Organisation for Economic Co-operation and Development
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ENVIRONMENTAL PERFORMANCE OF AGRICULTURE IN OECD COUNTRIES SINCE 1990:

Ireland Country Section

This country section is an extract from chapter 3 of the OECD publication (2008) ***Environmental Performance of Agriculture in OECD countries since 1990***, which is available at the OECD website indicated below.

This text should be cited as follows: OECD (2008), *Environmental Performance of Agriculture in OECD countries since 1990*, Paris, France

A summary version of this report is published as ***Environmental Performance of Agriculture: At a Glance***, see the OECD website which also contains the agri-environmental indicator time series database at: http://www.oecd.org/tad/env/indicators

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BACKGROUND TO THE COUNTRY SECTIONS

Structure

This chapter provides an analysis of the trends of environmental conditions related to agriculture for each of the 30 OECD member countries since 1990, including an overview of the European Union, and the supporting agri-environmental database can be accessed at *www.oecd.org/tad/env/indicators*. Valuable input for each country section was provided by member countries, in addition to other sources noted below. The country sections are introduced by a figure showing the national agri-environmental and economic profile over the period 2002-04, followed by the text, structured as follows:

- ***Agricultural sector trends and policy context:*** The policy description in this section draws on various OECD policy databases, including the *Inventory of Policy Measures Addressing Environmental Issues in Agriculture* (*www.oecd.org/tad/env*) and the Producer and Consumer Support Estimates (*www.oecd.org/tad.support/pse*).
- ***Environmental performance of agriculture:*** The review of environmental performance draws on the country responses to the OECD agri-environmental questionnaires (unpublished) provided by countries and the OECD agri-environmental database supporting Chapter 1 (see website above).
- ***Overall agri-environmental performance:*** This section gives a summary overview and concluding comments.
- ***Bibliography:*** The OECD Secretariat, with the help of member countries, has made an extensive search of the literature for each country section. While this largely draws on literature available in English and French, in many cases member countries provided translation of relevant literature in other languages.

At the end of each country section a standardised page is provided consisting of three figures. The first figure, which is the same for every country, compares respective national performance against the OECD overall average for the period since 1990. The other two figures focus on specific agri-environmental themes important to each respective country.

Additional information is also provided for each country on the OECD agri-environmental indicator website (see address above) concerning:

- Details of national agri-environmental indicator programmes.
- National databases relevant to agri-environmental indicators.
- Websites relevant to the national agri-environmental indicators (*e.g.* Ministries of Agriculture)
- A translation of the country section into the respective national language, while all 30 countries are available in English and French.

Coverage, caveats and limitations

A number of issues concerning the coverage, caveats and limitations need to be borne in mind when reading the country sections, especially in relation to making comparisons with other countries:

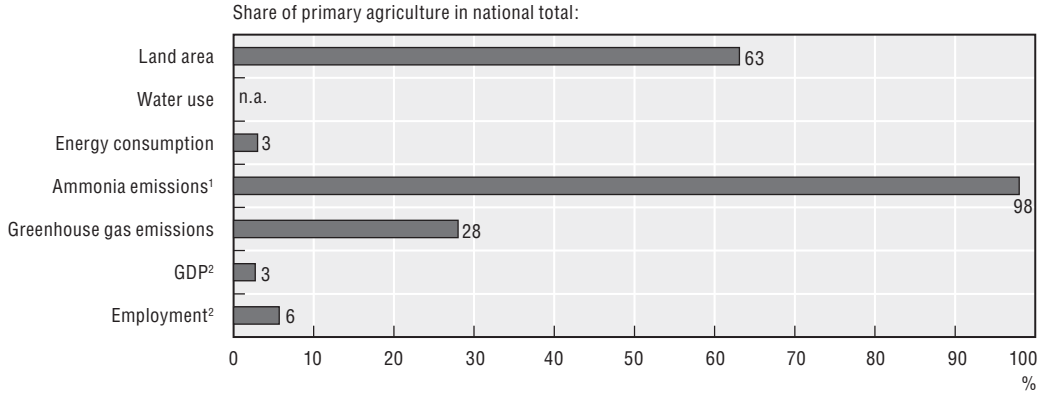
Coverage: The analysis is confined to examination of agri-environmental trends. The influence on these trends of policy and market developments, as well as structural changes in the industry, are outside the scope of these sections. Moreover, the country sections do not examine the impacts of changes in environmental conditions on agriculture (*e.g.* native and non-native wild species, droughts and floods, climate change); the impact of genetically modified organisms on the environment; or human health and welfare consequences of the interaction between agriculture and the environment.

Definitions and methodologies for calculating indicators are standardised in most cases but not all, in particular those for biodiversity and farm management. For some indicators, such as greenhouse gas emissions (GHGs), the OECD and the UNFCCC are working toward further improvement, such as by incorporating agricultural carbon sequestration into a net GHG balance.

- ***Data availability, quality and comparability*** are as far as possible complete, consistent and harmonised across the various indicators and countries. But deficiencies remain such as the absence of data series (*e.g.* biodiversity), variability in coverage (*e.g.* pesticide use), and differences related to data collection methods (*e.g.* the use of surveys, census and models).
- ***Spatial aggregation*** of indicators is given at the national level, but for some indicators (*e.g.* water quality) this can mask significant variations at the regional level, although where available the text provides information on regionally disaggregated data.
- ***Trends and ranges in indicators***, rather than absolute levels, enable comparisons to be made across countries in many cases, especially as local site specific conditions can vary considerably. But absolute levels are of significance where: limits are defined by governments (*e.g.* nitrates in water); targets agreed under national and international agreements (*e.g.* ammonia emissions); or where the contribution to global pollution is important (*e.g.* greenhouse gases).
- ***Agriculture's contribution to specific environmental impacts*** is sometimes difficult to isolate, especially for areas such as soil and water quality, where the impact of other economic activities is important (*e.g.* forestry) or the "natural" state of the environment itself contributes to pollutant loadings (*e.g.* water may contain high levels of naturally occurring salts), or invasive species that may have upset the "natural" state of biodiversity.
- ***Environmental improvement or deterioration*** is in most individual indicator cases clearly revealed by the direction of change in the indicators but is more difficult when considering a set of indicators. For example, the greater uptake of conservation tillage can lower soil erosion rates and energy consumption (from less ploughing), but at the same time may result in an increase in the use of herbicides to combat weeds.
- ***Baselines, threshold levels or targets for indicators*** are generally not appropriate to assess indicator trends as these may vary between countries and regions due to difference in environmental and climatic conditions, as well as national regulations. But for some indicators threshold levels are used to assess indicator change (*e.g.* drinking water standards) or internationally agreed targets compared against indicators trends (*e.g.* ammonia emissions and methyl bromide use).

3.13. IRELAND

Figure 3.13.1. **National agri-environmental and economic profile, 2002-04: Ireland**



StatLink http://dx.doi.org/10.1787/300466256078

1. Data refer to the period 2001-03.
2. Data refer to the year 2005.

Source: OECD Secretariat. For full details of these indicators, see Chapter 1 of the *Main Report*.

3.13.1. Agricultural sector trends and policy context

Primary agriculture's contribution to the economy is rapidly declining [1, 2]. Between 1990 and 2005 agriculture's contribution to GDP and employment more than halved to 2.7% and 5.7% respectively [1, 3] (Figure 3.13.1). The past decade has been characterised by farm families increasing participation in the non-farming activities of the rural economy [4].

Agricultural production is intensifying on a reduced area of land and concentrated on fewer farms [1]. Over the period 1990-92 to 2002-04 the volume of agricultural production rose by over 1%, but the total area farmed declined by 2.6% (Figure 3.13.2). Nearly 45% of farms are less than 20 hectares in area and over 40% of farmers work part-time [1]. Between 1991 and 2003 agricultural productivity (gross value added per employee annual average) grew by 3.2%, compared to 3.4% for the whole economy, partly reflecting the substitution of labour by purchased inputs [5]. The volume of purchased farm inputs rose over the period 1990-92 to 2002-04: inorganic nitrogen fertiliser by +1%; pesticides +5%; and direct on-farm energy consumption by +37%; although inorganic phosphate fertiliser use fell by –31% (Figure 3.13.2).

Pastoral farming dominates the agricultural economy. Livestock and livestock products accounted for almost 70% of the total value of agricultural output in 2005, with dairying and beef production accounting for 55% of the value of total output [3]. Sheep numbers, in particular, have shown great variability, with numbers peaking at nearly 9 million in 1992 (June enumeration), from around 3 million in 1980 largely due to EU payments, but decreasing to just over 6 million by 2005 [1, 6]. There are increasing structural and regional

differences in farming and land use. Livestock production is mainly concentrated in eastern and southern commercially viable farming areas. The west and border regions, however, are dominated by extensive cattle and sheep farms on which there is some tree planting, less dairying, and higher levels of participation in agri-environmental schemes [4].

Agriculture is mainly supported under the Common Agricultural Policy (CAP) with support also provided through national expenditure within the CAP framework. Support to EU15 farmers on average declined from 41% of farm receipts in the mid-1980s to 34% in 2002-04 (as measured by the OECD Producer Support Estimate – PSE). This compares with the OECD average of 31%. Nearly 70% of EU15 support to farmers was output and input linked in 2002-04, compared to over 90% in the mid-1980s. These are the forms of support that most encourage production [7]. Total budgetary support to Irish agriculture was over EUR 3 (USD 3.75) billion in 2005, of which around 50% was nationally financed [1]. Agri-environmental measures in Ireland accounted for about 9% of total budgetary support in 2005.

Agri-environmental measures were first introduced in the early 1990s. Such measures are mainly used to control water and air pollution and provide incentives to enhance biodiversity and landscape conservation [1, 6, 8]. A key measure to promote environmentally sensitive farming is the voluntary nationwide *Rural Environment Protection Scheme* (REPS), introduced in 1994 in response to EU agri-environmental regulations. Objectives of the scheme include: protecting wildlife habitats and endangered species; landscape protection; establishing farming practices to address wider environmental problems (*e.g.* water pollution); and producing quality food through extensive and environmentally friendly practices. Expenditure on REPS totalled EUR 1.5 (USD 1.9) billion between 1994 and 2004 and by 2005 it was EUR 283 (USD 354) million covering 37% of farmers and 40% of farmland [1, 9]. Farmers must sign up for REPS for 5 years and payments are conditional on undertaking a basic set of farming practices, such as having a nutrient management plan [1, 8, 10]. Supplementary REPS payments are also available to farmers, designed to deliver specific environmental outcomes, mainly: the protection of wildlife habitats; long-term set aside for riparian zones; conservation of local livestock breeds; and to promote organic farming. Almost a third of farmers in 2005 who undertook supplementary measures chose the organic farming option [1].

In addition to REPS there are other agri-environmental measures. The *Grant Aid for the Development of the Organic Sector* scheme also provides investment assistance to organic farmers and organic food processors. Investment aid for animal manure storage, winter housing for cattle and sheep, silage storage and equipment for spreading animal wastes is provided to farmers under the *Farm Waste Management Scheme*, up to an eligible investment maximum of EUR 120 000 (USD 150 000) per holding from 2006, with total expenditure under the scheme between 2001 to 2005 being nearly EUR 66 (USD 82) million. Farmers with land under shared ownership ("commonage" land) and participating in direct payment and agri-environmental schemes must implement the *Commonage Framework Plan* in order to be eligible for support. The Plan mainly seeks to prevent overgrazing on sensitive areas, with permanent stock reductions for commonages introduced since 2002.

Agriculture is also affected by national environmental and taxation policies. The National Action Programme under the Nitrates Directive (2005) seeks to meet obligations under the EU *Nitrates Directive* operating for a period of 4 years, with implementing Regulations taking

effect from February 2006 [11]. The key measures of the Programme include: regulating the timing and practices for the application of fertilisers; limiting application of fertilisers; and setting storage requirements for livestock manure and general provisions on storage management. Income tax relief for capital expenditure on pollution control facilities is granted to farmers with nutrient management plans [11]. Regulatory measures under the *Water Pollution Act*, implemented by local authorities, are used to address water quality issues by targeting the use of chemical fertilisers, storage and application of manure, and by setting concentration standards for nutrients and pesticides in water bodies. Under the *Phosphorus Regulations* concentration levels and biological status targets are set to reduce eutrophication [6]. The *Use of Sewage Sludge in Agriculture Regulations* place limits on heavy metal pollution from spreading sewage sludge on farmland. The *Farm Plastics Regulations* facilitate the improved recovery of waste farm plastics, with 9 000 tonnes recovered in 2003 and a target of 75% recovery of plastics by 2008. Under the ***Integrated Pollution Prevention and Control*** (IPPC) regime intensive livestock farms must develop an annual nutrient management plan, with around 90 piggeries and 3 poultry units already licensed. However, intensive dairying and beef farms are not subject to IPPC licensing [6].

Excise duty on kerosene and non-automotive liquid gas was halved in 2006 and reduced to zero in 2007, but the budget revenue forgone from this tax exemption for agriculture is unknown. Measures to increase the uptake of ***biofuels*** include: excise duty exemption of over EUR 200 (USD 250) million over the period 2006-10; reduction in vehicle registration tax for vehicles capable of operating on biofuels; investment grants for biomass heat and power projects; and payments of EUR 45 (USD 56) per hectare for energy crops since 2004 [12, 13]. Farmers are also provided support, of nearly EUR 111 (USD 125) million in 2005, for afforestation projects, especially in less-favoured areas.

International environmental agreements important to agriculture include: those seeking to curb nutrient emissions into the Atlantic (*OSPAR Convention*); the *Gothenburg Protocol* concerning ammonia emissions [14]; and commitments under the *Convention of Biological Diversity*. Ireland's vision of biodiversity conservation is articulated in the *National Biodiversity Plan*. Under the *National Climate Change Strategy*, Ireland's response to its commitments to reduce greenhouse gases (GHGs) under the *Kyoto Protocol*, it has set a target to reduce agricultural GHGs by the equivalent of a 10% reduction in livestock numbers below business as usual 2010 projected levels [6, 15].

3.13.2. Environmental performance of agriculture

The intensification of agriculture over recent decades has led to increasing environmental pressure, especially concerning water pollution [6]. Reducing ammonia and greenhouse gas emissions are also important environmental problems, reflecting the predominance of livestock. Overgrazing in some Western regions has been a concern for soil erosion, while structural changes, especially the shift toward fewer but more intensively farmed operations, have led to concerns regarding the conservation of biodiversity and landscapes. As agriculture is largely rain-fed its use of water resources is small with significantly less than 1% of farmland irrigated, mainly for vegetable production [16]. Organic farming accounted for less than 1% of total agricultural land in 2002-04 compared to an EU15 average of almost 4%, despite rapid growth during the late 1990s. Some 90% of land organically farmed is utilised to produce pasture and fodder [1, 17, 18].

Overall soil quality is high but has come under growing pressure, especially because of overgrazing [4, 6, 17, 19, 20]. Existing information on soil quality is fragmented as there is no

national soil monitoring network [19, 20]. Over the past 20 years there has been greater pressure on soil quality notably from overgrazing in hill areas, and also from the erosion of river banks from trampling by livestock, and land use changes, such as the increase in the area of artificial surfaces (buildings, roads, etc.) [4, 6, 19]. Overgrazing has been mainly associated with sheep, but since the early 1990s, with falling sheep numbers (partly in response to the *Commonage Framework Plan)*, there was a recovery of eroded hillsides in many areas [17]. For some hillsides in the West (notably Galway and Mayo), however, erosion is still apparent, especially on peatlands where sheep overgrazing has led to removal of vegetation, depletion of bog species and erosion of hillside peat and riverbanks [6, 17, 20, 21]. Erosion of riverbanks from livestock trampling has caused widening of rivers in such areas and made rivers highly unstable from one flood event to another, eliminating salmon and trout spawning in some cases [6].

Agriculture is a major and widespread cause of water pollution, including in rivers, lakes, groundwater and coastal waters [4, 6, 17, 22]. As a consequence addressing water pollution from agricultural sources, as well as sewage treatment, remains a key challenge for both national and local authorities in meeting the targets under the EU *Water Framework Directive* [23]. Pollution of water from farm pesticide use is very low given the dominance of pastoral livestock farming [24], although occasional pollution incidents involving sheep dip compounds have been recorded [6, 19, 22]. A growing concern is the contamination of water through livestock pathogens [4, 22].

Between 1990-92 and 2002-04 agricultural nutrient surpluses rose with respect to nitrogen, but sharply declined for phosphorus (Figure 3.13.2) (nutrient surpluses are the quantity of nutrient inputs minus outputs of nutrients, nitrogen [N] and phosphorus [P]). The increase in N surpluses has resulted from the rise in N inputs (inorganic N fertiliser and manure) relative to the reduction in N uptake by crops and pasture. But while inorganic N fertiliser use rose from 1990 to 1999, it returned to 1990 levels by 2004. The large decrease in P surpluses was due to the fall in inorganic P fertiliser use. Nutrient use efficiency (the ratio of N/P output to N/P input) was above the EU15 average between 1990-92 and 2002-04, while the level of nutrient use intensity (N/P per hectare of agricultural land) was the same as the EU15 average for nitrogen, but below it for phosphorus (Figure 3.13.2). The reduction in P intensity (–35%) was less than the EU15 average (–48%) over the period 1990-92 to 2002-04, although the rising trend in N intensity (+9%) compares to an overall decline for the EU15 average (–26%).

Agriculture accounts for the greater and rising share of water pollution from nutrients [17]. About one-third of slight and moderate eutrophication of rivers (Figure 3.13.3) is due to agriculture (2003-05), with over 70% of phosphorus and 80% of nitrogen reaching inland waters originating from farmland in 2004 [11]. Western regions show much lower levels of pollution compared to southern and eastern regions [25]. The adverse impacts of eutrophication on water bodies include damage to aquatic ecosystems, such as algal growths and fish kill events, and also higher costs for water treatment [6, 17, 22]. Nevertheless, the share of agriculture in total fish kills declined from nearly 60% in 1992-94 down to 22% by 2005, partly due to the effect of measures by local authorities, the Central and Regional Fisheries Boards and the Department of Agriculture and Food [6, 17, 22, 26]. Nitrate levels rose between the 1980s and 2005 in 9 of 11 large rivers that are monitored, which has led to the depletion of the nitrate sensitive protected Pearl Mussel (*Margaritifera margaritifera*) in some rivers [21, 26]. Aerial surveys have shown that damage to riverbanks by cattle and release of

nutrients into rivers from spreading manure and fertilisers close to riverbanks, is common and widespread [21].

Most drinking water quality meets required standards. Between 1998 and 2005 there was a rise in the share of groundwater monitoring sites with nitrate levels greater than the Irish drinking water guide level of 25 mg/l NO_3, mainly related to agriculture [26]. Groundwater accounts for over 15% of drinking water nationally and more than 85% in some rural areas [17, 26]. Drinking water contamination from pathogens, some resulting from land spreading of manure, is a problem in certain locations especially those using groundwater [6, 17, 22]. But between 1995 and 2005 there were less faecal coliforms monitored in groundwater, with a rise in the share of samples showing zero contamination [17, 26].

Soil phosphorus levels are rising despite the decline in P surpluses [6, 21]. Soil analysis indicate that an estimated 24% of soils contain P levels in excess of that needed to produce financially viable crop yields [21, 27]. This raises concerns over water pollution, as reducing the build-up of P in soils can take decades [6]. Estimates for 1998 indicate a surplus of 48-60 000 tonnes of P applied to farmland annually (an average of around 43 000 tonnes of inorganic P fertiliser were applied during the 2002-04 period). This unnecessary P fertiliser application is estimated to cost EUR 30 (USD 33) million annually [21]. While these P losses are not regarded as significant in economic terms, as they are less than 5% of the cost of P applied, they are significant for the environment because of the resulting eutrophication of water bodies [27]. The national P balance showed a surplus of about 6kg/hectare during the period 2002-04 (although this reveals the potential to pollute rather than actual pollution), while a surplus of 5kg/hectare can give rise to P concentrations in surface waters well in excess of the *Phosphorus Regulation* target of less than 30 μg P/litre [6].

Uptake of nutrient management plans is low and there are deficits in slurry storage facilities [21]. Farmer uptake of nutrient management plans is low in comparison with some EU countries which have similar nutrient surplus problems. In 2003 the share of farms and agricultural land under a nutrient plan was around 30%, compared, for example, to over 60% in Finland, Germany and the Netherlands [16]. Research indicates that there is a substantial deficit in slurry storage capacity on farms [21]. Local authorities have also identified other practices that may be contributing to nutrient pollution of water bodies including: manure and fertiliser spreading on over-enriched land or under unsuitable weather and soil conditions; and uncertainty over future policy developments at the EU, national and at local level, acting as a disincentive to investment in facilities that improve nutrient management on farms [21]. A further challenge faces the intensive livestock industry, especially pig and poultry farms, in terms of a shortage of land on which to spread manure. This is due to: competition between such farms for land for manure spreading; the previous history of over fertilisation resulting in excessive P accumulation in soils; and the recent introduction of the *Nitrates Regulations* [4, 6].

Growth in agricultural ammonia emissions has been above the EU15 average. Agriculture accounted for 98% of national ammonia emissions and 60% of all acidifying emissions in 2004 [28]. This growth in ammonia emissions of 2% compares to a reduction of –7% for the EU15 between 1990-92 and 2001-03 and a 24% decrease in acidifying emissions from all Irish sources over the period 1997 to 2004 (Figure 3.13.2) [28]. While there was a steady rise in ammonia emissions over the 1990s, the recent reduction in nitrogen fertiliser use and livestock numbers contributed to a downturn in emissions between 1999 and 2004 [17, 28].

Livestock manure accounts for about 85% of agricultural ammonia emissions and fertilisers account for much of the remainder [14, 17]. Ireland has agreed to a ceiling for total ammonia emissions of 116 000 tonnes by 2010 under the *Gothenburg Protocol*. By 2004 emissions totalled 114 000 tonnes, so Ireland was already compliant with the 2010 ceiling, and projections to 2010 suggest further reductions may occur [17, 28]. While the growth in agricultural ammonia emissions up to 1999 contributed to increased pressure on ecosystems (terrestrial and aquatic) sensitive to excess acidity, there is little research on these impacts.

Agricultural greenhouse gas (GHG) emissions decreased by 2% between 1990-92 and 2002-04 (Figure 3.13.2). Emissions in the agriculture sector increased over the course of the 1990s, but since the end of that decade have reduced, resulting from a decline in both livestock populations and fertiliser use, with the net result that emissions from agriculture in 2004 were marginally lower than in 1990. This compares to a reduction of –7% in agricultural GHG emissions for the EU15, but a 24% rise in total GHG emissions in the Irish economy as a whole over the period 1990-92 to 2002-04. Under the *Kyoto Protocol* and the EU *Burden Sharing Agreement* Ireland can increase total GHG emissions up to 13% by 2008-12 from the 1990 base year, although it has set its own target to reduce methane emissions, equivalent to a 10% reduction in livestock numbers below business as usual 2010 projected levels [15]. The share of agriculture in national GHG emissions was among the highest across OECD countries at 28% in 2002-04, dropping from 36% in 1990, with methane from livestock, and nitrous oxide from fertilisers and manure applied on soils the main sources of farm GHGs [15]. Research suggests that under EU 2003 CAP reform the farm sector would contract, and, as a result of lower livestock numbers and fertiliser use, agricultural GHGs are projected to decrease to a level variously estimated at between 12% and 16% below their 1990 level [15, 29, 30].

The net annual decrease of carbon storage in soils between 1990 and 2000 was 2.7 million tonnes, equivalent to 14% of total national greenhouses gas (GHGs) emissions in 2000. This was mainly due to industrial peat extraction [33, 34]. Schemes to encourage afforestation of farmland, however, have the potential to increase carbon sequestration. These schemes have led to 244 000 hectares of farmland being converted to forestry between 1990 and 2004. However, the national forest area represents only 10% of the total land area compared to the EU15 average of about 35% [15].

The rise in direct on-farm energy consumption by 37%, compared to a 53% rise for the rest of the economy, over the period 1990-92 to 2002-04 (Figure 3.13.2). While the rise in farm energy consumption contributed to higher GHG emissions, agriculture's share of total energy consumption is low at 2.6% (2005). Agriculture's role in ***renewable energy production*** was minimal between 1990 and 2005. However, Ireland's first solid biomass fuelled combined heat and power plant began operating in 2003, largely using forestry biomass, while there is a small number of farm based biogas digesters, but no central anaerobic digestion facility [31, 32]. To meet the *EU Biofuel Directive* by 2010 (*i.e.* 5.75% national market penetration of biofuels in transport fuels) would involve a significant change in land use and in energy policy, or necessitate higher imports, although recent policy measures have been introduced to encourage biofuel development [1, 12, 13, 15].

Overall agriculture has had adverse impacts on biodiversity since the early 1990s, part of a longer term trend linked to the accelerated development of agriculture, especially since Ireland's entry into the EU [35]. The adverse impacts of agriculture on biodiversity are

largely the result of overgrazing in certain areas, changes in grassland management, and land use changes [6, 10]. Consequently more wild species and high nature value habitats associated with farming are being confined to marginal areas [10].

The genetic diversity of most crop varieties and livestock breeds used in production increased over the period 1990 to 2002. However, there was a reduction in varieties of barley, pulses and forage used in production [16], but there are *in situ* and *ex situ* crop conservation programmes through the *REPS* and supported by the Irish Seed Savers Association [35]. There are also a number of endangered livestock breeds (cattle, sheep, poultry, horse and pony breeds) [16, 36]. Various livestock breeding associations play a key role for *in situ* conservation, but *ex situ* conservation is only limited to Kerry cattle, despite other livestock breeds being endangered [36, 37].

Agriculture accounted for over 60% of land use in 2002-04, emphasising the importance of agriculture for biodiversity. While there was only a modest decline in the total area farmed between 1990-92 and 2002-04 (2.6% compared to a 5.2% fall for the EU15), more significantly for wild species were the changes between different forms of agricultural land use and in land management practices, especially with respect to grassland, which accounts for over 90% of farmland. Some semi-natural farmed areas (*i.e.* permanent pasture and rough grazing) were converted to forest, although some arable land was converted to pasture [6]. Grassland management also intensified, part of a longer-term trend, including the switch from hay to silage production [6]. There has also been increasing pressure on certain marginal farmed habitats, including some with designations as *Special Areas of Conservation* and *Natural Heritage Areas*, such as: limestone pavements (notably the Burren plateau); turloughs (vegetation covered limestone basins); machair (Atlantic dune grassland); orchid rich grassland; and salt marshes. The greater pressure on these habitats has been because of overgrazing, drainage and reclamation to more intensive land uses [6, 38]. Harvesting of peat moss and turf is an important industry, but there is now a moratorium on establishing new turf cutting of raised bogs [35]. Peatland habitats have also been degraded from overgrazing by sheep in hilly areas [19].

There have been significant declines in farmland bird populations. This has largely been associated with the reduction in the area and quality of semi-natural farmed habitats [39, 40, 41]. In the period from 1998 to 2004, however, the *Countryside Bird Survey*, covering 57 species, revealed that there were significant increases in 18 species and declines in 10 (Figure 3.13.4) [42]. The Corncrake (*Crex crex*) is the only Irish breeding bird which is threatened with global extinction. Corncrakes are dependent on low-intensity semi-natural farmed habitat, especially lowland rough grazing. With the decline in rough grazing the breeding population of this species decreased rapidly from the 1960s, down from 900 males in 1988 to 174 by 1993, but from 1993 to 2004 the population stabilised [43]. The impact of agriculture on other wild species is poorly monitored. Through the REPS there is potential to ease the pressure from farming activities on bird populations and other forms of biodiversity. Research has shown that in some areas where habitat conservation has been under the REPS and other schemes, bird populations have started to recover. Also plant species richness in the margins of tilled fields tends to be (slightly but not significantly) higher in areas under REPS [17, 44].

3.13.3. Overall agri-environmental performance

Overall agriculture has been harmful to the environment but the pressure is easing. Declining livestock numbers and a reduction in the use of inorganic fertilisers (nitrogen

and phosphorus) and pesticides between 2000 and 2005, have helped to reduce water and air pollution pressures, the two key environmental problems for Irish agriculture since the early 1990s. Overgrazing by livestock in some areas, changes in land use (notably conversion of semi-natural grassland) and grassland management (the switch from hay to silage production), have also had adverse effects on soil quality and biodiversity but there have been recent improvements.

The agri-environmental information system does not effectively monitor and evaluate agri-environmental performance and policies, but this is changing [4, 6]. There is little information on farm management practices that affect either biodiversity [6, 17] or the environment (*e.g.* grazing practices, manure management) [14]. A well-established national water monitoring network, however, generates information related to agricultural impacts on water bodies. In addition, considerable effort is underway to upgrade the monitoring system, including: developing agri-environmental indicators [45]; the creation in 2006 of the National Biological Records Centre [17] together with Ag-biota a research project that includes the development of agri-biodiversity indicators [35]; and establishment of a national soils database in 2006 [46].

Agri-environmental policies have started to improve environmental performance since about 2000. This was reflected, in particular, in the strengthening of the REPS, with around 40% of farmers and farmland under the REPS by 2005. The scheme has provided some success in reducing nutrient pollution, but few local authorities are using the nutrient planning powers available to them under the *Water Pollution Act* [6, 22]. A survey of REPS and similar non-REPS farms in 2002, showed on average, lower use of inorganic and organic fertilisers on REPS farms [15, 21], although another survey found little difference in terms of beetle (*Carabidae*) species richness and abundance [44]. The REPS, however, has been criticised for its system of monitoring and evaluation and specific environmental targets are not well defined [17, 21, 38, 44, 47].

The projected contraction of agriculture should further reduce environmental pressure [6, 15, 18]. Projections indicate that in the period up to 2010-15 the decrease in grazing livestock numbers and fertiliser use would help lower nutrient pollution of water and air, while the trend toward further afforestation is likely to be beneficial for biodiversity and the sequestering of carbon. The European Court of Justice held in 2004 that Ireland was in contravention of the EU *Nitrates Directive,* for not having established an action programme (this was due to be established in December 1995) [11, 21]. An action programme is now in place, which should have a positive impact on water quality. Over 50% of national water bodies in 2004 were identified as being at risk or probably at risk of failing to meet the EU *Water Framework Directive* objectives by 2015. "At risk" does not imply that current water quality is impaired, but rather that there is a risk it may not meet the Directive's objective of "good status" in all waters by 2015 [17]. Although phosphorus surpluses have declined markedly, further reductions will be necessary to bring about a sustainable phosphorus balance and reduce eutrophication [6, 21].

Improved farm management and the use of best agricultural practices would ensure better control of agricultural water pollution, especially substantial investment in manure and slurry storage capacity [6, 17, 21]. This would also bring advantages in further reducing ammonia emissions, such as enabling the use of low emission manure spreading techniques [14]. In this regard a scheme introduced in 2006 to help farmers establish manure storage capacity and other facilities required by the *Nitrates Regulations*, attracted

almost 49 000 applications and should yield positive results. There are concerns that the rise in nitrate pollution of groundwater could become more widespread and require costly treatment of drinking water unless nutrient management plans are strengthened and implemented [26]. The implementation of the *National Action Programme*, under the EU *Nitrates Directive, EU Water Framework Directive* and cross compliance measures, should yield results in reducing agricultural nutrient pollution of water bodies [21, 22]. The *Nitrates Directive* derogation agreed by the EU for Ireland in November 2006 up to 2011, increasing the maximum limit of nitrogen from livestock manure from 170 to 250kg per hectare per year for grassland, will give time for graziers to adapt to the measures. This does not apply to pig and poultry producers.

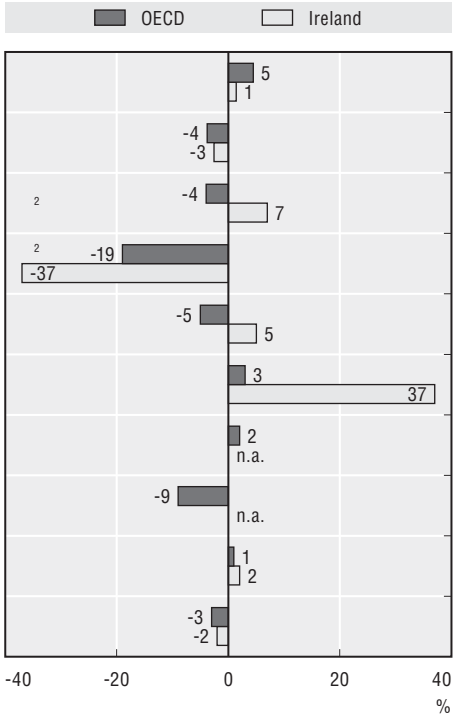
The REPS has had some recent success in addressing biodiversity concerns, but this has been mainly targeted at farmed habitats of high conservation value (*e.g.* peatlands, species rich grasslands) while large-scale intensive farms are significantly under-represented [17, 21, 38, 48]. The loss of farming in some upland and marginal areas could be to the detriment of semi-natural habitats and cultural farmed landscapes, including abandonment to shrub or conversion to forestry as already evident in the Burren (county Clare) [4]. This trend might continue into the future as projections suggest a 23% reduction in farm numbers between 2002 and 2015. By 2015 only a third of farms are projected to remain economically viable, with three quarters of these farms expected to be operated part-time [18].

The increase in part-time farming, however, could lead to greater biomass production through afforestation, with potential biodiversity and GHG emission reduction benefits [4, 18]. Under the Rural Development Regulation for the period 2007-13, aid for afforestation is provided up to a maximum of EUR 500 (USD 625) per hectare, on the condition that the tree plantings are compatible with environmental protection, such as water quality and landscape [8]. Fuel tax concessions for farmers undermine incentives to use energy more efficiently and may lead to higher GHG emissions. At the same time, the government has set a target for the agricultural sector to reduce methane emissions, equivalent to a 10% reduction in livestock numbers below business as usual 2010 projections.

The National Development Plan (2007-13) seeks to make the environment a central feature of farm budgetary support over the next seven years [49]. The focus is on reducing eutrophication, mitigating GHG and ammonia emissions, and enhancing biodiversity. The latter includes the purchase and restoration of areas of raised peat bogs, that also act as effective carbon sinks [49]. The overall package for agriculture under the Plan will be EUR 8.0 (USD 10.0) billion, an 85% increase over the expenditure during the last plan (2000-06). EUR 2.1 (USD 2.6) billion of this will be met from EU funding. The major share of expenditure, over EUR 6 (USD 7.5) billion, will be environmentally orientated, of which EUR 3 (USD 3.8) billion will be provided for REPS and related programmes, such as afforestation and farm waste management [49].

Figure 3.13.2. **National agri-environmental performance compared to the OECD average**

Percentage change 1990-92 to 2002-04[1]



Absolute and economy-wide change/level

Variable	Unit		Ireland	**OECD**
Agricultural production volume	Index (1999-01 = 100)	1990-92 to 2002-04	101	104
Agricultural land area	000 hectares	1990-92 to 2002-04	–116	–48 901
Agricultural nitrogen (N) balance	Kg N/hectare	2002-04	83	74
Agricultural phosphorus (P) balance	Kg P/hectare	2002-04	6	10
Agricultural pesticide use	Tonnes	1990-92 to 2001-03	+111	–46 762
Direct on-farm energy consumption	000 tonnes of oil equivalent	1990-92 to 2002-04	+82	+1 997
Agricultural water use	Million m^3	1990-92 to 2001-03	n.a.	+8 102
Irrigation water application rates	Megalitres/ha of irrigated land	2001-03	n.a.	8.4
Agricultural ammonia emissions	000 tonnes	1990-92 to 2001-03	+3	+115
Agricultural greenhouse gas emissions	000 tonnes CO_2 equivalent	1990-92 to 2002-04	–316	–30 462

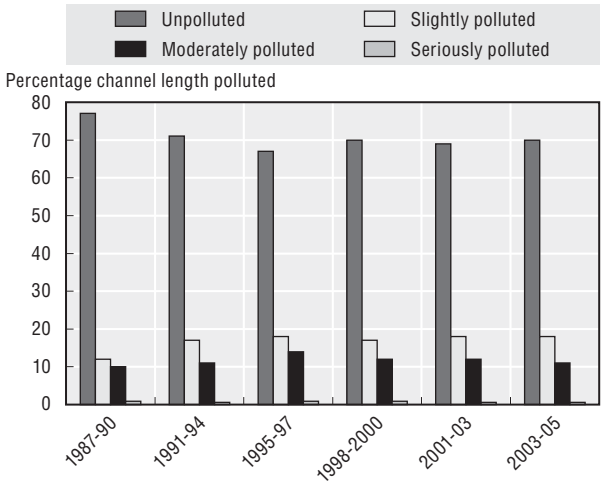
n.a.: Data not available. Zero equals value between –0.5% to < +0.5%.

1. For agricultural water use, pesticide use, irrigation water application rates, and agricultural ammonia emissions the % change is over the period 1990-92 to 2001-03.
2. Percentage change in nitrogen and phosphorus balances in tonnes.

Source: OECD Secretariat. For full details of these indicators, see Chapter 1 of the *Main Report*.

Figure 3.13.3. **River water quality**

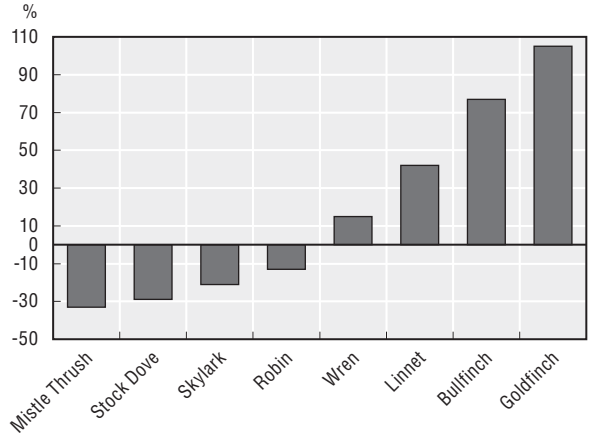
13 200 km channel length baseline



Source: Environmental Protection Agency.

Figure 3.13.4. **Population changes for key farmland bird populations**

1998 to 2004



Source: Countryside Bird Survey News, March, 2005.

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