of Farm Households

A summary of the elements making up total income of farm households is given in Table 1. The data were compiled by the Central Statistics Office (CSO) and Teagasc - the CSO having selected from its Household Budget Survey the sample that Teagasc uses in its National Farm Survey. However, only in the latter survey is detailed information on receipts of direct payments sought so that the results of the two surveys had to be merged.

**Table 1: Summary of Rural Farm Household Income, in £ per week per household and in percentages of Disposable Income**



CSO Item No.	Average weekly household income	£	% of disposable income
	<b>Earned income:</b>		
57	Employees - Wages/Salaries	100.37	31.36
58	Self Employed - Non Farm	10.12	3.16
59	Self Employed - Farming: Family Farm Income	183.32	57.27
59a	<b>Of which: Total Direct Payments</b>	<b>88.43</b>	<b>27.63</b>
59b	Of which: Set aside	1.97	0.62
59c	Crop compensation	8.32	2.60
59d	Suckler cow premium	11.59	3.62
59e	10 month beef premium	7.95	2.48
59f	22 month beef premium	9.67	3.02
59g	Slaughtering premium	2	0.62
59h	Extensification	6.54	2.04
59i	Cattle headage	15.35	4.80
59j	Ewe premium	19.14	5.98
59k	Sheep headage	3.3	1.03
	Residual direct payments	2.6	0.81
60	Retirement pensions	4.05	1.27
61	Investment income	2.16	0.67
62	Property income	5	1.56
63	Own produce (valued at retail pr)	7.8	2.44
64	Other direct income	2.81	0.88
<b>A</b>	<b>Total Direct Income</b>	<b>315.63</b>	<b>98.61</b>
<b>B</b>	<b>Total State transfers (OAP etc)</b>	<b>41.72</b>	<b>13.03</b>
<b>A + B</b>	<b>Gross Income</b>	<b>357.35</b>	<b>111.65</b>
<b>C</b>	<b>Total direct Taxation</b>	<b>37.27</b>	<b>11.64</b>
<b>A + B + C</b>	<b>Disposable Income</b>	<b>320.07</b>	<b>100.00</b>
	Number in sample (adjusted)	736	
	Number of persons per household	3.63	

Having seen that total income is the item of interest, there is in fact a choice of two measures of total income, one being Gross Income, the other being Disposable Income (which is Gross Income less direct taxes). While Disposable Income is the most relevant measure, Gross Income is perhaps the more reliable one. Table 1 shows the components of these measures of income, in £ per week. The right hand column expresses items as percentages of Disposable Income, which is shown at the bottom of the table. Some 34 per cent of disposable income is earned from non-farm sources, as wages/salaries in off-farm jobs or as self employed non-farm income (item nos. 57 and 58). Earned income from Self-Employed - Farming (item no. 59, Family Farm Income) accounts for 57 per cent of disposable income. Retirement pensions (non-State), investment, property and other direct income, and own produce valued at retail prices account for 7 per cent. The addition of Total State Transfers (B) gives Gross Income. Finally, subtraction of Total Direct Taxation (C) gives Disposable Income. Given that Gross Income is nearly twice Family Farm Income and Disposable Income exceeds it by three quarters, the shortcomings of analysing direct payments merely in relation to Family Farm Income are evident.

Direct payments can be broadly grouped into two categories. First there are those that aim to maintain viable incomes, thereby preventing further depopulation and conserving the countryside. They can be classed as mainly distributional measures. These are Cattle Headage, Sheep Headage (both of which are Compensatory Headage Allowances: part of the Structural Funds) and the Suckler Cow Premium. To the extent that the Ewe Premium favours disadvantaged areas, by means of the higher limits on eligible numbers, it is somewhat distributional in character also. Secondly, the remainder includes those measures which effectively compensate farmers for a change of policy regime. In particular, Set Aside and Crop Compensation were designed to make up for price reductions. Though this second group is not strictly distributional in design, this chapter judges all the direct payments by distributional standards.

### Value of Direct Payments by Decile of Total Income

In the breakdowns that follow, both measures of total income will generally be used in turn, that is Gross Income and Disposable Income, where they happen to be available. It should be remembered that income of farmers tends to vary from year to year and that these results all refer to the years 1994-5.

Figure 1 gives the value of direct payments per week per farm household, broken down by decile of (a) Gross Income and (b) Disposable Income. It should be borne in mind that the results reported here are based on a survey of 736 households, so that there are in fact 73 or 74 households in each decile.

**Figure 1a: Value of Direct Payments by decile of Gross Income, £ per week per household**

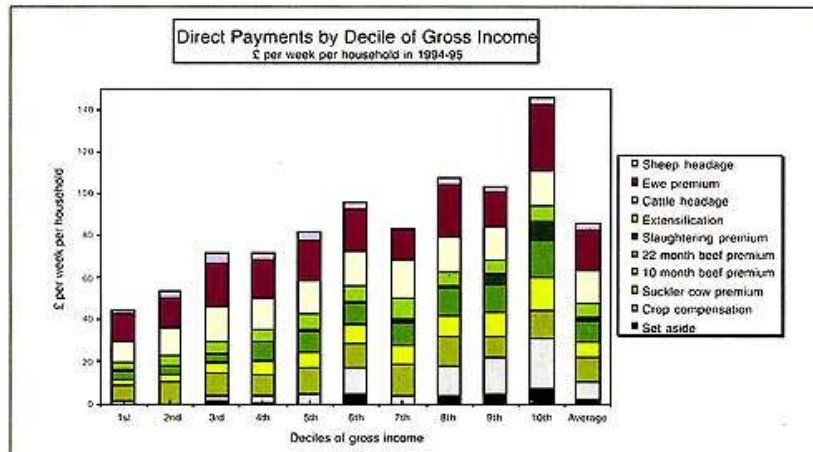
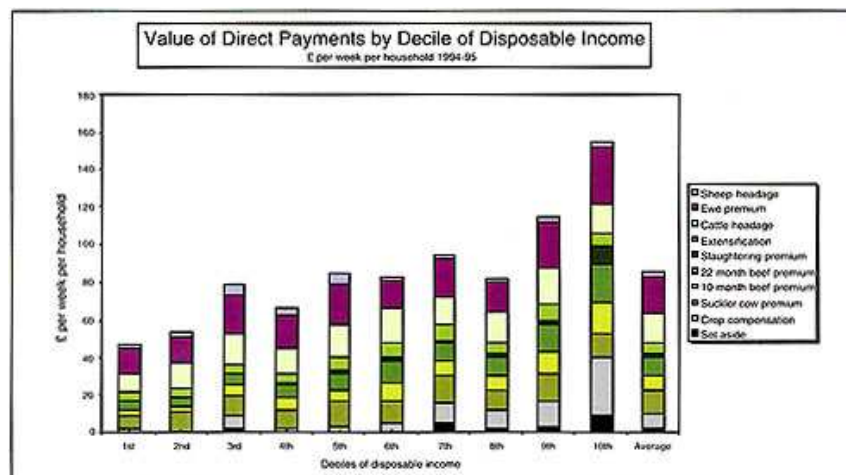


Figure 1b: Value of Direct Payments by decile of Disposable Income, £ per week per household



Despite a few reversals, the pattern shows direct payments per household rising with income, from about £45 per week to households in the lowest decile to £160 in the highest. The large payments to high-income deciles comprise Crop Compensation, and Beef, Slaughtering and Ewe Premium payments. Low-income deciles benefit largely from the Suckler Cow Premium, Cattle Headage and the Ewe Premium.

It is worth noting in Figure 1 (a and b) that the sum of subsidies per household from Cattle Headage, Ewe Premium and Sheep Headage (the three top portions of each vertical bar) and the Suckler Cow Premium combined increases somewhat over the decile range. As already mentioned, these are the measures that are generally viewed as being distributional in character, though the Ewe Premium only to some extent. Each of them increases in value per household with higher incomes, except Sheep Headage, which is one of the smallest components of direct payments.

From the data, the distributional characteristic of direct payments as a whole can be summarised by looking at the five lower and five upper deciles. The total value of receipts of direct payments splits 37/63 per cent respectively, when using Gross Income deciles. The proportions are similar, 38/62 per cent, when using Disposable Income deciles. In other words the low-income half of farm households receive a little over a third of the funds that are disbursed as direct payments, and the upper income half of households receive just under two thirds.

On the basis of the study so far, not only do the total direct payments give significantly more per household to the well off but, Sheep Headage payments apart, even the intentionally distributional schemes do also.

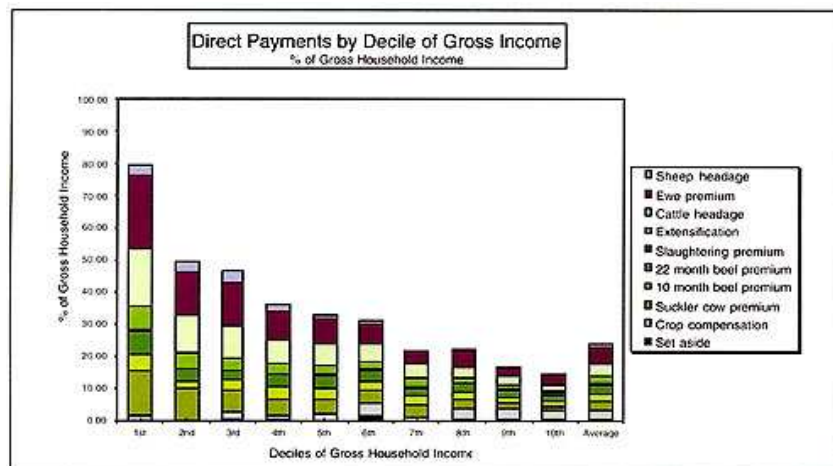
### Direct Payments as percentages of Total Income.

We next view direct payments as percentages of total income, to see whether the percentage declines with higher deciles. Figure 2 shows the percentages, in relation again to (a) Gross Income and (b) Disposable Income. There is indeed a steep decline from the lowest to highest decile, from 80 per cent down to 16 per cent for (a), and from 96 per

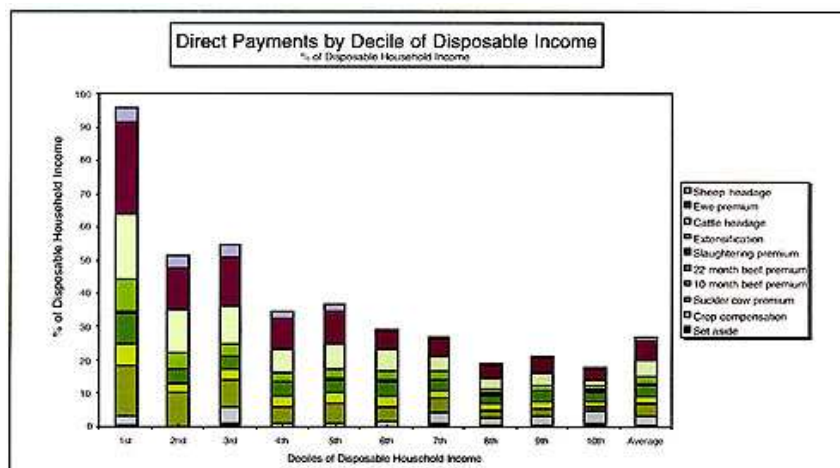
cent down to 18 per cent for (b). This indicates that direct payments are progressive when expressed in relative terms.

That said, the shares are still high at high incomes. Direct payments constitute some 20% of disposable income for households in the top three deciles, for example.

**Figure 2a: Direct Payments as percentages of Gross Income, by decile of Gross Income**



**Figure 2b: Direct Payments as percentages of Disposable Income, by decile of Disposable Income**



However, while the descent to the second decile is very steep, from there on the descent is rather gentle, indeed the fourth through sixth deciles are almost flat and the seventh through tenth are barely less so. The pattern is more erratic in (b), where disposable income is used. This may be due to unreliability of the data, or to the fact that households in the third decile of disposable income, in particular, do indeed receive more payments than the pattern for the remainder would lead one to expect.

Turning again to the four measures that are viewed as having distributional features, that is the Cattle Headage, Ewe Premium (to some extent), Sheep Headage, and Suckler Cow Premium, these are indeed seen in Figure 2 to decline steeply over the decile range. These include the top three segments of the vertical bars (the Suckler Cow Premium is lower down), and indeed they decline much more steeply than the other segments of the bars, which decline rather little.

### Direct Payments as percentages of Disposable Income by Farm Type

It has been possible to derive direct payments as percentages of disposable income by Farm Type. Unfortunately, however, some of the numbers of households of certain farm types in the sample are quite small. In particular, farms involved in Dairying and Field Crops (Farm Type 5) are under-represented with only three farms (seven before adjustment), and Pig and Poultry farms (Farm Type 8) with only four farms. Results for these two categories are therefore not reliable. A further category called "Unclassified", which is separate from "Other" (Farm Type 0), has been

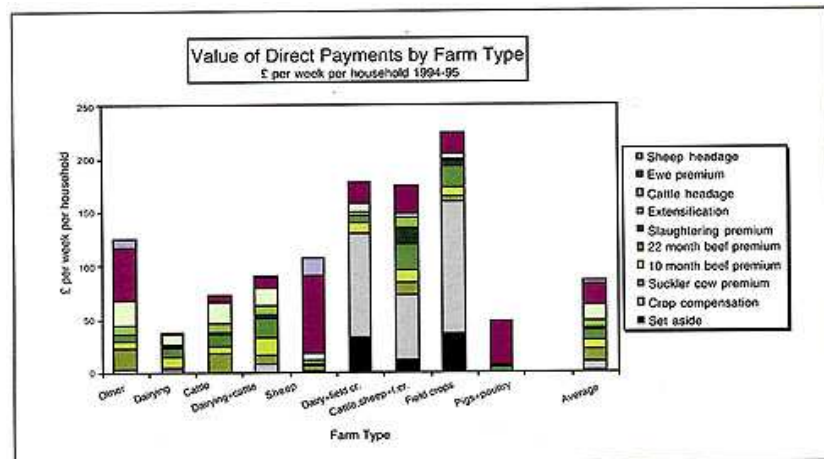
omitted here for lack of numbers. By consequence, the other seven farm types are correspondingly well represented.

Figure 3 shows the value of Direct Payments (a) by Farm Type and (b) as a percentage of Disposable Income by Farm Type. Farms involved in growing Field Crops, that is the categories called:

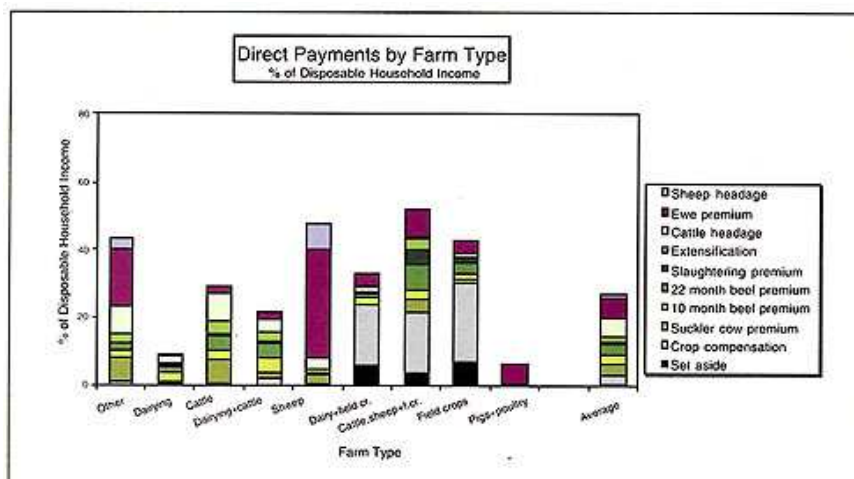
- Dairy and field crops
- Cattle, sheep and field crops
- Field Crops

which received Set-Aside and Crop Compensation, have the highest direct payments

**Figure 3a: Value of Direct Payments by Farm Type, £ per week**



**Figure 3b: Direct Payments as percentages of Disposable Income, by Farm Type**



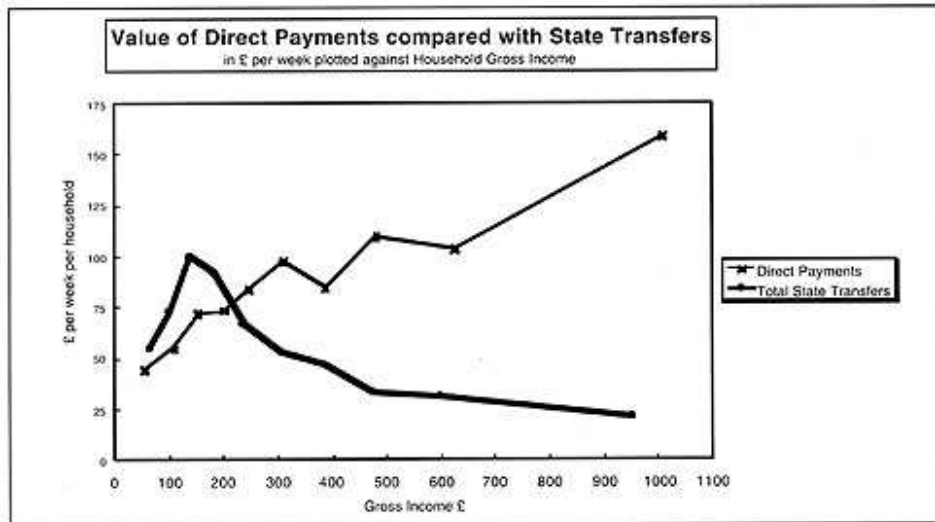
The low direct payments to Dairying illustrate the fact that direct payments are but the visible part of support to farmers. As pointed out elsewhere virtually all support to this sector comes via price-raising mechanisms and not through direct payments.

### The Distributional Pattern of Direct Payments seen in Context

We have seen that direct payments, while declining as percentages of income overall, nevertheless appear to decline steeply after the first decile but then seem to be quite generous towards high-income households. The questions remain: how steep and how generous? If one were assessing them purely in distributional terms, is there a yardstick with which to compare the slopes of the percentage lines in Figure 2?

There is a yardstick, which is arguably the result of a conscious choice made via the democratic process. This yardstick is the pattern of Social Welfare Benefits, voted annually by the Oireachtas. These Benefits are summed under the heading "State Transfers", and are published, broken down by Gross Income, in the Household Budget Survey 1994-95. It is therefore possible for us to compare direct payments per farm household with Transfers per average household in the State by graphing them both against Gross Income. This is shown in Figure 4, (a) in £ per week per household and (b) in percentages of Gross Income.

**Figure 4a: Value of Direct Payments per farm household compared with State Transfers per average household, in £ per week broken down by Gross Income**



**Figure 4b: Direct Payments compared with State Transfers, as % of Gross Income broken down by Gross Income**

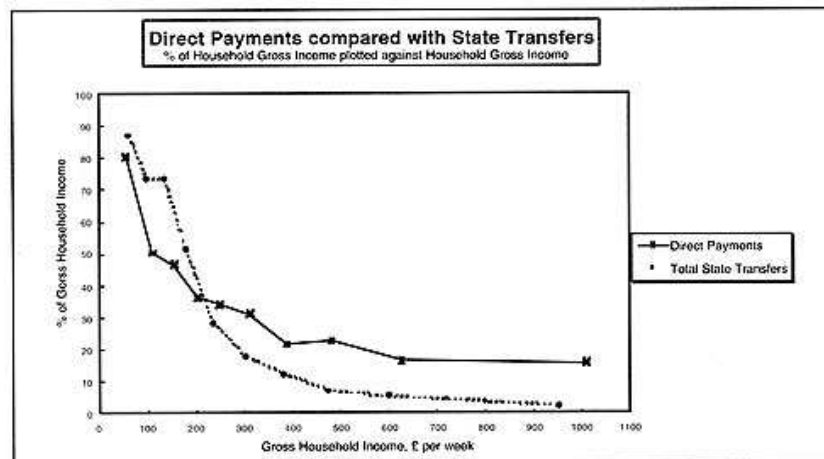


Figure 4a highlights the difference between the two series: the value of direct payments generally rises with Gross Income while State Transfers fall. Incidentally, the low values of State Transfers at the low end of the Gross Income scale (on the left hand side) may reflect the fact that take-up of payments by low-income households is sometimes poor, as well as perhaps the fact that some of these households have low incomes that are temporary. These considerations beset figures on direct payments also. A more important explanation of the low State Transfers at low incomes is the fact that these would tend to be households with few inhabitants, as the figures here are not adjusted for household size.

Figure 4b shows the contribution to Gross Income of direct payments per farm household and State Transfers per average household in the State. There are two major contrasts. Direct payments are much more generous to households on higher incomes. State Transfers, which decline much more steeply, are more supportive of households with low incomes.

In fact farm households receive State Transfers in addition to direct payments. Information on receipts of State

Transfers by farm households broken down by decile of income is not immediately to hand to supplement the data here on direct payments. From information published in the Household Budget Survey, one can say that the average farm household receives £41.72 per week compared with the average for all households in the State which receive £57.54. As Table 1 showed, the average farm household's direct payments and State Transfers added together accounted for about 40 per cent of Disposable Income.

## Summary and Conclusions

To date, analyses of direct payments have only been able to view them in relation to Family Farm Income, which we saw to be but part of the total income of farm households. By co-ordinating data gathered in the National Farm Survey 1995 and the Household Budget Survey 1994-95, direct payments can now be viewed in relation to Gross Income or Disposable Income, as was recommended in the recent report on the EU Structural Funds. The main findings are:

### (i) Taking all direct payments together

- Looking at the value of receipts by income group of direct payments as a whole, it is seen that these payments increase strongly with higher incomes. From the lowest to the highest income group the increase is over threefold, from about £50 to over £150 per household per week.
- Splitting the total number of farm households in half, with lower incomes in the one half and higher incomes in the other half, it is found that the lower half receive 38% of funds disbursed as direct payments, the upper half receiving the remaining 62%.
- It is only when viewed as relative contributions to income that direct payments could be called progressive in distributional terms. Direct payments do indeed constitute a higher share of income of the lower income groups. This share declines steeply from the lowest income decile, where it is 80% of Disposable Income, but the decline slackens so that for the top three deciles the share is still some 20%.

### (ii) Schemes with distributional aims

- Only a few of the schemes, however, were set up with the intention of alleviating low incomes. These are the three measures, Cattle Headage, Sheep Headage and the Suckler Cow Premium and perhaps also, to the extent that the limit on eligibility is higher in disadvantaged areas, the Ewe Premium. These four schemes give about £30 per week per household in the lowest income group, rising to about £60 per week for the highest income group.
- Excluding the Ewe Premium, the three distributional measures (Cattle Headage, Sheep Headage and Suckler Cow Premium) give about £20 per week per household in the lowest income group, rising to some £30 per week in the highest income group. Hence, even these schemes give more to the better off.
- Only Sheep Headage, which is one of the smallest components of direct payments at less than 4 per cent, gives more in value terms per household to the lower half of the income range.
- Taking the three distributional schemes again and looking at their contributions to income expressed in relative terms, they constitute some 40 per cent of income of the lowest income group falling to some 4% of income in the highest income group. Therefore they do indeed aid low-income households considerably more in relative terms. The above-mentioned report on the Structural Funds observed that the Headage payments were broadly progressive when viewed as a proportion of Family Farm Income. We can now state that this is still the case when viewed as a proportion of total income, though as mentioned the actual amount paid per household in higher income groups is higher.

### (iii) Other observations

- Analysis by Farm Type shows that households which gain most from direct payments are those involved in producing Field Crops, through receipt of Set Aside and Crop Compensation. Next, farms in the category "Other" and Sheep farms receive sizeable payments in the form of Ewe Premium (Figure 3, a and b).
- A possible yardstick for measuring the extent to which direct payments can be called distributional is to compare them with "Total State Transfers" which the State votes annually to correct income distribution within society. Compared with this yardstick, direct payments give lower support to low-income households, and higher support to high-income households (Figure 4a). This applies in both value and percentage terms. However, unlike with State Transfers, the actual value of direct payments per household rises with household income while State Transfers, which are partially means-tested, decline with higher incomes.

In sum, the regime of direct payments pays more to those with high incomes. It does not exhibit a good distributional pattern by reference to society's revealed choice of intervention to correct income distribution generally, though this of course is not the objective of many of the components of direct payments. However, even the schemes which are distributional in aim pay more to higher income groups, with the exception of the relatively small Sheep Headage scheme.

Where alleviation of need is the aim, more integration of the farming sector into the Social Welfare system might be

worth considering as an option for policy. Where need is not an issue, the question which is increasingly asked in order to justify continued transfers from the rest of society (in mainland Europe or Ireland) is: what other societal benefits are being obtained in return for taxpayers' outlays? Fair treatment of a section of society which has suffered a change of regime can be a justification, but tying the payments to output is not the only route. The incentive effects of such a route were under-estimated, as frequently happens. Incentive effects, combining taxation of harms and subsidies to societal benefits, will need to be considered in devising the solution.

Central Statistics Office (1997): *Household Budget Survey 1994-95*, Volume 1, Detailed Results for All Households. Stationery Office, Dublin.

Fitzpatrick Associates (1997): *Operational Programme for Agriculture, Rural Development and Forestry 1994-1999*, Mid-Term Review Report. Report to the Community Support Framework Evaluation Unit.

Honohan, P., ed. (1997): *EU Structural Funds in Ireland - A Mid-Term Evaluation of the CSF 1994-99*, ESRI, PRS No. 31, Dublin.

Keeney, M., A. Matthews and J. Frawley (1997). "The Distribution of Direct Payments in Irish Agriculture", paper read to the Economic Policy conference, Dublin Economic Workshop, at Kenmare, October 17-19.

Stationery Office (1994): *Operational Programme for Agriculture, Rural Development and Forestry, 1994-1999*. Dublin.

Teagasc (1996): *National Farm Survey 1995*. R. Power and M. Roche, Dublin.

## Appendix III The Irish Red Data List of vascular plants grouped on a phytosociological basis (see Figure 4.1)

Vegetation Class (by Formation)		Number of Species / Red Data List Status				
		Extinct	Endangered	Vulnerable	Rare	Non rare/Indeterminable
<b>Freshwater and Peatland Vegetation</b>						
(LEM)	<i>Lemetea</i>					
POT	<i>Potamogetonetea</i>			2	4	
LIT	<i>Littorelletea</i>				2	
PHR	<i>Phragmitetea</i>			2	2	
MON	<i>Montio-Cardaminetea</i>		1		7	
PAR	<i>Paracurcetea</i>		1	2	5	2
OXY	<i>Oxycocco-Sphagnetetea</i>	1		1	2	
CHA	<i>Characetea fragilis</i>			1		
<b>Saltwater and Seashore Vegetation</b>						
(ZOS)	<i>Zosteretea marinae</i>					
RUP	<i>Ruppinetea</i>			1		
AST	<i>Asteretea tripolii</i>			1	1	1
CAK	<i>Callitetea maritima</i>				1	
AMM	<i>Amnophiletea</i>	1	1		1	1
HON	<i>Honkenyo-Elmetea arenarii</i>				1	1
<b>Pioneer terrestrial vegetation of disturbed places</b>						
ISO	<i>Isoto-Nanojanetea</i>			2	2	
BID	<i>Bidentetea</i>				1	
CHE	<i>Chenopodietea</i>	1	1	1	1	1
SEC	<i>Secalietea</i>	3	3	1	1	
ART	<i>Artemisietea</i>			2	1	
EPI	<i>Epilobietea angustifolia</i>			1	1	
PLA	<i>Plantaginetea majoris</i>			1	1	
<b>Vegetation of Rocks and Walls</b>						
ASP	<i>Asplenietea rupestris</i>			2	10	1
(VIO)	<i>Violetea calaminariae</i>					2
THL	<i>Thlaspietea rotundifolia</i>			1	1	
<b>Anthropo-zoogenic Grasslands and Heathlands</b>						
NAR	<i>Nardetea</i>			1	2	
CAL	<i>Calluno-Ulicetea</i>			3	3	1
KOE	<i>Koelerio-Corynephoretea</i>			2	10	1
FES	<i>Festuco-Brometea</i>		1	3	3	4
CAR	<i>Carex rupestris-Kobresietea</i>				2	
MOL	<i>Molinietea</i>					
	Mol <i>Molinietalia</i>	1	2	5	6	1
	Arr <i>Arrhenatheretalia</i>		1	1		
<b>Vegetation of Woodland Margins</b>						
TRI	<i>Trifolio-Geranietea</i>			2	1	
<b>Scrub</b>						
FRA	<i>Franguletea</i>				3	
(SAL)	<i>Salicetea purpureae</i>					
RHA	<i>Rhamno-Prunetea</i>				1	
<b>Woodland Vegetation</b>						
ALN	<i>Alnetea glutinosae</i>				1	2
VAC	<i>Vaccinio-Piceetea</i>		1	1	2	
(QUE)	<i>Quercus robur-petreae</i>					
QUF	<i>Quercus-Fagetum</i>			6	2	1

Note: Abbreviations in (...) refer to vegetation types to which no Red Data List vascular plant species have been assigned. These types are not included in Figure 4.1.

Nine plant species could not be assigned to vegetation classes on the basis of the available information. These include *Carex divisa*, *Viola lactea*, *Callitriche truncata*, *Salix phylicifolia*, *Sibthorpia europaea*, *Limonium paradoxum*, *Limonium transwallianum* and *Polygonum viviparum*.

\* The category of "non rare or threatened species" includes species that are presently found in more than 10 10km squares of the national grid or that have not shown a significant decline since 1970. Since these two criteria are used exclusive of each other, the species are either relatively rare or have shown more or less substantial decline since 1970, but are, at present, less susceptible to overall decline than species in other categories.



## Appendix IV - Recent Comparative Research in Europe on Biodiversity on Organic and Conventional

<b>Biodiversity on Organic Farms: Recent Comparative Research in Europe</b>				
<b>The Study</b>	<b>Study Area</b>	<b>Key Findings</b>	<b>Discussion</b>	<b>Reference</b>
<p><b>Butterflies</b> UK study by the Oxford University Wildlife Conservation REsearch Unit and funded by Butterfly Conservation and the SAFE Alliance.</p>	<p>A survey in 1994 of 8 paired farms (organic and conventional) comparing butterfly populations in similar habitats. Study expanded in 1995.</p>	<p>Mean abundance of 23 non-pest butterfly species was 23.1/Km on organic farms compared to 11.8/Km on conventional farms.</p>	<p>Butterflies benefitted on organic farms due to the absence of herbicide to base of hedges, different cropping patterns and better hedgerow management.</p>	<p><b>Warren, Martin</b> (1996); <i>New Study Shows Organic Farms are Better for Butterflies</i> - Press Release; The British Butterfly Conservation Society, Essex UK.</p>
<p><b>Birds</b> UK study carried out by the British Trust for Ornithology (BTO) and funded by the Ministry of Agriculture, Fisheries and Food and WWF-UK</p>	<p>Study of 22 paired farms (organic and conventional) from 1992-1994 of bird densities in the breeding and wintering season, plus a study of skylarks and survey of food sources.</p>	<p>Bird density of all bird species were higher on organic farms during both seasons. Skylark populations were twice as high on organic farms. Invertebrate and plant food sources were also higher.</p>	<p>BTO identified differences on organic farms due to hedgerow structure, cropping patterns and type and increased amount of food sources.</p>	<p><b>Chamberlain, D, Fuller, R and Brooks, D</b> (1996); <i>The Effects of Organic farming on Birds</i>; EFRC Bulletin 21, Jan. 1996; EFRC, Newbury UK</p>
<p><b>Plant Species</b> German study carried out</p>	<p>Weed species diversity was compared</p>	<p>Weed species were twice as high, and</p>	<p>Non-use of herbicide was identified as the main</p>	<p>Friebe, B and U Kopke (1995); <i>Effects of farming</i></p>

<p>by the institute for Organic Agriculture at the University of Bonn.</p>	<p>on arable farm pairs in 1994 and 1995. Comparisons were made from 32 organic and 36 conventional sites.</p>	<p>endangered species were only present on organic farms. Average plant species on permanent pastures were 12.9 (+/- 2.85) on organic farms and only 7.1 (+/- 1.93) on conventional sown pasture.</p>	<p>factor for increased species numbers, along with reduced soil cultivation. Field boundaries were also identified as refuge sites for endangered weed species, as well as birds and arthropods.</p>	<p>systems on biodiversity; in <b>Isart J and Llerena, JJ</b> (eds); Biodiversity and Landuse: The Rols of Organic Farming; Proceedings of the first ENOF Workshop, Bonn.</p>
<p>Soil Biota Swiss study carried out by the REsearch Institute of Organic Agriculture (FiBL). Oberwil.</p>	<p>Comparison, between 1990 and 1995, of microbial and faunal diversity on a long-term field trial comparing biodynamic, organic, two conventional and a control plots.</p>	<p>Microbial biomass and activity and earthworm and carabid species were highest in the biodynamic plots. Density of epigeal aethropods were 93% and 88% higher respectively in the biodynamic and organic plots.</p>		

# Appendix V

## The Implementation of the Nitrates Directive in Ireland

### Outline of the Directive

The objectives of the Nitrates Directive are

- to reduce water pollution caused or induced by nitrates from agricultural sources and
- to prevent further such pollution.

In order to achieve these objectives Member States must identify waters affected by nitrate pollution from agriculture and designate these areas as "Nitrate Vulnerable Zones". The criteria for designation are either a concentration of nitrate above 50 mg/l in fresh surface waters and groundwater, or eutrophication, or a water which may become one of these in the near future, including estuaries, coastal waters and marine waters. The agricultural areas which drain into these waters, and which can be said to contribute to pollution have to be designated as vulnerable zones. The process of the identification of waters, and the designation of vulnerable zones was to be completed by 20.12.1993. A revision was to take place every four years thereafter. In the designated zones Member States must draw up Action Programmes which contain mandatory restrictions on agricultural practices which must prevent further nitrate pollution from occurring, including:

- the stipulation of maximum quantities of amount of livestock manure that can be applied to the land each year, including by the animals themselves, i.e. 210 kg/ha during the first four-year action programme and 170 kg/ha during the second four-year action programme;
- the requirement for the land application of fertilisers to be based on a balance between the requirements of the crops and the supply to the crops from the soil and from fertilisation;
- the requirement for each farm to have sufficient livestock manure storage capacity for the periods when they are not permitted to apply the manure to land.

Most of these mandatory restrictions should have been in place by the end of 1995. Member States are also under the obligation to monitor nitrate concentrations of waters to assess the impacts of the measures taken. Member States have a choice of either designating the whole of their territory under Article 3(5) of the Directive - which will not then be labelled a Vulnerable Zone - or designating Vulnerable Zones based on the results of their monitoring programmes. The requirements for these areas are, however, exactly the same, except with regard to the monitoring of waters. Member States are exempted from the requirement to identify specific vulnerable zones if they establish and apply action programmes throughout their national territory.

Table 1 shows the timetable for the implementation of the Directive, the stipulated completion dates, the measures completed by Ireland and the assessment by the Commission of the conformity of the measures.

**Table 1 Implementation of the requirements of the Nitrates Directive in Ireland**

Requirement	Completion Date stipulated in Directive	Measures taken by Ireland	Conformity of Measures
Transposition into National Law	20.12.1993	Communication 17.7.95	No
Monitoring	20.12.1993		?
Designation of Vulnerable zones	20.12.1993	'No Zones' 17.7.95	under examination
Establishment of Code of Good Agricultural Practice	20.12.1993	Communication 20.9.96	under examination

Establishment of first four year Action Programme	20.12.1993	-	?
Submission of Summary Report to Commission	20.6.1996	Communication 17.7.95	yes
Completion of the Review of Designations	21.12.1997	(in progress)	
Start of the year during which maximum of 210 kg N/ha may be applied	20.12.1998		
Completion of first Action Programme	20.12.1999		
Start of the year during which maximum of 170 kg N/ha may be applied	20.12.2002		
Completion of second Action Programme	21.12.2003		

## Measures taken by Ireland pursuant to the Nitrates Directive

### Transposition into national law

There is no specific law which transposes the Nitrates Directive into national law. The reasoning communicated to the Commission is that there is a sufficient legal base in existing water pollution legislation (Walsh, pers. comm., 1998).

### Monitoring, Identification of Waters and Designation of Vulnerable Zones

The Summary Report submitted to the Commission by Ireland under Article 11 (CEC, 1997a) states the following: "In October 1992 Local Authorities were instructed to monitor waters for the purposes of the Directive. Specific guidance was given on particular aspects of the monitoring. This included an instruction to cease monitoring for the purposes of the Nitrates Directive if evidence came to light in the course of monitoring and investigation that the source of the nitrate was non-agricultural or from an agricultural point source.

Following analysis of the results of this monitoring by local authorities, and other information, such as published reports and geographic information systems for farming intensity, and following consultation with the Environmental Protection Agency, the Department of the Environment concluded that no waters coming within the terms of Article 3.1/Annex I had been identified, and, in the circumstances, the designation of vulnerable zones was not required at the time. Nevertheless there remain areas of concern. For certain rivers such as Aghalona, Munster Blackwater, Lerr, Moyle,

Owenduff and Stoneyford Stream concentrations of nitrate are above 40 mg/l. These rivers have been targeted for careful examination at the next review. For a small number of groundwater sources concentrations of nitrate are above 40 mg/l. However these are considered to be due to what are described as "bad housekeeping practices" such as incorrect sitings of silage or slurry pits and seepage from septic tanks. Although there are eutrophication problems in some Irish lakes these are not considered to be due to nitrogen compounds, rather to increased supply of phosphorus.

For estuarine, coastal and marine waters the assessment relied on the Environmental Research Unit's review covering the period 1987 to 1990. This concluded that for the sixteen tidal waters assessed serious pollution is of very limited occurrence and any problems identified are not caused by sources coming under the remit of the Nitrates Directive. The Irish Authorities acknowledge that there is a need for a more detailed estuarine and coastal waters monitoring programme". Information gathered as part of the implementation of the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) is likely to be used for the purposes of identifying 'Nitrate Vulnerable Zones' in the future (Goodchild, pers. comm. 1998).

The Local Authorities carried out a further monitoring programme for the purposes of the Directive between April 1997 and March 1998. The Department of the Environment is currently in the process of evaluating the monitoring data (Walsh, pers. comm. 1998). On the basis of the results the designation of vulnerable zones and the implementation of action programmes including a mandatory Code of Good Agricultural Practice within these zones may become necessary in certain regions.

### **Code of Good Agricultural Practice**

A Code of Good Practice to Protect Waters from Pollution by Nitrates was published jointly in July 1996 by the Department of Agriculture and Food and the Department of the Environment. The code prescribes methods to prevent or minimise the pollution of waters from nitrates by adopting certain farm waste and nutrient management techniques in the storage of organic wastes, silage, dungstead and farmyard manure and soiled water.

### **Action Programmes**

As no vulnerable zones were designated, there was no obligation under the Directive to draw up action programmes (CEC, 1997a).

### **Conformity of the measures taken**

Transposition into national law

According to the Commission the implementing legislation notified to the Commission is not as specific as required by the Directive (Goodchild, pers. comm., 1998).

### **Monitoring, Identification of Waters and Designation of Vulnerable Zones**

The fact that information submitted by Member States in their Summary Reports is presented in the report by the Commission is "not be taken as a sign that the approach adopted (or not adopted) by a Member State in the implementation of the Directive is approved by the Commission" (CEC, 1997a).

Indeed, questions remain as to the validity of the instruction of the Local Authorities "to cease monitoring for the purposes of the Nitrates Directive if evidence came to light in the course of monitoring and investigation that the source of the nitrate was ... from an agricultural point source" (CEC, 1997a). No provision is made for this approach in the Nitrates Directive.

According to the Commission the 'No Zones' approach taken by Ireland is legitimate (Goodchild, pers. comm. 1998). As Ireland has not designated any vulnerable zones there is no requirement in the Directive for action programmes. However, the Commission stresses that the 50mg/l nitrates level is likely to 'be significantly too high to reduce eutrophication' and is therefore "not considered to be the defined limit in the Directive" (CEC, 1997b). This would appear to indicate that the Commission advises Member States to apply more strictly the precautionary principle on which some of the stipulations in the Nitrates Directive are based.

In March 1997 the Commission decided to send a Reasoned Opinion on the basis of Article 169 of the Treaty of Rome for having national implementing legislation that was not as specific as required by the Directive, for the incorrect monitoring of waters for nitrates, the failure to identify vulnerable zones and the failure to establish action programmes. This decision was publicised but has yet to be executed. Any legal case taken by the Commission requires a detailed technical examination of the situation. The pace of the proceedings depends on the nature of the infringements, the degree of dialogue between the Member State and the Commission and the provision of sufficient information and

evidence by both the Member State and relevant non-governmental organisations.

## References

CEC (1997a): *Report of the Commission to the Council and European Parliament. Measures Taken pursuant to Council Directive 91/676/EEC concerning the Protection of Waters against Pollution caused by Nitrates from Agricultural Sources*. Summary of Reports submitted to the Commission by Member States under Article 11. Brussels.

CEC (1997b): *The Implementation of Council Directive 91/676/EEC concerning the Protection of Waters against Pollution caused by Nitrates from Agricultural Sources*. COM (97) 473 final. Brussels 1.10.1997.

*Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources*. Official journal NO. L 375 , 31/12/1991.

Personal communication:

*Walsh, Tom, Department of the Environment - Water Quality Section*. June 1998

*Goodchild, Robert, European Commission, DG11, Water Protection Section*. June 1998

