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REPS EVALUATION AND ITS IMPLICATIONS

Matthew Sinnott
Department of Agriculture, Food and Rural Development

INTRODUCTION

In 1994, Ireland introduced the Rural Environment Protection Scheme (REPS), under Council Regulation 2078/92. The stated objectives of the scheme were

- The establishment of farming practices and production methods which reflect the need for environmental conservation and protection.
- The protection of wildlife habitats and endangered species of flora and fauna.
- The production of quality food in an extensive and environmentally friendly manner.

Participation in the scheme is currently in the order of 43,000 farms covering approximately 1.5 million ha representing approximately 31% of agricultural land. Sheep farmers have the highest rate of participation in REPS while specialist dairy farms have the lowest. Geographically, uptake was higher in western and north-western regions.

This paper presents a brief summary of the main findings of the REPS evaluation complied by Fitzpatricks and Associates on behalf of the Department of Agriculture, Food and Rural Development (DAF). The report title is "Evaluation of the Rural Environmental Protection Scheme" (July 1999). The objective of the report was to address the extent to which the objectives set out in Council Regulation 2078/92 and the objectives of the REPS programme have been achieved. It was submitted to the EU Commission in July 1999 as part of the procedure necessary to achieve renewed funding of the current REPS programme.

EVALUATION REPORT - APPROACH USED

The evaluation procedure involved the review and analysis of a wide range of date including the following:

- National Farm Survey - Teagasc.
- A representative sample of all agri-environmental plans relating to REPS.
- A number of studies regarding the implementation and impact of REPS (mainly M. Sc. Theses).
- A survey of REPS planners.
- Official data relating to up-take and implementation of the scheme.
- Evaluation submissions provided by other agencies concerned with aspects of the scheme.
- Interim reports of a number of Walsh Fellowship studies into the scheme.

EVALUATION REPORT – RESULTS SYNOPSIS

A synopsis of the key elements of the evaluation are presented under the following headings:

- Implementation and Uptake.
- Environmental Impact.
- Agricultural Impact.
- Socio-economic Impact.

- Supplementary Measure A.
- Review of Administration and Control.
- Policy, Planning and Financial Considerations.

Implementation and Uptake
The uptake of the various REPS measures, relative to the target goals, is summarised in Table 1.

Table 1: The uptake of the various REPS measures relative to the target goals

	Participation (% of target)	**Area (ha) (% of target)**	**Expenditure (% of target)**
Basic REPS	87	106	87
SM1 – Designated areas	134	255	119
SM2 – Degraded areas	39	84	55
SM3 - Rare breeds	266	45% of LU.	
SM4 – Riparian zones	4.7	5.6	
SM5 – Public access	35	64	
SM6 – Organic farming	125	285	

SM = Supplementary Measure.

Environmental Impact
The relationship between agriculture and the environment in Ireland was discussed in the report. It assessed the design and structure of REPS in terms of environmental objectives. The report presented the environmental impact evidence and discussed the findings. Many of the environmental outputs provide an economic benefit by contributing to the revenue from tourism and recreation, however, much of this environmental output is threatened by changes such as:
- specialisation and intensification
- overgrazing
- water pollution

A survey of REPS plans, found a change in the amount of phosphorus (P) used and a reduction in the use of nitrogen (N) fertiliser were the first and fourth most common key adjustment required in REPS plans.

The National Farm Survey (NFS) for 1994 and 1997 provided useful comparative data for the following three categories of farms:
- REPS farms
- non-REPS extensive farms (< 170 kg/ha of organic N)
- non-REPS intensive farms (> 170 kg/ha of organic N)

A summary of the main findings in relation to the use organic and inorganic N and P for these three categories of farms is presented in Table 2. The noted reduction in P use is reflected in the national inorganic P use data. This has fallen by approximately 17,000 t per annum to 45,000 t per annum since the mid-nineties. The increase of 7% in the organic P use on REPS farms reflects the increase in stocking rate on REPS farms (c.f. below). REPS farms applied significantly lower levels of inorganic P than both extensive and intensive non-REPS farms. Similar trends were evident for inorganic N use.

The stocking rate changes between 1994 and 1997 on REPS and both categories of non-REPS farms were compared (Table 3). It is note worthy that many REPS farms actually increased stocking levels while staying within REPS stocking rate and nutrient limits. This reflects the more efficient use of organic and inorganic fertilisers on REPS farms.

Table 2: A summary of the change in organic and inorganic P use between 1994 and 1997 and the level of organic and inorganic N use on REPS, non-REPS, extensive and non-REPS extensive farms.

	Organic			Chemical		
	REPS	**non-REPS extensive**	**non-REPS intensive**	**REPS**	**non-REPS extensive**	**Non-REPS intensive**
Change in P Use 1994 *vs* 1997 (%)	+ 7	0	+10	- 23	- 9	-10
N use in 1997 (kg/ha)	92	98	200	59	85	206

Table 3. Stocking rate changes between 1994 and 1997 on REPS and non-REPS farms.

	REPS	**non-REPS extensive**	**non-REPS intensive**
Change in stocking rates 1994–1997 (%).	+5	+1	+11
1997 Stocking rate (LU/ha)	1.26	1.30	2.48

Record Keeping: The evaluation concluded that the record keeping and monitoring required by REPS had an educational benefit to farmers. Taken together with nutrient management advice and soil testing, also a requirement, it was considered to have contributed to the achievement of the scheme's environmental objectives.

Historical/Archaeological Sites: In relation to sites of historical or archaeological interest, a survey found that 64% of REPS participants were aware of the Sites and Monuments Record and 79% were aware of the National Monuments Act, compared with 37% and 47% for non-REPS farmers, respectively.

Supplementary Measures 3, 4, 5 and 6 were also evaluated for their environmental impact with the outcome being quite variable depending on the measure in question.

Agricultural Impact

The agricultural objectives of REPS are:

- to establish farming practices and production methods which reflect the need for environmental conservation and protection.
- to produce quality food in an extensive and environmentally friendly manner

The agricultural impact of REPS was evaluated using a range of variables including livestock density, fertiliser use, lime use and pesticide use.

The evaluation results pertaining to gross output, gross margins, overhead costs and investment costs for machinery and buildings are only considered here as indicators of agricultural impact. The gross outputs and margins for REPS and non REPS farms are summarised in Table 4.

Table 4: A comparison of the 1997 gross output index relative to 1994, the gross margins in 1997 and an index of the 1997 gross margins relative to 1994 for REPS and non REPS farms.

	REPS Farms		non- REPS Farms		All Farms
	Excl. REPS Payments	**Incl. REPS payments**	**Extensive**	**Intensive**	
Index of Gross Output 1997 – 1994	105	122	101	102	
1997 Total Gross Margin (£/ha).	447	551	535	1124	616
Index of Gross Margin 1997 – 1994	107	132	103	103	

Gross output increased by 5% on REPS farms excluding REPS payment and by 22% when REPS payments were included between 1994 and 1997. Gross output on both extensive and intensive non-REPS farms increased by 1% and 2%, respectively, over the same period. Gross margin per ha for all systems on REPS farms increased by 7%, excluding REPS payments. When REPS payments are included, the growth rate was 32% over the period. The change in gross margin for both extensive and intensive non-REPS farms was 3%. The increase in the growth rate of gross margin for REPS farms excluding REPS payments is largely attributed to "dairying", where there was a 27% increase, while the position on "mainly sheep" systems improved by 16%.

The time trends in the 1997 data for overhead costs and investments in machinery and buildings for the three categories of farms is presented in Table 5.

Table 5: The time trends in and the 1997 data for overhead costs and investments in machinery and buildings for the three categories of farms.

	REPS Farms	non- REPS Farms		All Farms
		Extensive	**Intensive**	
1997 Overhead costs (£/ha)	238	257	514	289
Trends in overhead costs 1994-1997 (%)	+26	+7	+6	
1997 Investment in machinery (£/ha).	56	50	97	
1997 Investment in buildings (£/ha).	77	41	82	

The growth in overhead costs on REPS farms exceeded that on both extensive and intensive non-REPS farms in all farming systems. Overhead costs increased by 26% on REPS farms over the period 1994 – 1997. Machinery investment costs in 1997, on REPS farms were 12% higher than on extensive non-REPS farms but significantly lower than on intensive non-REPS farms.

Building investment costs in 1997, was also higher on REPS farms than on extensive non-REPS farms, ranging from a high of 303% on the "dairying + other" system farms to a low of 52% on "cattle rearing" system farms. Building investment costs on REPS farms was lower than on intensive non-REPS farms by

only 6%, however this was due mainly to higher building investment costs on "Dairying" system REPS farms.

The evaluation concluded that since REPS farms had achieved an increase in gross output, while at the same time reducing expenditure on fertilisers per livestock unit, indicates that substantial efficiency benefits may be attributable to REPS in terms of planning and management of nutrients.

Socio-Economic Impact

The socio-economic impact of REPS is taken to mean the effects on farm income, farm employment, farmer's awareness and behaviour through education and training and attitudinal effects within wider society. Article 1 of Council Regulation 2078/92 states that the scheme was instituted in order:

- "to contribute to providing an appropriate income for farmers" and to promote,
- "to promote the use of farming practices which reduce the polluting effects of agriculture, a fact that also contributes, by reducing production, to an improved market balance", and
- "education and training for farmers in types of farming compatible with the requirements of environmental protection and up-keep of the countryside."

While the evaluation report is critical of the fact that socio-economic objectives are not among the stated aims of the Scheme, it is clear from the report that participation in REPS has also resulted in improved incomes.

Employment: The total employment in Agriculture, Forestry and Fisheries has declined from 147,000 in 1994 to 137,000 in 1998 and this trend is expected to continue. Based on the 1996 Census of Population 92% were engaged in farming, 2.4% in marketing gardening, 2.3% in fishing, 1.7% in forestry and 1.8% in other agricultural industries.

Demographic background: A comparison of the demographic backgrounds of REPS and non-REPS farmers is presented in Table 6.

Table 6: Demographic background of REPS and non-REPS farmers in 1997

	REPS	**non-REPS Extensive**	**non-REPS Intensive**	**All Farms**
Age (Farm Holder)	50	53	47	51.5
Married (%)	81	63	69	67
Farms with off-farm income (%)	53	41	35	43
Holder with off-farm income (%)	33	30	22	29
Economic Size Units	15.3	16.9	38.8	19.6

On average REPS farm holders are slightly younger than extensive non-REPS farm holders, but older than intensive non-REPS farm holders. A significantly higher proportion of REPS farms had off-farm income than either the extensive or intensive non-REPS farms. While more REPS farmers had off-farm income that either of the other two groups. The size of the farming business unit was lower on REPS farms than on both extensive and intensive non-REPS farms.

Family Farm Income 1994/1997: The change in family farm income index for REPS and both extensive and intensive non REPS farm systems over the period 1994 to 1997 were calculated (Table 7).

Table 7: Family farm income index in 1997 (base year 1994) for REPS and non-REPS farms

Farming System	REPS Farms		non-REPS Farms	
	Excl. REPS payments	Incl. REPS Payments	Extensive	Intensive
Dairying	123	151	107	104
Dairying + Other	80	111	100	98
Cattle Rearing	72	139	106	
Cattle Other	84	128	89	
Mainly Sheep	104	190	107	
Mainly Tillage	71	104	83	
Total (all systems)	92	137	99	102

Family farm income on REPS farms declined by 8% between 1994 and 1997 before REPS payments are taken into account. However, when REPS payments are taken into account family farm income increased significantly over the period. In the same period family farm income declined by 1% for extensive non-REPS farms while that of intensive non-REPS farms increased by 2%. The change in family farm income varies significantly between the various farming systems.

REPS payments are intended to compensate for more than the explicit costs covered in the NFS. Additional farmer labour input and opportunity costs (or income foregone) are necessarily excluded from the Survey cost data, but represent significant components of the income impact for which compensation is offered.

The evaluation concluded that REPS has been effective in contributing to farm income

Training: Over 21,000 participants attended REPS training courses. The syllabus established by DAF covers a comprehensive range of issues and factors pertaining to the Scheme. This training has helped to improve farmer awareness of agri-environmental issues.

Supplementary Measure A: This was introduced recently to replace both SM 1 - Natural Heritage Areas and SM 2 - Rejuvenate Degraded Areas. Both were revised on a number of occasions but did not achieve the stated objectives. The new measure will be monitored over the coming years.

Review of Administration and Control

The evaluation investigated the administration and control procedure and has highlighted some short falls both actual and perceived. Recommendations in this area will be taken into account where possible. However, in many cases it may not be possible to address some perceived short falls due excessive administrative costs or the need to comply with the terms and conditions specified in EU regulations.

EVALUATION REPORT - RECOMMENDATIONS

The evaluation report made a number of recommendations including

- The REPS approach to environmental effects of agricultural practices is appropriate and should remain.
- REPS has made substantive inroads toward achieving optimal environmental sustainability on farms.
- It is recommended that any new agri-environmental programme be closely modeled on the existing REPS scheme.

- Efficiency must take into account the administrative implications of alternative options.
- The current scheme addresses a number of issues which are widespread and diverse, a more targeted approach may undermine this attribute.
- The alternative option of a "menu" system should be considered in designing successor schemes with reference to the potential benefits and disadvantages identified by the evaluation.
- There is a need for better evaluation procedures and indicators.

In addition more specific recommendations are included in the evaluation report which will receive due consideration in drafting a REPS programme of the period 2000 - 2006.

CONCLUSION

The EU Commission on the basis of the evaluation report submitted by DAFF has proposed the continuation of co-financing of the current REPS contracts until they come to an end in 2004.

However, the following points should be noted. Several recent water quality reports (e.g. EPA Water Quality in Ireland 1995 – 1997; the Lough Derg and Lough Ree Catchment Monitoring and Management System and the Lough Leane Catchment Monitoring and Management System) indicate that a major effort is still required in the storage and management of farm waste.

It is likely that there will be a strengthening of environmental integration and sustainable development within the Common Agricultural Policy (CAP). In the European Model of Agriculture, the integration of the environment into CAP starts by recognising that a reference level of "good agricultural practice" which is dependent on local conditions should be respected in all agricultural areas of the EU. With this new approach it is becoming clear that the protection of the environment and landscape will apply more and more to all farmers and not just those that join schemes such as REPS. It is important therefore for the future of farmers and farming that all those involved in the sector should follow "Good Agricultural Practices" in order to achieve sustainable farming systems.

IMPACT OF REPS – ANALYSIS FROM THE 1998 TEAGASC NATIONAL FARM SURVEY

Oliver McEvoy
Teagasc, Kilmallock, Co. Limerick.

INTRODUCTION

The Rural Environment Protection Scheme (REPS) is now in operation for 5 years. To date there is a limited information available to access the impact of the scheme. The Teagasc National Farm Survey (NFS) is a representative data source of farm management data. The present evaluation uses the 1998 NFS data to examine the financial and physical impacts of REPS on farms. The analysis of the data was in two parts:

- the first part examines the performance of REPS and non-REPS farms in the 1998 NFS (NFS98)

and

- the second part compares 1998 REPS farms with their position in 1994 pre REPS (NFS94/98).

A similar evaluation was previously conducted usinng the 1997 NFS data. Throughout this report references are made to the 1997 results where appropriate.

APPROACH

Farms in the 1998 NFS were divided into two groups:

- REPS farms. The NFS estimated that 34,400 farms received a REPS payment within 1998. This was an increase of 8,700 on the 1997 NFS estimate.
- Non-REPS farms. This group is further divided into two sub groups:
  - Extensive non-REPS farms. These are farms that produce less than 170 kg of organic nitrogen (N)/ha (UAA1) per year and are potential REPS clients. The NFS estimated that there were 78,800 of these farms.
  - Intensive non-REPS farms. These farms produce over 170 kg of organic N/ha (UAA) per year and are unlikely to participate in REPS. The NFS estimated that there were 15,100 of these farms.

The organic N production was calculated from livestock numbers and animal types. Tillage farms were classified as REPS and non-REPS farms only. The NFS data was analysed to evaluate the financial and physical performance of these three groups of farms. The results, presented below, allow an evaluation of the impact of REPS participation.

DEMOGRAPHIC COMPARISON BETWEEN 1998 NFS FARMS

Drystock farming systems (cattle rearing, cattle other and mainly sheep) made up 70% of farms in REPS in 1998. The system with the highest percentage of REPS participants was the mainly sheep system at 46% followed by the mainly tillage system at 39% and cattle other system at 25%. Seventeen percent of dairying were in REPS, this is an increase of 5% on 1997.

Fifty-two percent of REPS farms were in the 20 – 50 ha category. Twenty percent of REPS farms were in the 10 – 20 ha category while 11% were in the 50 – 100 ha category. Thirteen percent of REPS farms

[1] Utilisable Agricultural Area (UAA): Area under crops and pasture plus the area (unadjusted) of rough grazing. It is the total area owned, plus area rented, minus area let, minus area under remainder of farm.

were hill farms. Very small and very large farms were under represented in REPS with farms under 10 ha accounting for 3.6% of REPS farms and farms over 100 ha accounting for 1% of REPS farms.
REPS farmers were younger (50) in age than extensive non-REPS farmers (53) but were older than the intensive non-REPS farmers (48). REPS farms had smaller size units (15.9 ESU2) than the extensive (17.5 ESU) and intensive (39.7 ESU) non-REPS farms. Seventy-seven percent of REPS farm holders were married compared to 64% and 68% of the extensive and intensive non-REPS farms, respectively. The percentage of farms with off farm income was similar for the REPS and extensive non-REPS groups (45% and 44%, respectively). Also, the percentage of farm holders with off farm income was similar for the REPS and extensive non-REPS groups (30% and 32%, respectively).

NFS98 ANALYSIS - FINANCIAL RESULTS

The 1998 financial performance for the REPS and non-REPS farms as indicated by gross output, direct costs, gross margins, overhead costs and family farm incomes are summarised in Table 1.

Table 1: Financial performance indicators for the REPS and non-REPS farms (£/ha).

	REPS		non-REPS	
	Excl. Payment[1]	**Incl. Payment[2]**	**Extensive**	**Intensive**
Gross Output	702	812	808	1709
Direct Costs	227		268	630
Gross Margin	475	585	539	1080
Overhead Costs	246		254	504
Family Farm Income	229	339	286	576

[1] Excludes REPS Payment, [2] Includes REPS Payment.

Excluding the REPS payment, the gross output for the REPS group was £702/ha, however when the REPS payment was included the gross output increased to £812/ha. The corresponding gross outputs for the extensive and intensive non-REPS groups were £808 and £1,709, respectively. Low output in REPS is not due to lower stocking rates but to these farms having relatively low output systems of farming.

Direct costs for the REPS group were £227/ha compared to £268/ha and £630/ha for the extensive and intensive non-REPS groups, respectively. Excluding the REPS payment, the gross margin for the REPS group was £475/ha: however, when the REPS payment was included the gross margin increased to £585/ha. The gross margins for the extensive and intensive non-REPS groups were £539/ha and £1,080/ha, respectively.

Overhead costs for the REPS group were £246/ha compared to £254/ha and £504/ha for the extensive and intensive non-REPS groups, respectively. Compared to 1997, overhead costs increased on REPS farms while they decreased on both groups of non-REPS farms. This increase in overhead costs could be attributed to REPS compliance costs particularly, land and building maintenance.
Excluding the REPS payment, the family farm income for the REPS group was £229/ha: however, when the REPS payment was included the family farm income increased to £339/ha. The family farm incomes for the extensive and intensive non-REPS groups were £286/ha and £576/ha, respectively. Compared to 1997, family farm income on REPS farms increased by £26/ha while there was an £8/ha increase on extensive non-REPS farms and £34/ha decrease on intensive non-REPS farms.

[2] ESU: As an alternative to farm size measured by surface area (map area) the size of the farm business is measured in European Size Units (ESU), where, 1 ESU = 1,200 ECU of Standard Gross Margin.

NFS98 - Investment and Maintenance:

REPS measure 1 requires adequate pollution control and animal housing facilities to be put in place on the farm. For many less intensive farms this means significant new investment in the early stages of the plan. Also existing farm buildings must be kept in good repair, boundary fences stockproofed, watercourses fenced off and farmyards kept tidy (REPS measures 3, 5 and 8).

The investment and maintenance costs per ha for the REPS and non-REPS farms in the 1998 NFS are summarised in Table 2.

Table 2: Investment and maintenance costs (£/ha) for the REPS and non-REPS farms in the1998 NFS.

	REPS	**non-REPS**	
		Extensive	**Intensive**
Machinery Investment	33	35	62
Building Investment	55	32	64
Building Maintenance	10	9	25
Land Improv./Maint.	23	17	24

For the REPS and non-REPS groups, the level of machinery investment per hectare in 1998 was below the corresponding investment levels for 1997. Machinery investment on REPS farms in 1998 was £33/ha compared to £35/ha and £62/ha for extensive and intensive non-REPS farms, respectively. Corresponding machinery investment for 1997 was £56/ha, £50/ha and £97/ha, respectively.

Likewise the 1998 level of building investment per hectare was below the 1997 level for the REPS and non-REPS groups. However, the 1998 level of investment in buildings for the REPS group was still higher than for the extensive non-REPS group. Building investment on REPS farms in 1998 was £55/ha compared to £32/ha and £64/ha on the extensive and intensive non-REPS farms, respectively.

For the REPS group, building maintenance costs were slightly higher (£10/ha) than for the extensive non-REPS group (£9/ha). Building maintenance costs for the intensive non-REPS group were £25/ha. The intensive non-REPS group would have more buildings and this would explain the higher maintenance costs. Land improvement and maintenance costs were £23/ha for the REPS group in 1998 compared to £17/ha and £24/ha for the extensive and intensive non-REPS groups, respectively.

NFS98 - Levels of Inputs and Stocking Rates:

The input costs for the REPS and non-REPS farms in 1998 are summarised in Table 3. Expenditure on lime for the REPS group in 1998 was £3/ha compared to £2/ha and £3/ha for the extensive and intensive non-REPS groups, respectively. A major objective of REPS is to prevent water pollution by the movement of nitrates and phosphates from agricultural sources. Organic and inorganic fertilisers along with pesticides are potential water pollutants and in order to reduce this pollution risk REPS imposes certain usage and spreading limits on participants.

The REPS farms spent less per hectare on fertiliser than the non-REPS farms. Fertiliser costs on the REPS farms were £43/ha compared to £57/ha and £110/ha for the extensive and intensive non-REPS farms, respectively.

Table 3: Input costs for the REPS and non-REPS farms in 1998 (£/ha).

		non-REPS	
	REPS	**Extensive**	**Intensive**
Lime	3	2	3
Fertiliser	43	57	110
Pesticides (Tillage)	64	84	

Except for the tillage system, expenditure on pesticides was minimal on all other farming systems in the REPS and non-REPS groups. The tillage system in the REPS group spent £64/ha on pesticides compared to £84/ha for the tillage system in the non-REPS group.

The stocking rates (LU/ha) and inorganic N and phosphorus (P) use (kg/ha) for the REPS and non-REPS farms in 1998 are summarised in Table 4.

Table 4: Stocking Rates (LU/ha) and inorganic nitrogen and phosphorus use for the REPS and non-REPS Farms in 1998.

		non-REPS	
	REPS	**Extensive**	**Intensive**
Stocking Rate	1.37	1.34	2.49
Inorganic nitrogen	70	95	215
Inorganic phosphorus	9	13	15

Stocking rates for the REPS group were higher than the extensive non-REPS group (1.37 LU/ha vs. 1.34 LU/ha, respectively). For the REPS group, the stocking rate increased by 0.11 LU/ha over the stocking rate of the 1997 REPS group. This increase in stocking rate is a result of more intensive farms entering the REPS scheme in 1998 than in the earlier years.

REPS farms used less inorganic N (70 kg/ha) than the extensive (95 kg/ha) and intensive (215 kg/ha) non-REPS farms. For the three groups the inorganic N usage was higher in 1998 compared to 1997. The bad weather conditions and reduced grass growth in 1998 meant that farmers had to spread more inorganic N to grow adequate grass. As the REPS group represented farms of higher stocking rates in 1998 than the 1997 REPS group, the 1998 REPS group would be expected to require more inorganic N compared to the 1997 REPS group. Total N use by REPS farmers was still below the limits set down in the scheme.

The quantity of inorganic P used in 1998 was below the 1997 level for the three groups. The largest decline in inorganic P usage was on the intensive non-REPS farms where it fell by 3 kg/ha compared to 1997. The reduction in P inputs may, in part, be attributed to the successful Teagasc P campaign in 1998. Of the three groups, REPS farms used the lowest level of inorganic P (9 kg/ha).

NFS98 –Summary of Results:

Participating farmers in the REP scheme are in a better position having joined REPS. REPS payments increased the gross output on participating farms from £702/ha to £812/ha. The direct costs were lower on REPS farms, due largely to the lower chemical fertiliser usage on these farms. The gross margin increased from £475/ha to £585/ha as a result of REPS participation. However, REPS compliance costs meant that there was an increase in 1998 overhead costs for the REPS group compared to 1997. The overhead costs for both non-REPS groups declined over the same period. When REPS payments were included, family farm income increased from £229/ha to £339/ha in 1998. In 1998 the family farm income for the REPS

group was £53/ha greater than for the extensive non-REPS group. The additional income can be regarded as a return for the work involved in implementing the REPS plan, compensation for the production restrictions imposed by the scheme and a return from the additional investment in buildings and equipment.

In 1998 the level of machinery investment was below the 1997 level for the three groups. The REPS and extensive non-REPS group had almost the same level of investment in 1998. In 1998, the investment in buildings was also under the 1997 investment levels for the three groups. However, investment in buildings was higher on the REPS farms than the extensive non-REPS farms. This indicated that the REPS group are putting pollution control facilities and animal housing in place on their farms as required under REPS measure 1. The decrease in building investment across all three groups compared to 1997 may be linked to the lack of farmyard pollution grants in 1998. But also by 1998 a significant proportion of REPS farmers were in the second and third year of the plan and may have investments made in the earlier years.

Land improvement and maintenance costs were also higher on REPS farms than on the extensive non-REPS farms. Again this is due to REPS compliance costs. However, as a result participating farms in REPS have their external field boundaries stockproof, all watercourses on the farm fenced and improved the visual appearance of the farm.

For REPS farms, stocking rates increased in 1998 compared to 1997 and the REPS group now have higher stocking rates than the extensive non-REPS groups. The increase in stocking rate is a result of more intensive farms entering the scheme. The percentage of specialist dairy farms in REPS was up from 12% in 1997 to 17% in 1998. Also when farmers enter into a 5 year plan and improve building and pollution facilities on the farm, this may give them the option of carrying some more animals on the farm in the initial stages of the plan.

Even with higher stocking rates, the REPS farms used less chemical nitrogen and phosphorus than the extensive non-REPS farms. This shows that REPS farms are benefiting from the nutrient management plans and soil analysis which are required for all REPS participants.

NFS94/98 ANALYSIS

This analysis allows us to compare the position of farms pre-entry and post-entry into REPS. Farms that were in the NFS in 1994 and were also in the 1998 NFS were examined. These farms were divided into three categories:

- REPS Farms. These are farms that were in the NFS in 1998 and 1994 and who had joined REPS by 1998. There were 151 farms in this sample.
- Non-REPS Farms. This group is further broken down into two sub groups:
    - Extensive non-REPS Farms. These farms were not in REPS but were in the NFS in 1998 and 1994. These farms produced less than 170 kg organic N/ha (UAA) in 1998. There were 302 farms in this sample.
    - Intensive non-REPS Farms. These farms were not in REPS but were in the NFS in 1998 and 1994. These farms produced over 170 kg organic N/ha (UAA) in 1998. There were 68 farms in this sample.

For these three groups, their situation in 1998 was compared relative to 1994. The performance of the REPS group was also compared relative to the performance of the non-REPS group.

NFC94/98 - FINANCIAL RESULTS

Excluding the REPS payment, the gross output (£/ha) on the REPS farms increased by 4% in 1998 when compared to 1994. When the REPS payment was included the gross output per hectare increased by 22% on the REPS farms. This contrasts with a 1% and 3% increase in the value of gross output per hectare for the extensive and intensive non-REPS farms, respectively.

Direct costs (£/ha) increased by 2% for the REPS farms. The direct costs per hectare for the extensive and intensive non-REPS farms remained the same and increased by 6%, respectively.

Excluding the REPS payment, the gross margin per hectare for the REPS farms increased by 5%. However, when the REPS payment was included the gross margin per hectare increased by 31%. For the extensive and intensive non-REPS farms there was a 2% and 1% increase in gross margin per hectare, respectively.

Overhead costs per hectare increased by 21% for the REPS farms compared to a 6% and 1% increase for the extensive and intensive non-REPS farms, respectively.

Excluding the REPS payment, there was a 9% decrease in family farm income per hectare on the REPS farms. When the REPS payment was included the family farm income per hectare increased by 40% for the REPS farms. There was a 1% decrease and 1% increase in family farm income on the extensive and intensive non-REPS farms, respectively, in the same period.

NFS94/98 - Investment and Maintenance

Machinery investment per hectare increased by 116% in 1998 compared to 1994 for the REPS farms. On the extensive and intensive non-REPS farms machinery investment per hectare increased by 56% and 48%, respectively. Investment in buildings increased by 167% per hectare on REPS farms compared to corresponding increases of 17% and 49% on the extensive and intensive non-REPS farms, respectively.

The cost of building maintenance per hectare increased by 18% an REPS farms while there was a 4% and 7% decrease in corresponding costs on the extensive and intensive non-REPS farms, respectively.

There was an increase in land improvement and land maintenance costs of 81% per hectare on REPS farms compared to a 47% increase and 30% decrease in corresponding costs on the extensive and intensive non-REPS farms, respectively.

NFS94/98 – Input Usage and Stocking Rates

For the REPS farms there was a 50% increase in lime expenditure in 1998 compared to 1994. Over the same period there was no change in lime expenditure on the extensive and intensive non-REPS farms. Fertiliser expenditure per hectare decreased by 12% on REPS farms compared to a 2% increase on the extensive non-REPS farms. There was no change in fertiliser expenditure on the intensive non-REPS farms. Pesticide expenditure per hectare decreased by 6% on REPS tillage farms, while there was a 39% increase on non-REPS tillage farms.

Inorganic N use decreased by 9% on the REPS farms, it decreased by 5% and increased by 3% on the extensive and intensive non-REPS farms, respectively. Fertiliser P use decreased by 34% on REPS farms, 18% and 29% on extensive and intensive non-REPS farms, respectively. A 29% reduction in P fertiliser use on intensive farms may reflects the effect of the 1998 Teagasc P campaign.

The stocking rate on REPS farms increased by 10% in 1998 compared to 1994. Stocking rates also increased on the extensive and intensive non-REPS farms by 4% and 13%, respectively. This increase in stocking rates automatically gave an increase in the amount of organic nitrogen and organic phosphorus produced by the three groups.

NFS94/98 – Summary

Excluding the REPS payment, there was an increase in gross output per hectare on REPS farms in 1998 compared to 1994. However, the increase in gross output per hectare was much greater when REPS payments were included. The increase in farm output is a once off increase and is probably linked to investment in new facilities on the farm, the nutrient management plan for the farm and the fact that the REPS farms were coming from a lower output base. Further increases in output are not expected after the first year of the REPS plan.

There was an increase in direct costs per hectare on the REPS farms due in part to the higher stocking rates. Overhead costs on the REPS farms increased by 21%. Part of this increase in overhead costs is land and building maintenance costs together with REPS compliance costs. The REPS payment exceeded these higher costs. Family farm income increased by 40% per hectare on REPS farms compared to a 1% decrease and 1% increase for the extensive and intensive non-REPS groups, respectively.

The higher income of the REPS group facilitated an increase in their level of investment in machinery and buildings in 1998 compared to 1994. In absolute terms the REPS farms had a higher investment in buildings and machinery than the extensive non-REPS farms.

There was an increase in stocking rates on the REPS farms in 1998 compared to 1994. Even with the increase in stocking rates the REPS farms were still within the fertiliser limits set down in REPS and were using less chemical nitrogen and phosphorus in 1998 than they were in 1994 when they had lower stocking rates. In 1998, REPS farms used 25 kg and 4 kg less of chemical nitrogen and chemical phosphorus, respectively, per hectare than the extensive non-REPS farms. The use of pesticides on tillage farms in REPS also reduced in 1998 compared to 1994.

REPS farms are in a better position having joined REPS. Financially farms in REPS are better off, although they had increased investment and maintenance costs. The REPS planning process and investment in facilities allowed participating farms increase their stocking rates. The amount of chemical nitrogen and chemical phosphorus used on REPS farms decreased between 1998 and 1994. This shows that the REPS farms are benefiting from the nutrient management plan and soil analysis, both of which are essential requirement of REPS. This reduction in chemical fertiliser usage directly benefits the farmers as they spent 12% less per hectare on fertiliser in 1998 compared to 1994. Increases in machinery and building investment would suggest that REPS farms have improved pollution control facilities and buildings on the farms in order to meet the REPS standards. Increases in building and land maintenance costs also indicate that farm and farmyards, hedgerows, buildings, waterways etc. are being maintained as required under REPS. This should give an improved visual appearance of the countryside, protect waterbodies and support wildlife and habitats. REPS payments are providing a reasonable reward to participating farmers for their investment in new facilities, their work in implementing the REPS plan and their substantial planning and compliance costs.

CONCLUSIONS

Both the short term (NFS98) and the long term (NFS94/98) analysis indicate that farmers participating in REPS are achieving better financial returns than extensive non REPS farmers.

The relative short term and long-term investment and maintenance costs on REPS were higher compared with extensive non REPS farms. This may reflect the compliance costs that REPS participation requires.

Inorganic N and P inputs were lower on REPS compared with extensive non REPS farms.

REPS farms increased stocking rates between 1994 and 1998 relative to extensive non REPS farms. This increase in conjunction with the reduction in fertiliser inputs provides an indicator of improved nutrient use efficiency on REPS compared extensive non REPS farms. This suggests potentially improved environmental performance on REPS farms.

APPROACHES TO EVALUATING SOME REPS MEASURES

Dr Brendan Kavanagh, Botany Department
Royal College of Surgeons, Dublin

INTRODUCTION

Agriculture has been traditionally concerned with the production of food and fibre to meet the needs of the world's population. However, European agriculture is in a period of change. This reflects not only the consequences of the intensification of agricultural production systems but also changing global markets for food and the recognition of the need to address the impacts of agriculture on the natural environment (water, air, soil and biodiversity). Equally society requires other issues relating to agriculture including animal welfare, food safety and rural development to be addressed. Therefore, the requirements of the "new" agriculture will be to deliver not only food and fibre but also environmental protection, stewardship of the rural landscape and contribute to the viability of rural areas.

Consequently, European Union (EU) agricultural and environmental policies and instruments are seeking to meet these societal demands. An important element of this has been the reform of CAP. It is resulting in a change from price support systems to direct farmer payments. Increasingly, such payments will be directed towards the achievements of the broadened requirements of the "new" agriculture. The financial support provided to achieve these objectives is considerable in terms of the overall EU budget.

The EU agri-environmental regulation, 2078/92, provides for Member States to introduce programmes that encourage farmers to farm in a more environmentally friendly way. The Rural Environment Protection Scheme (REPS) forms part of the Irish Government's response. Its objectives are to promote the development of a more sustainable agriculture that meets specific environmental targets. This is achieved through the development of individual farm plans that are prepared to protect the environment. Farmers are financially compensated for implementing measures that exceed the basic requirements of good agricultural practices.

In today's society, and particularly in Ireland, transparency and value for money have become part of the vernacular. Therefore, it is not surprising that there are European requirements to demonstrate that REPS is delivering on its objectives considering the level of expenditure. Indeed, the Department of Agriculture, Food and Rural Development (DAF) has recently submitted an evaluation report of the first five years of the Irish REPS to the EU.

Teagasc and a number of third level institutions (University College Dublin, Trinity College Dublin, Royal College of Surgeons) in conjunction with DAF have put in place a seminal programme to evaluate the impact of a number of REPS measures on biodiversity and the landscape. The projects broadly address landscape and biodiversity. The objective of this paper is to present a brief description of the studies involved and to outline possible future requirements.

STUDIES TO EVALUATE LANDSCAPE AND BIODIVERSITY ASPECTS OF REPS MEASURES

Currently, there are four Teagasc Johnstown Castle studies in progress to evaluate landscape and biodiversity aspects of REPS measures. These studies are being facilitated by the Teagasc Walsh Fellowship Scheme (WFS) and are receiving additional funding from DAF. The projects involve collaboration between Teagasc and third level institutions with each of the students proposing to prepare and submit a PhD thesis on their work. The project details are summarised in Table 1.

Table 1: Walsh Fellowship studies to evaluate aspects of REPS measures in 1999.

Title	**Third Level Institution & Academic Supervisors**	**Student**	**Initiation Date**
The implementation and impact of Measure 7 of REPS	Dept. of Archaeology, UCD Dr. M. O'Sullivan, UCD Dr. B. Coulter, Teagasc	E. Sullivan	1996
A baseline study of the effects of agricultural practices on the natural heritage of the Burren	Dept. of Environmental Resource Management, UCD Dr. J. Feehan L. Jones, Teagasc	B. Dunford	1997
An evaluation of the impact of REPS on the biodiversity of farmland using avifauna as bio-indicators	Biology Division, Royal College of Surgeons in Ireland Dr. B. Kavanagh, RCSI Drs, Culleton & Carton, Teagasc	M. Flynn	1998
Assessment of the effects of REPS on biodiversity	Geography Dept, TCD Dr. D. Gillmor Drs. Culleton & Carton, Teagasac	J. Feehan	1998

A brief description of each project is presented with relevant results where applicable.

The Implementation and Impact of Measure 7 of REPS

Objective: To evaluate the implementation and impact of REPS on the identification and protection of features of historical and archaeological interest.

Method: Five pilot study areas within counties Kerry, Mayo, Roscommon, Tipperary and Wexford were chosen. The base line data used was the county Sites and Monuments Record (SMR) which was produced by the Archaeological Survey of Ireland. Three of the study areas had additional published field inventories. All planners are recommended to consult the SMR to identify sites and monuments for inclusion in the agri-environmental plans.

Farms in the study area were visited. A detailed field by field archaeological survey was conducted and a questionnaire was completed by interview.

Results: Some of the earlier results of this work have been presented previously at REPS conferences. The more recent research results indicate there is an increased usage of the SMR in the preparation of REPS plans. The most recent pilot study areas were Mayo and Kerry, where in excess of 92% of SMR features were recorded by planners. In three of the pilot study areas only two SMR sites for each area were not recorded. Non detection of known monuments in plans from the two other study areas appears to reflect the high concentration of archaeological features in the area and the fact that the REPS plans were originally prepared in the early years of the scheme. This latter finding suggests that the usage of the SMR has improved as REPS has continued. Nearly all the REPS plans in the study areas produced within the last two years have included reference to and a photocopy of the relevant portion of the SMR constraint maps.

The REPS field survey has resulted in the discovery of 65 new features of historical and archaeological interest, which were not previously recorded. This represents one newly recorded feature for every three farms. The method used for the discovery of these features is of greatest interest. Thirty percent of all the newly discovered features were identified during conversation with the farmer and would have gone unrecorded through the conventional archaeological survey. The highest concentration of newly discovered features was in Co. Kerry, where the majority, 83%, were located in isolated areas of mountainous commonage. This contrasts sharply with other areas, such as Wexford, where only one newly discovered archaeological feature was identified through the field survey.

General Comment: The impact of REPS has been beneficial in terms of increasing farmer awareness of historical and archaeological features on their land. The success of REPS can also be seen in the increased numbers of newly discovered features identified by the Teagasc REPS planners in the agri-environmental plans and identified by an archaeologist through inspection of the farm and conversation with the farmer. The potential for further discoveries is enormous when one considers that these figures represent a detailed analysis of approximately half a percent of all REPS farmers. This potential archaeological catalogue is of much importance in terms of assessing the condition and scale of our Irish heritage as well as highlighting the avenues for extending the cut off point of the SMR, which culminates at 1700AD. In terms of the features themselves, none of the archaeological features in the study areas shown on the SMR and recorded in the agri-environmental plans have been destroyed since REPS commenced in 1994.

A Baseline Study of the Effects of Agricultural Practices on the Natural Heritage of the Burren

Objective: To evaluate in detail the critical relationship between farm practices and the environment in the Burren region.

Management prescriptions for fertilisation, supplementary feeding and grazing that affect farm landscape are included in the Burren's area-specific REP scheme. Recent estimates indicate that approximately700 farmers, accounting for 50% of the area, are REPS participants.

Methods: Uniform plots within the 'winterage' area were chosen, over the last 20 months, on 50 randomly selected farms. The vegetation is sampled by taking two transects. Five, 1 m^2 quadrats, were recorded along each transect. In addition, a soil sample was taken and analysed for major nutrients and pH values. The site was marked and photographed should it need to be revisited in future to monitor subsequent developments.

A questionnaire was prepared and completed during interviews with the farmers. The results will be used to support analysis/interpretation of the ecological data and to ascertain farmer's attitudes to a variety of relevant issues. Approximately 20 farm questionnaires have already been completed. The data will be analysed using appropriate statistical and ecological analyses.

Results: As the data analysis is not yet complete only a provisional indications of the expected outcome can be presented.

It is becoming clear that certain limitations are emerging in terms of using the collected data to evaluate the effectiveness of REPS from an ecological perspective. In the absence of existing baseline data, direct comparisons between similar REPs/non-REPs farms has been adopted as the best method of evaluating the scheme. However, the inherent complexity and high variability of the Burren vegetation compromise the effectiveness of this approach.

There is little likelihood that ecological changes between REPS and non REPS farms will be detected after less than four years operation.

Early indications from the farm surveys suggest that the scheme is playing an important role in supporting farming in areas where it would otherwise prove fruitless. This is especially significant in the Burren where neglect of farmland would seem to promote the encroachment of scrub, increasingly seen as one of the greatest threats to the integrity of Burren's remarkable natural and cultural heritage. Further research into quantifying this threat and its implications from agricultural and environmental perspectives, will form part of this study.

An Evaluation of the Impact of REPS on the Biodiversity of Farmland Using Avifauna as Bio-Indicators

Objective: To evaluate the impact of REPS on the natural environment within farmland using birds as biological indicators.

There has been a decline in many birds associated with farming in recent years, the most notable being the Corn Crake and the Corn Bunting in Ireland. This project will shed light on the habitat requirements of key species of birds on farmland and allow both the assessment and modification of REPS with respect to biodiversity on farmland.

Method: This will be accomplished by examining the benefits of the management prescriptions on biodiversity using birds as biological indicators. Field work began in January 1999 with the selection of farms in Wexford and Offaly. In each county, three farms were chosen, two of which are REPS participants. All of the farms are representative of typical farming in the area.

Birds were censused using the established territory mapping method. This method is based on the British Trust for Ornithology (BTO) Common Bird Census, in use since 1962. It provides a table of bird numbers and also a map of the location of each bird territory within the farms. Analysis of Common Bird Census data from the BTO has shown that hedges hold a greater amount of breeding birds than any other feature of farmland. Primary hedgerow characteristics were measured including hedgerow length, width and height, tree species, shrubs and herbs present. The hedgerow characteristics selected by each species will be identified using multivariate statistical analysis. This will enable us to predict the impact of specific hedgerow management prescriptions as set out under REPS, on each species. A broader survey of farmland and hedgerows will be undertaken to test the predictions based on this analysis. Relatively few studies have been carried out describing the bird populations of farmland in Ireland

Results: Approximately, 180 ha of farmland have been intensively studied on the 6 farms in Wexford and Offaly. To date, 26.092 km of hedgerow have been surveyed 8 times and maps of the location of the bird species drawn up. Thirty-three species have been recorded with an average of 21 breeding species on the farms.

Assessment of the Effects of REPS on Biodiversity

Objectives: There are three objectives that include

1. To investigate the effects of the REPS on biodiversity by surveying plants and selected invertebrate groups.

2. To devise a methodology for the collection of ecological baseline data on REPS farms.

3. To appraise those REPS measures, which relate to the maintenance and enhancement of biodiversity, making recommendations where necessary.

Methods: Thirty farms in Laois and Offaly were surveyed in the first year. All are predominantly drystock cattle farms. Equal numbers of REPS and non-REPS farms were included, and care was taken to ensure that these two groups were as similar as possible. This approach was necessary to substitute for the lack of baseline data. All REPS farms had been in the scheme for a minimum of four years.

Plants, carabid beetles, spiders and a group of parasitoids were sampled. These groups were selected because they span a wide range of guilds and tropic levels, are relatively widespread, and are responsive to alterations in management. Surveying was designed to relate to specific measures. Botanical surveying was carried out on hedges, field margins and watercourse margins. Pitfall traps in field margins were set in early June and late August. The parasitoids of aphids on thistles were surveyed on each farm in August and September.

Results: On each of the 30 farms a total of two hedge surveys, four field margin quadrats, two watercourse margin quadrats, eight pitfall traps (four in June and four in August), and aphid parasitoid sampling, were carried out.

It will be very difficult to distinguish the impact of the REPS from the impact of the many other factors that influence biodiversity on a given farm. This problem could be considerably reduced if the basis for comparison were baseline data for each REPS farm, rather than non-REPS farms, which can differ in many ways other than membership or non-membership of the scheme. It is also the case that five years is an insufficient length of time for many of the potential ecological benefits of the scheme to emerge, let alone to become statistically detectable.

For these reasons, an absence of statistical differences between the biodiversity on REPS and non-REPS farms at this stage would be neither surprising nor reflective of the success, or otherwise, of the scheme. It is more important that a system for baseline data collection be established and that a comprehensive monitoring scheme be set up, such that regular critical evaluation of the scheme take place - particularly important for a scheme as innovative as the REPS. The experience with the tools of ecological monitoring and assessment that has been accrued in this first year will help in the devising of a protocol for such a monitoring scheme.

CONCLUSION

There are a limited number of studies in place to monitor the impact of REPS on landscape and biodiversity.

There is a requirement for an evaluation of REPS impact on water quality.

The project outputs will provide a monitoring framework rather than robust baseline data for future evaluations.

A comprehensive programme is required to establish the robust baseline required for REPS evaluation. By coordinating the relative national experts from the competent bodies a more comprehensive monitoring and evaluation programme can be developed and implemented. The inter-agency model used for the projects, discussed above, may offer an initial framework for such a development.

ENVIRONMENTAL PROTECTION REQUIREMENTS FOR AGRICULTURE – PERSPECTIVE FOR THE NEW MILLENNIUM

Michael Hamill
Head of Agriculture Sector
European Commission, DG Environment.

INTRODUCTION

The profile of the environment is rising in relation to all human activity but especially to agriculture. Agriculture and forestry account for 75 % of land use in Europe and the limited overall space in Europe means that farming and other activities are often intervened. Agriculture is a very visible activity and farming itself is changing very rapidly.

This paper examines briefly the trends in both agriculture and in policy in the European Union (EU) and then to develop three themes dealing with the Nitrates Directive, the linkage between direct support payments and environmental protection and finally rural development and the place of agri-environment measures (REPS).

CHANGING FACE OF FARMING

Currently, there are about 7.4 million people working in the agricultural sector in the EU with an annual decline of 2-3%. Agriculture accounts for 5% of the workforce with a marked imbalance between various Member States.

Various trends are evident within agriculture itself. Both intensification and specialisation are among the more important of these and both place increased pressure on the environment.

The dairy sector provides a clear picture of the trend towards intensification. Producer production quotas were introduced in 1984 in order to avoid over-production and stabilise markets. Since then, milk production has remained static but dairy cow numbers have decreased by 20% as milk yields have risen. However, the number of producers has decreased by 50% while the average size of dairy herd has risen from 19 to 30 cows. Of course, many herds are much larger and 40% of dairy cows are now held on farms with more than 50 cows.

In the pig sector, an overall trend to increasing production has been evident for many years and production is concentrated in certain areas although there is a recent trend to place units in the cereal growing areas. In most Member States (MS), pigs are now held on holdings with more than 100 sows but by 1995 the average number of sows per holding was greater than 300 in the UK and Ireland and more than 200 in Denmark, Greece, Portugal, Germany, Netherlands and Sweden.

Inorganic fertiliser consumption, which was about 5 million tonnes annually in the 1950s, peaked at 20 million tonnes in the 70s and 80s before decreasing to its current level of approximately 16 million tonnes. Pesticide use shows a similar trend with current levels at about 300,000 tonnes annually.

At the same time, some regions of the EU are facing the marginalisation of agriculture through the abandonment the abandonment of extensive farms and in areas where small farms predominate.

These various trends in agriculture all have implications for the environment and their effects can be seen in so far as water, air, soil, bio-diversity and landscape are concerned.

CHANGING CAP

Until its reform in 1992, the Common Agricultural Policy (CAP) was largely concerned with market management and the income situation of farmers although, of course, pressures had been building for several years for the integration of environmental concerns notably through the Single European Act of 1986.

CAP spending at that stage tended to be in the form of public intervention purchasing of farm produce in the form of butter, skim milk powder, beef and cereals and/or the support for the export of these and many other farm products through the provision of export refunds. The use of these mechanisms, together with import controls, enabled market prices for farm produce to remain at levels ensuring farm incomes.

In general, although the sheep sector provides an obvious exception, farmers were not paid direct support payments.

When over-production in particular sectors, such as sugar beet or milk, threatened to cause major disruption, production quotas were introduced.

In the 1992 reform, partly undertaken to prepare the Community for the international trade issues to be faced the Council of Ministers reduced the institutional price for several commodities and introduced quotas, in various forms, into the cereals, beef and sheep sectors. As compensation, it introduced direct support payments notably in cereals and much extended their scope in the beef sector.

This changed method of support is important. Farmers, since 1992, have been paid direct support on all the main land-using production systems with the exception of dairying. It is important to stress, however, that pig and poultry production is little dependent on the CAP and producers in these sectors are not normally in receipt of support payments.

The Agenda 2000 reform of the CAP, finally agreed in Berlin this spring, reinforces the concept of direct payments to producers. In this reform, institutional prices for beef, cereals and eventually milk will be reduced further and producers will be compensated through increased direct payments. Subject to market developments producers' dependence on such payments may increase and a very large part of the CAP market budget, which, in 2000, is set to reach Euro 40 billion will be in the form of direct payments. This dependence is all the more crucial now as in recent years market prices for many of the major farm products have fallen substantially both within the EU and world-wide.

The visibility of support to farmers is therefore greatly increased just as society develops its expectations from the farm sector and seeks to ensure that it gets value in environmental as well as agricultural terms.

ENVIRONMENTAL POLICY

Environmental policy too is developing. There is a vast array of environmental legislation in place in the EU and several classical Directives. These include the so called Nitrates Directive and the Dangerous Substances Directive both are of importance for agriculture as are Nature Protection Directives and now and in the future Directives dealing with sludge, waste, air, water and perhaps someday even soil.

But the orientation of environment policy is changing. The Amsterdam Treaty which, entered into force in early summer of 1999 requires the integration of environment into other policies. A much loved argument that CAP agricultural support should deal with markets while farmers contributions to a neutral environment should be an add on are, therefore, no longer valid.

Alongside the Treaty obligation there is now an active process going on to ensure the integration of environment into all policy areas with each Council (including the Agriculture Council) required to report on progress on integration to the Helsinki Heads of Government meeting in a few weeks time.

The Nitrates Directive

The Nitrates Directive (91/676/EEC) concerning the protection of waters against pollution caused by nitrates from agricultural sources was agreed by the Council of Ministers in December 1991. It is binding on all Member States (MS) and in keeping with the "polluter pays principle" there is no payment to producers for respecting it.

Although Ireland has not designated any nitrate vulnerable zones, discussion of the Directive is important given the trends in Irish farming and indeed the pattern of uptake of REPS.

In the European Union the Drinking Water Directive has regulated the concentration of nitrate in drinking waters since 1980. This has recently been updated by Council Directive 98/83/EC on the quality of water intended for human consumption. This Directive establishes a maximum admissible nitrate concentration of 50 mg/l in drinking water. The maximum level is based on World Health Organisation guidelines. The maximum and a lower guide level are widely accepted on human health grounds, and significantly, were not challenged by MS during the negotiations on the Commission's proposal for a revision of the Directive.

The 1995 Dobris assessment of Europe's Environment quoted model concentrations of nitrate leaching from agricultural soils. The assessment indicated that 87 % of the agricultural area in Europe has nitrate concentrations in the groundwater that are above the guide level value of 25 mg/l, and 22 % that are above the 50 mg/l level. In many areas these levels are increasing with existing sources of drinking water having to be closed or being subject to costly treatment processes at the expense of the consumer. The 1998 assessment indicates that little has changed in recent years.

Elevated levels of nitrates are also significant contributors to eutrophication, particularly in marine and coastal areas. In these areas they stimulate high levels of algal growth which lead to marked changes in the nature of the ecosystem, usually to its detriment. Large areas of the North Sea coastlines have been identified as suffering from eutrophication, as well as areas of the Mediterranean. The most efficient way of reducing such eutrophication is to reduce the inputs of nitrate and other nitrogen (N) sources. Finally, in some parts of Europe high nitrates levels can be linked to the presence of high phosphate levels also leading to eutrophication of groundwater.

It can take many years for nitrate pollution to reach a water body once it has left the soil-root zone. Indeed, much of the high concentrations of nitrate in waters today have been caused by agricultural practices of past decades. It also follows that today's agricultural practices will determine future nitrate pollution levels. The absence of an immediate visible link between an agricultural practice and pollution makes it difficult for farmers and others to see their role in causing pollution and the need to change practice.

The objectives of the Directive are two fold:

- to reduce water pollution caused or induced by nitrates from agricultural sources

- to prevent further pollution

In order to achieve those objectives, a timetable with a series of milestones was set down for the implementation of the Directive by MS.

Of particular interest are Codes of Good Agricultural Practice and the designation of vulnerable zones. The Department of Agriculture, Food and Forestry and the Department of the Environment published the Irish Code of Good Agricultural Practice to Protect Waters from Pollution by Nitrates in July 1996.

The designation of vulnerable zones includes all lands in a MS which drain into monitored waters affected by nitrate pollution and waters which could be affected by pollution if action was not taken.

Vulnerable zone designation requires the establishment of action programmes and presents the cutting edge of the approach to the achievement of the objectives of the Nitrates Directive. These programmes include rules relating to:

- Periods when the land application of fertilisers is prohibited.
- The storage capacity for livestock manure.
- The limitation of the land application of fertilisers consistent with Good Agricultural Practice taking account of soil, climatic conditions and land use and based on the balance between the foreseeable N requirements of the crop and the N supply to the crop from soil and fertilisation.
- These measures are intended to ensure that, for each farm, the amount of livestock manure applied to the land each year, including by the animals themselves, shall not exceed, in the initial action programme, 210 kg N/ha and thereafter 170 kg N/ha.

Efforts by Member States, which have already designated vulnerable zones, to implement action programmes are already well underway. They involve severe restrictions on farming as evidenced by measures such as the obligation to reduce inorganic N-fertilizer in Denmark to 90 % of the level for optimum crop yield is achieved or to achieve at least 85 % ground cover on arable land in winter.

In the Netherlands, the government is currently developing legislation designed to ensure that each individual farmer respects the N-manure application limit. This could result in the closure and restructuring of farms and a resultant loss of employment.

To the extent that a MS can, it is much better to avoid a situation where pollution tends or gets to such levels as requiring the designation of vulnerable zones and the follow up obligatory action plans. This is a key point.

AGENDA 2000 – CAP REFORM

The new reform, now agreed, represents a further development of the CAP. If all the opportunities therein are grasped by both MS and regions it can mark the turning point from the CAP's traditional role to that of a dynamic instrument for rural development and environmental integration.

In recognising the broadened role of agriculture while nevertheless acknowledging its importance for competitive food supply, the reform from an environmental viewpoint confirms society's legitimate demands that agriculture should not pollute the environment, nor lead to severe erosion, nor destroy cultural landscape features highly valued by society. On the other hand, where society desires that farmers deliver an environmental service beyond the baseline of good farming practice, this service

should be purchased through agri-environment measures. In blunt philosophical terms, farmers should observe basic environmental standards without compensation.

Common rules - environmental protection requirements: The main new element in so far as market support is concerned is the linkage of environmental protection requirements to direct support payments to farmers. A new Regulation No. 1259/99 establishes common rules for direct support schemes under the CAP and article 3 is worth quoting in full:

- Where agricultural activity within the scope of this regulation is concerned, MS shall take the environmental measures they consider to be appropriate in view of the situation of the agricultural land used or the production concerned and which reflect the potential environmental effects. These measures may include:
    - support in return for agri-environmental commitments,
    - general mandatory environmental requirements,
    - specific environmental requirements constituting a condition for direct payments (cross-compliance).
- MS shall decide on the penalties that are appropriate and proportionate to the seriousness of the ecological consequences of not observing the environmental consequences referred to above. They may provide for a reduction or, where appropriate, a cancellation of the benefits accruing from the support schemes concerned if such environmental requirements are not respected.

In a subsequent article of the same regulation, it is established that payments not made due to the implementation of this and a separate article dealing with the modulation of payments to producers shall be available to the MS concerned as additional Community support for rural development. These include measures dealing with early retirement, less favoured areas and areas with environmental restrictions, agri-environment and afforestation.

A number of issues require stressing;

1. The measure concerns direct support to farmers so that, while some unsupported and mainly non-land using sectors are unaffected, the vast majority of farmland comes under its remit.

2. There is an obligation on MS to take the measures they consider appropriate. This means that, unlike cross-compliance introduced in certain sectors in the 1992 reform and generally honoured in the breach, MS must now at least carry out some reflection and, if that reflection establishes that there are potential environmental effects, take the appropriate measures. The new burden of responsibility cannot be ignored.

3. The application of general mandatory requirements is always appropriate. This measure establishes that non-respect of such requirements can result in loss of direct support.

4. As direct support payments not made are diverted elsewhere within the CAP there is no loss of funding to the MS.

In developing thinking for the application of this regulation, the role of regions will be essential. The rural development plans, which involve consultation of the environmental authorities, to be submitted under the CAP reform require a detailed description of the current situation and an appraisal, among others, of the environmental impact. If the description of the current situation indicates environmental problems linked to agriculture then it would seem logical that while, in some measure, they be dealt with

through the rural development plan, to a greater extent they be approached through environmental protection measures linked to direct support payments.

The importance of these payments to farmers is now vital but it will be crucial that farmers be aware of any requirements linked to the environment and that these requirements be practical and verifiable. To achieve this there is certainly need for dialogue between the various authorities, farmers' organisations and NGOs.

In developing the practical application of the new rules, a MS or region might, for instance, decide that nutrient levels in water were too high or that soil erosion was a contributor to river silting or flooding. They could then insist that all farmers keep fertiliser or pesticide use records with a view to improving the nutrient balance on the farm or that only a certain proportion of arable land was left without cover during winter as a condition for direct payments. Furthermore, they could and should insist that the respect of MS regional Codes of Good Farming Practice be obligatory as a condition for direct payments.

Initial contacts with several MS indicate a growing interest in the use of the new rule. In the Netherlands for instance, it will be used to ensure the use of integrated production methods in relation to maize production and to reduce spraying of starch potatoes.

While many observers claim that the linkage of environmental conditions to direct payments will be a disincentive to farmers and cost them financially, this may not be correct. There is considerable wastage of nutrients in grazing livestock and arable production in many parts of the EU, which can be eliminated. Likewise, moves towards integrated crop management suggest that very significant reductions in pesticide use can be achieved through the adoption of better practices often with no change in crop yield and sometimes with an increase in income.

There is certainly a challenge now in place to use the measure. In Ireland, where there is considerable public concern about the state of water it might well be useful to reflect on making a Nutrient Management Plan of the type in Measure I of the REPS compulsory for all in receipt of CAP direct support. This should gradually result in ensuring a balanced use of fertilisers in relation to crop and land needs.

Rural Development Plans

The Agenda 2000 reform introduced the much publicised second pillar of the CAP in the form of rural development plans to be developed at MS and/or regional level. The measures to be covered by the plans are:

- Investment in agricultural holdings;
- Setting up of young farmers;
- Training;
- Early retirement;
- Less favoured areas and areas with environmental restrictions;
- Agri-environment (REPS) (only compulsory measure);
- Improving processing and marketing of agricultural products;
- Forestry;
- Promoting the adaptation and development of rural areas.

Funding essentially is via the EAGGF guarantee fund for non-Objective 1 areas and in them for the traditional accompanying measures and Less Favoured Areas (LFA). For other measures it is via the structural funds and the measures concerned form part of the structural programmes.

The Berlin agreement devoted Euro 4.3 billion to rural development annually during the period 2000 to 2006 so that, inevitably, the many legitimate expectations of MS and regions from rural development cannot be fully funded. The Commission has now divided this amount among MS. It will be essential that the plans be constructed in such a way as to ensure the maximum benefit possible.

From the environmental viewpoint, this will certainly mean placing sufficient emphasis on training, agri-environment, LFAs, and parts of forestry and it will be essential that environmental authorities play a full role in the development of plans. A number of elements in the rural development regulation and the detailed rules regulations will aid in this process.

First, Codes of Good Farming Practice will have to be defined. Agri-environment payments can only be made for actions going beyond this good practice. Clearly, the Codes can also be used to help establish whether farmers are entitled to direct payments under the CAP.

Secondly, environmental authorities will have to be consulted at all stages of the process on agri-environment – i.e. when measures are being prepared, implemented, monitored and evaluated. They will also be extensively consulted on the rural development programmes as a whole, which should result in a better integration of environmental concerns in the whole rural development approach in each region.

Thirdly, MS have to examine what the particular environmental needs and assets of their regions are, and this has to be part of the starting point for the Region Rural Development Plans. So it will not be possible for a rural development programme to ignore a major environmental issue in the region concerned.

REPS

The pieces of legislation described above put the REPS into context as a scheme that is acting in concert with several other policy instruments. The REPS, together with other components of rural development under Agenda 2000, the Nitrates Directive and the Habitats Directive are not separate and do not act in isolation. On the contrary, they are interlinked and mutually reinforcing.

REPS and environmental protection: Environmental protection and REPS have a special relationship. As noted above the intention is to make support payments conditional on the carrying out of basic good farming practice. REPS, however, operates on the assumption that a baseline level of good farming practice is being exceeded, and that further costs are being incurred in order to farm in a more environmentally responsible manner. The intention of the scheme is to provide compensation for losses incurred in doing this, or to provide an incentive to continue to farm in an extensive manner where intensification would otherwise have taken place. REPS should not be about paying farmers simply to reach a baseline level of good farming practice, and there is nothing new in this.
REPS and the Nitrates Directive: The relevance of the REPS to the Nitrates Directive is limited because uptake is highest in the areas where nitrate pollution problems are at there lowest. It is those areas of the country where intensive dairying and large piggeries are located that pose problems of nitrate pollution, and these are precisely the farming systems which, REPS has failed to attract.

However, the REPS may have a certain contribution to make. Measure 1, the Nutrient Management Plan, forms a useful framework for the type of sensible practice that could be made compulsory for all farmers in receipt of direct support. This is cross-compliance in action.

REPS Measure 4 ('Retain Wildlife Habitats') and the Habitats Directive: The habitats measure is a very useful but is underused. This is partly due to a misunderstanding of what a 'habitat' actually is. Many people think of a habitat as being a nature reserve or an NHA (SAC), something that is fenced off to

protect it from interference. Most of the SAC's designated in Ireland to date would be consistent with this notion. However, this idea of a habitat is very limited. A habitat is not a museum. Many areas are valuable and special precisely because they are lived in, farmed, and managed in certain ways. Fencing off is more often than not the wrong approach to take. Features that may seem ordinary and unremarkable, often merit designation as habitats within the REPS. Ponds, old hedges and some areas of unimproved grassland are examples. It should not take a substantial area of woodland or bogland to invoke Measure 4.

If we are to make correct use of this measure, it will be necessary for planners to have a broader approach to ecology and botany. (A step which would go a long way towards better implementation of the scheme overall.)

It is also useful to address the misconception that the presence of a rare type of plant or animal on one's land is a problem. It does not follow from this that someone else can dictate how that part of land is managed. Discussion and co-operation between the relevant parties is essential to resolving these issues.

Measure 4 may have a role to play in supplementing Ireland's contribution to the Natura 2000 pan-European network of valuable habitats. Ireland's contribution to date is a fraction of what it should be, and we are not doing our beautiful environment justice by appearing to value it so little.

The importance of evaluating and assessing the scheme, and establishing baseline data in order to carry out that evaluation cannot be overstated. The REPS is an innovative scheme which, will need to be appraised and modified if it is to realise its full potential.

CONCLUSION

It is now clear that both agriculture and agricultural support are entering a new phase. The political stage is set for the next seven years although, inevitably, both the upcoming WTO round and the eastern enlargement of the EU will provide challenges for the CAP.

Those concerned about agriculture's interaction with the environment must face the changing reality of farming and, in so doing, need to make use of the many existing pieces of environmental legislation relevant to farming. Rigorous application of the nitrates directive would, for example, yield great benefits for water.

Farmers must accept society's new expectation.

The linkages between good commercial farming and the environment are now clear as is the obligation to respect good farming practice including environmental legislation. Society expects no less from the support it is giving through direct payments. Beyond good farming practice comes agri-environment and society is prepared to pay for the measures concerned. This, in turn, requires vigilance to monitor and evaluate so as to ensure progress and value for money. Otherwise society will increasingly question its support.

Combined, these approaches provide a major weapon in ensuring a better, more long lasting relationship between agriculture and environment. The opportunity is now present but only its rigorous application will ensure success.

MONITORING OF THE ENVIRONMENTALLY SENSITIVE AREAS SCHEME IN NORTHERN IRELAND

Alastair Cameron and Jim Mc Adam
Queen's University Belfast

INTRODUCTION

The Environmentally Sensitive Areas (ESA) Scheme was introduced by the Department of Agriculture for Northern Ireland (DANI) in 1988 and has continuously expanded to the present level of 20% of the land area of Northern Ireland. Its aim is to help safeguard areas of the countryside where the landscape, wildlife or historic interest is of particular importance and where that interest would benefit through farmers continuing with or engaging in environmentally sensitive farming practices.

A ten-year agreement plan was set up with various tiers of management prescriptions. Payments vary according to tier level are area based and paid annually in arrears.

A long-term monitoring programme was established in 1992 to determine if the ESA scheme is fulfilling its aims. Baseline biological and landscape monitoring programmes were completed in 1993-95 and comparative re-surveys in 1996-9. Results were compared between years for ESA participant and non-participant farms.

METHODS

Biological Monitoring

Plant species and invertebrates (ground beetles and spiders) were monitored on target habitats. Data for ESA participant and non-participant farms were compared with three-year intervals between baseline and re-survey.

Plant species were monitored, as this is the most widely used method of assessing ecological change in the environment. Vegetation is the key element in agro-ecosystems responding to agricultural management practices and impacting on animal diversity. Invertebrates were monitored as ground beetles and spiders are habitat specific, easily trapped and good indicators of environmental quality and biological change. Monitoring was carried out per ESA on a habitat basis due to the biological diversity of the habitats.

ESAs were re-monitored three years after baseline monitoring, to allow an initial appraisal of the scheme's effectiveness and to facilitate modification of prescriptions if necessary. Although it must be emphasized that significant long-term changes in biodiversity will occur over a long time span.

Landscape Monitoring

A landscape-monitoring programme was undertaken in 1995. This provided an overview of the landscape character of each ESA as soon as possible after ESA designation. Vegetation, buildings, field boundaries and historic features were recorded resulting in a comprehensive assessment of land cover elements. This provided the basis for a re-survey three years after the initial survey.
An extensive map-based database was completed for each ESA for 1995 and for 1998. This has been accessed and processed using the GIS system ArcView. Results were compared between years to identify change in land cover elements in ESAs since 1995 and quantify these with regard to ESA prescriptions

and participation. Landscape monitoring provides an indication of the effectiveness of environmental management and ESA prescriptions, as land cover elements are a reflection of land use. This will permit refinement of management prescriptions where necessary.

RESULTS

Biological Monitoring

The biological monitoring programme has shown that even after three years, the plant and invertebrate species diversity of all habitats under an ESA agreement have been maintained and in hay meadows the diversity had been significantly enhanced. The species diversity of wet grassland and heather moorland under ESA prescriptions also showed indications of an increase in species diversity since designation in 1993. Thus the ESA management prescriptions in these habitats appear to be maintaining and in some cases enhancing, wildlife diversity.

The habitat diversity of hay meadows, wet grasslands, limestone grasslands, unimproved grasslands, woodlands and hedges not under an ESA agreement were also maintained. However, some indications of reductions in species targeted for conservation, and an increase in more competitive, ruderal grass and weed species, suggested that the diversity of these habitats may be falling on non-agreement farms although these changes were not yet significant.

The species diversity of heather moorland not under ESA agreement was significantly reduced between 1993 and 1996.

The carabid beetle species *Carabus clatratus* and *Carabus nitens*, identified in the baseline survey as indicator species, maintained their presence on wetlands and heather moorland.

The biological monitoring programme provides evidence for the success of the scheme in the maintenance and enhancement of the plant and invertebrate species diversity indicating that the overall wildlife value of habitats in the ESA has been maintained.

Landscape Monitoring

Data were compared between the years 1995 and 1998 to determine changes in the distribution and abundance of land cover elements with respect to the ESA scheme. By considering the ESA as a whole and ESA participant and non-participant farm, estimates were made on the effect of the ESA scheme on various land cover elements.

The results indicated a continued rise in ESA scheme participation. Consequently, there has been an increase in areas of threatened habitat under the protection of the scheme. Practices such as field boundary removal and reclamation are continuing within the ESA boundaries. These changes have, however, been on non-participant land. The ESA scheme is therefore instrumental in maintaining the characteristic landscape of each ESA by encouraging farmers to maintain major landscape elements and preserve vulnerable habitat.

Changes in land cover occur slowly and continued monitoring over an extended period of time should further highlight the effects of environmental protection initiatives in maintaining valuable land cover elements and vulnerable habitats.

CONCLUSIONS

The monitoring of ESAs in Northern Ireland has broadly met the directives outlined within the EU STAR report, particularly in the key elements of biodiversity and landscape. Within these elements there is evidence of preservation and enhancement of biodiversity in key habitats (particularly hay meadows, and wet grasslands) as a direct result of the scheme. Such a conclusion is possible because of the methods adopted *i.e*, the groups of organisms chosen to monitor and the comparison of ESA participant and non-participant farms over time.

The programme will also assess longer-term changes in elements such as soil and the condition of heritage features. These long-term changes and other long-term changes in habitat quality highlight the need to maintain an intensive and focused monitoring programme.

When combined with information on uptake and enhancement work it may be concluded from the monitoring exercise that the ESA scheme is making a significant contribution to the general ethos of more environmentally sensitive farming practices.

THE 'NEW' COUNTRYSIDE MANAGEMENT SCHEME

Dr. Harry Gracey, Head of Countryside Management Division
Department of Agriculture for Northern Ireland

INTRODUCTION

In Northern Ireland, we have over ten years experience with the development and implementation of agri-environment measures. From the introduction of our first measure in 1988 the learning curve has been extremely steep; but we have come a long way, and in May 1999 the Department of Agriculture launched a new agri-environment measure – the Countryside Management Scheme (CMS). This paper describes the background to its development, together with an outline of measures in the Scheme.

BACKGROUND

Commitment to achieve real environmental benefit

The introduction of regulation 797 / 85 marked a significant change in emphasis for European Union policy. As agriculturalists, within the Department of Agriculture, we were well aware of the impact of intensive agricultural policies on the countryside and the concerns of the environmental lobby. We very much welcomed this new direction – recognising and rewarding the farmer for his role as manager of the countryside, as well as producer of food. The potential for this regulation was recognised, and that it could only be sustained in the longer term, if it delivered real environmental benefit. Hence our commitment.

Learning from experience

Initially, we targeted two areas of national importance for their landscape, habitat and heritage value. These were referred to as 'environmentally sensitive', and farmers were offered the opportunity to enter into voluntary 5-year management agreements. In return for their annual payment, there were certain restrictions on their farming activities and in addition they were required to undertake positive measures to manage the countryside. With the introduction of regulation 2078 / 92 we built on the success of the earlier programme, and currently some 20% of Northern Ireland is designated in five Environmentally Sensitive Areas (ESA).

Who should draw up an agri-environment scheme?

In the early days the aims and objectives of agri-environment schemes tended to be very broad but with experience these have been refined and become more focussed. Changing environmental priorities highlighted the need to develop future schemes with specific objectives.

Rather than agriculture and the environment being viewed as two separate disciplines there was need to attain a balance between the two. Agri-environmentalists have been employed to develop and deliver our schemes.

Setting clear objectives

To deliver environmental benefits the scheme must have clear and specific aims. Objectives for the CMS were identified through the Northern Ireland Countryside Survey (NICS), the Biodiversity Action Plan

and consultation with government and non-government organisations. The NICS is an on-going strategic monitoring programme for assessing the change of landscape and ecological resources whilst the Biodiversity Action Plans allowed us to identify and evaluate key objectives for each of the targeted habitat and species.

The objectives of the CMS are;

- to contribute to biodiversity by encouraging sensitive management of target habitats and features.
- to protect and enhance the rural landscape, including heritage sites and features.
- to integrate a positive approach to waste and nutrient management.
- to integrate environmental objectives as one of the primary considerations of farm business management.

Developing Management Prescriptions

Scientific publications and research, the work of conservation organisations involved in habitat management, prescriptions from other agri-environment schemes managing similar habitats, advice from the Environmentally Sensitive Areas scientific monitoring team and our own experiences in delivering countryside management initiatives provided the foundations for the development of the management prescriptions.

The code of good farming practice for conservation, was adopted as tier 0, (Appendix 1) and represented activities which the farmer should be undertaking as standard practice.

Selection Criteria – Setting Priorities

In the event of the number of applications exceeding the allocated budget, a ranking or selection mechanism was developed which could prioritise applications – identifying those that were likely to contribute most to the aims and objectives of the Scheme and therefore maximise the environmental benefit. The use of selection criteria is a new concept within agri-environment schemes. It must be easily understood and must be simple not only for those administering the scheme but also for those participating in the scheme. It is important that applicants understand the criteria on which have been rejected. In this Scheme, each of the targeted habitats and features was allocated a score. The score given was a reflection of:

- the importance of the habitat or feature within biodiversity;
- its vulnerability and sensitivity to agricultural threats or inappropriate farming practices;
- the irreversibility of potential damage;
- the extent of the remaining habitat both in a Northern Ireland and European context.

A willingness to consult

There was a formal period of consultation with a wide range of farming, conservation and government bodies.

Piloting the prescriptions on farms

Once the management prescriptions were finalised, the Scheme was piloted on a wide selection of farms with a variety of the targeted habitats and features. This provided an opportunity to modify and assess the management prescriptions to deliver more fully the objectives of the Scheme. A staff-training programme was undertaken to develop knowledge and understanding of scheme prescriptions to enable effective delivery of CMS to farmers.

Ongoing support through training and education

Promoting an ethos of continual development is the key to the long-term success of any agri-environment scheme. This involves integrating a range of techniques, which will increase and assist participants understanding of the aims and objectives of the scheme, and allow them to develop the necessary competencies to deliver them. For example, in our ESA Scheme, demonstrations and training courses provide practical advice and 'hands on' experience for habitat management skills such as heather regeneration. 'Best practice' is promoted through farm walks whilst continual support is provided on an individual basis and through newsletters and information sheets. Specifically targeted mail shots, keep participants informed of developments and achievements, as well as providing them with timely reminders of their management obligations.

In the new CMS a training and education programme to develop participant knowledge, competencies and skills is an integral part of the scheme. Participants in the CMS will have their training needs identified and agreed at the outset.

Monitoring and Evaluation

To evaluate the Countryside Management Scheme, an integrated monitoring programme has been proposed. This will involve biological, landscape, historical and socio-economic monitoring. Biological monitoring will assess whether the scheme is achieving its commitment to biodiversity by assessing the effect of the management prescriptions on indicator plants and insects. Monitoring the landscape, on the other hand will quantify changes in the quality of habitats subject to our management prescriptions and compare these with equivalent habitats not under management.

OUTLINE OF COUNTRYSIDE MANAGEMENT SCHEME

A Whole Farm Approach

To integrate environmental objectives as one of the primary considerations of farm business management, the Countryside Management Scheme adopts a whole farm approach.

Tier 0 – Code of Good Agricultural Practice for Conservation

A baseline of what is considered to be good agricultural practice must be established so that payment is not given for farmers merely attaining this standard. This is a European Union requirement for participation in any agri-environment scheme. Payment can only be given for measures that go beyond this level and for which there are no compulsory legal obligations.

In the CMS, this is referred to as tier 0 or the code of good agricultural practice for conservation (Appendix 1). These measures apply to all the land on the farm holding.

The main objectives underlying the code are the protection of environmental and landscape interest on the holding, compliance with existing environmental legislation and the protection of biodiversity.

Tier 1:

A general set of measures aimed at the maintenance of more extensive farming system applies to all land classified under this tier (Appendix 2). For example, participants must not increase the overall stocking density for the farm business nor exceed a stocking rate, which is deemed agriculturally sustainable for the landholding.

Additional measures include a fertiliser ceiling, development of a sustainable approach to waste and nutrient management beyond both the code of good practice and legislative requirements, no ploughing and reseeding of unimproved grassland and the selective control of weeds using specialist equipment. The total payment for Tier 1 land cannot exceed £1500 per year.

Tier 2 & 3 Priority & Optional Habitats

Tier 2 and 3 measures are those which go beyond the baseline of good practice and tier 1, and are aimed at habitats or features where specific measures or management prescriptions must be applied. The majority of habitats have prescriptions limiting grazing, fertiliser and the use of pesticides.

Tier 2: Priority Habitats or Landscape Features - characteristic of the Northern Ireland countryside, which if present on the farm must be brought under agreement (Appendix 3).

Tier 3: Optional Habitats or Landscape Features - could be created on farmland, optional habitats, for example buffer zones. Optional habitats may be brought under agreement, Appendix 4.

An example of Priority Habitat Management Prescriptions: Moorland: Moorland is classified into three major types: Dry heath, Wet heath, Blanket Bog according to the plant species present and the peat depth. Degraded heath is available as an optional habitat, where heather cover is between 5-25% and managed according to the moorland prescriptions to encourage regeneration. Management prescriptions are listed below:

Management Prescriptions for all Moorland Types

- *Grazing* : Exclude all livestock from 1st November until 28/29 February.
- *Maximum stocking density* -for each Moorland Type

Moorland Type	Maximum stocking density(LU/ha)
Dry heath	0.3
Wet heath	0.25 – Sheep 0.2 – Cattle only between 1st June to 31st August
Blanket Bog	0.075 – Sheep only

Areas under five hectares, where the stocking rates would result in very small numbers of stock being allowed to grazed will be issued with a site specific grazing plan.

- *Supplementary Feeding:* The siting of all supplementary feeders require prior agreement of the Department of Agriculture and cannot be placed on areas of moorland.
- *Fertilisers and Lime:* The application of fertiliser, slurry, farmyard manure, sewage sludge, basic slag and lime is not permitted.
- *Cultivation and reclamation:* including construction of new lanes and extraction of minerals is not permitted.
- *Pesticides:* the application of insecticides, fungicides and diluted sheep dip is not permitted.
- *Tree and Hedge Planting* is not permitted on heather moorland.
- *Scrub and Bracken Control* must be undertaken where this is considered necessary by DANI.

CONCLUSION

Just over 1000 CMS applications were received during the opening period of application in 1999. Preliminary audits are approaching completion and the budget will be the deciding factor in the cut off score used in the selection criteria to select successful participants. All participants will then be subject to a Main Audit and agreements issued as soon as practical.
As future policies to maintain biodiversity and support sustainable development evolve, the Countryside Management Scheme will play a lead role in the future of farming in Northern Ireland – particularly with the continuing emphasis of agri-environment in Agenda 2,000.

Appendix 1: Code of good farming practice for conservation – Tier 0

The farmer shall:

1. Retain and not damage any habitat, landscape or water feature, heritage feature, including archaeological sites, features of historic interest (e.g. lime kilns, traditional pillars, sheep folds) and vernacular buildings on the landholding.

2. Retain existing field boundaries and shall not remove any hedge, tree, copses, scrub, ditch, dyke or wall or any part thereof, except with the prior written permission of the Department.

3. Maintain open drains and sheughs in accordance with the written advice of the Department.

4. Ensure that no pollution of water, soil or air occurs as a consequence of agricultural practices by point or diffuse sources.

5. Remove eyesores, rubbish and litter and keep the farm free from same e.g. derelict machinery and equipment, scrap cars, discarded and waste material, silage wrappings and empty fertiliser bags.

6. Seek the permission of the Department before undertaking work which may have a detrimental impact on landscape, habitat or heritage features e.g. construction or reconstruction of any farm road or the erection, extension or major renovation of a farm building or the painting of a farm building or the planting of trees or hedges.

7. Comply with all environmental legislation relevant to the landholding.

8. Dispose of fallen animals in such a manner to prevent the pollution of water or air.

9. Comply with the codes of good agricultural practice

The farmer shall not:

1. Cause severe damage to vegetation by poaching or repeated vehicular access, nor graze land with livestock in such numbers as adversely to affect the growth quality or species composition of vegetation (other than vegetation normally grazed to destruction) to a significant degree.

2. Carry out any activity or deposit on, or extract from any land, any article, material or substance in a manner likely to significantly detract from the natural beauty or damage or destroy flora or fauna or materially alter the geological or physiographical features of such land.

3. Realign, dredge or dam any watercourse nor alter the water levels within any existing water feature without the prior agreement of the Department.

Appendix 2: Management prescriptions for Tier 1

The farmer shall:

1. Follow the Departments code of good farming practice for conservation.

2. Develop and follow a nutrient management plan for the non-habitat elements of their farm unit.

3. Control rushes, bracken and scrub (including European Gorse) in accordance with the written advice of the Department.

4. Partake in an agreed environmental human resource development programme.

The farmer shall not:

1. Exceed the stocking density deemed by the Department to be agriculturally sustainable for the landholding nor increase the stocking density for the farm business to a level above that which existed, on average in the year, preceding the year of entry, unless where it is deemed necessary by the Department to achieve environmental objectives.

2. Undertake ploughing, levelling or reseeding of unimproved grassland and on such land or on any semi-natural vegetation shall only control weeds by spot treatment or weed wiper.

3. Install new underdrainage or substantially modify the existing drainage system.

4. Apply lime to any priority or optional habitat without the prior written approval of the Department.

5. Permit land or open water within their control to be used for recreational and / or commercial / organised sporting activities without the prior permission of the Department.

Appendix 3: Annual Management rates and minimum entry requirements for CMS Tier1 and Priority habitats.

Tier 1 - The total payment given for the non-habitat land on the farm will not exceed £1500 per year.

Habitats and features	Annual Payment £/ha
Improved grassland and arable land	25
Unimproved grassland	30

Priority Habitats and features	Min.entry Requirement (ha)	Annual Payment (£/ha)
Species-rich grasslands	0.1	110
Species-rich acid grassland	0.1	75
Traditional hay meadows	0.1	150
Upland breeding wader sites	1.0	
Restricted grazing option		75
Closed grazing option		105
Wetlands	0.2	110
Lowland wet grassland – enhanced breeding wader option		150
Moorland	1.0	£50: 1-100 ha
Dry heath		£25:101-200ha
		£10: >20 ha
Wet heath		£10: >201ha
Blanket Bog		
Degraded heath (Optional)		
Rough Moorland grazing	1.0	£20: 1-20ha
	£10: 21-100ha	
		£5: > 101ha
Lowland raised bogs	1.0	50
Broad-leaved farm woodland / scrub	0.2	95
Coastal farmland	1.0	80
Archaeological features (must be above ground feature)		£80/0.25ha
Parkland	3.0	50
Land adjacent to lakes (lake must be over 0.5ha)		
Adjacent fields – improved grassland		35
Adjacent fields – unimproved grassland		40
Buffer strips – improved grassland		400
Buffer strips – unimproved grassland		365
Livestock disposal option		
rate/ewe		35
rate/suckler cow		275

Appendix 4: Annual Management rates and minimum entry requirements for CMS Optional habitats and features.

Optional Habitats and features	**Minimum Entry Requirement**	**Annual Payment**
	ha	£/ha
Arable fields managed for wildlife		
Retention of winter stubble	1.0	65
Conversion of improved grassland to spring cereal / rape	1.0	105
Planting wild bird cover on improved grassland or as an arable crop margin	0.2	595
Creation of a rough grass field margin	0.2	490
Establishment of a conservation crop margin	0.2	515
Winter feeding sites for migratory swans & geese (land must be grazed by more than 25 birds)	**1.0**	
Improved grassland		130
Winter cereals or oilseed rape		195
Lapwing breeding sites (land must be used by nesting lapwing)	1.0	
Improved grassland		175
Unimproved grassland		155
Buffer strips next to		
ASSIs*, NNRs*, woodlands and rivers	1.0	
Improved grassland		400
Unimproved grassland		365
Traditional orchards - an area of 4.0ha containing at least 4 standing trees with space for 12		
Restoration		260
Recreation		400

Field boundaries undertake at least 250m of restoration every 5 years

*ASSI - Areas of Special Scientific Interest
*NNRs – National Nature Reserves

PROGRESS ON COMMONAGE FRAMEWORK PLANS

Pat Warner
Department of Arts, Heritage, Gealtacht & the Isalnds

INTRODUCTION

The commonage framework plan is an assessment of the vegetation condition of a commonage and a setting of the appropriate changes in stocking level, if any, which are then passed on to the REPS planner to implement.

PROGRESS ON COMMONAGE FRAMEWORK PLANS

Framework plans are required for all target areas for SMA; *viz*. all commonages, all SACs and all NHAs. They are being produced by contract teams of an agronomist and an environmentalist working under the joint supervision of Dúchas and the Department of Agriculture, Food and Rural Development (DAF). A standard methodology has been produced and a team of two officers, one from Dúchas and one from DAF, are checking all plans to ensure that they are consistent, fair and in accordance with the agreed methodology. All teams have attended and passed a training course in the methodology.

The process of producing these plans and of checking them has been slower than planned, partly because the first plans produced by many of the teams have required some revision. Everyone is new to this process and it has taken time to become familiarised with the approach.

The initial priority was the upland and lowland blanket bog commonages in the six "degraded" counties of Kerry, Galway, Mayo, Sligo, Leitrim and Donegal. The progress to date is summarised in Table 1.

Table 1: A summary of progress with producing framework plans

County	**Kerry.**	**Galway**	**Mayo**	**Sligo/ Leitrim**	**Cork**
Priority	1	1	1	1	2
Contracts issued	22	11	14	7	12
Area Covered ('000 ha)	68	42	46	13	28
Contracts approved	2	3	6	2	1
Area Covered ('000 ha)	7	9	20	7	0.5

The next issue will be the conversion of vegetation assessments done as part of the SAC conservation plans into framework plans and this work has just started.
Of course not all commonages are in the uplands or on blanket bogs; there are a considerable number of lowland grassland commonages also. These will require a different set of damage assessment criteria although the same general approach (mapping vegetation, assessing damage and setting appropriate destocking) will be followed.
The two Departments have looked at the largest group of these grasslands, the sand dune and machairs. The process of selecting the criteria has been completed and the manual is in draft and awaiting testing.

In these sites the damage criteria include such things as patches of bare sand and the presence of weed species such as nettles.

ENVIRONMENTAL PLANS

It is worth commenting briefly on the various levels of Irish environmental planning currently ongoing.

REPS Plans

These were the first in terms of environmental plans for agriculture. They are well know and genrally accepted.

Framework Plans

The next level of planning is the commonage plan (where relevant) which are discussed above. This covers an area of land larger than the individual land holding and has involved a fairly detailed inventory of the ecological condition of the land. The approach will be invaluable when it comes to monitoring of the impact of agri-environmental programs. By repeating the process of mapping the vegetation after the five-year plan is complete, it will be possible to give a very detailed evaluation of the ecological and agricultural improvement that occurred. Since all the other monitoring schemes in this country and elsewhere involve a system of sampling, not complete repeat survey, the approach being adopted generate high quality reliable results.

Natura 2000 Sites

Every Natura 2000 site (all SACs and SPAs) will have a conservation plan, which will lay out the necessary measures for the conservation of the habitats, and population for which the site is designated. REPS and the framework plans are an important part of the implementation of these plans. These plans usually cover a much larger area than the individual commonage.

Regional Plans

The conservation of ecosystems and species often has to look at a wider scale than the individual SAC and to look at how the SACs act as a network; it may in some cases be appropriate to consider “ecological corridors” joining SACs so that species can move between island sites. In Dúchas the concept of regional conservation plans is being examined. Probably the most important areas to benefit from this regional approach will be the wetland sites and catchment management plans are a very welcome approach, which Duchas hope to co-operate with.

National Bio-Diversity Plan

The NBP which is in draft at present will be the top level of planning which will incorporate and direct all the other levels.