National REPS Conference Proceedings

Delivering for Farming and the Environment

Future Role of REPS under a Changing CAP
Alan Matthews, Professor of European Agricultural Policy, Trinity College

Evolving Water Protection Policy – Implications for Farming
Sean Regan, Chief Environment Adviser, Teagasc

Irish/Scottish Comparison of Environmental Protection
Catherine Keena, Countryside Management Specialist, Teagasc

Impact of REPS on Aspects of the Environment
Jane Freehan, Former Research Scientist, Teagasc/Trinity College
Meadbh Flynn, Former Research Scientist, Teagasc/College of Surgeons

REPS 2000 and Beyond

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Introduction

It is now clear that EU agricultural policy is putting and will continue evolving to place more emphasis on rural development, the environment and animal welfare. The greater the participation of farmers in REPS, the better Ireland will be placed to meet challenges on the agricultural environment front. For example, the Good Farming Practice standards introduced last year pose no challenge to farmers who are already meeting REPS requirements; neither should they have any difficulties in complying with whatever measures Ireland takes to implement the Nitrates Directive and other EU environment laws.

A consultation process has begun leading into a mid term review of REPS2 in 2003. All stakeholders will have an opportunity to take part in this process, out of which the Department may look for changes in REPS in its discussions with the Commission in 2003.

The Rural Development Programme provides for total spending on REPS to 2006 of €2.04 billion. Current trends in participation would keep spending below the level at which this EU funded programme could be fully used. There could be a further knock on effect if changes in the CAP reflect the thinking in the current reform proposals which envisage increased EU funding of rural development measures. Failure to take up EU funding in the current programming period could make it harder to argue funding for Ireland in the next period.

Progress Report on REPS

REPS1

Table 1 shows that when the first REP Scheme closed to new applications at the end of 1999, it had about 45,000 participants.
It started relatively slowly and was behind the target level of participation during the first two years. However between 1996 and 1998 the level of uptake of REPS accelerated beyond expectations, with the result that by 1999 the level of participation at 45,000 was almost exactly as projected at the beginning of the programme.

At the beginning of October 2002 there are just over 13,000 participants in REPS 1. Some 32,500 farmers were no longer in REPS 1 having completed their contracts. Annual payments under REPS 1 peaked in 1999 at €204 million and while there were some minor problems with the scheme, it was generally considered to have been an outstanding success.

Table 1 PROGRESS ASSESSMENT OF REPS 1

Year	Participants New	Participants Cumulative	Area Hectares (000)	Payment € million
1994	336	336	12	1
1995	8,400	8,700	285	71
1996	13,200	22,000	614	128
1997	9,000	31,000	1,119	169
1998	8,200	39,200	1,381	183
1999	6,300	45,553	1,575	204

Table 2 PARTICIPANTS BY COUNTY IN REPS 1 & 2 AT 10/10/02

County	REPS2 participants	Also in REPS1	% in REPS1	REPS1 Participants	REPS1 & 2 Participants
Carlow	223	187	84	72	295
Cavan	856	673	79	515	1371
Clare	1035	866	84	657	1692
Cork	1761	1347	76	1021	2782
Donegal	1956	1515	77	936	2892
Dublin	60	50	83	30	90
Galway	3025	2501	83	1535	4560
Kerry	1533	1107	72	614	2147
Kildare	311	272	87	168	479
Kilkenny	551	451	82	327	878
Laois	585	503	86	218	803
Leitrim	757	634	84	328	1085
Limerick	670	518	77	512	1182
Longford	583	512	88	284	867
Louth	151	123	81	80	231
Mayo	3014	2468	82	1729	4743
Meath	535	451	84	256	791
Monaghan	545	376	69	411	956
Offaly	568	499	88	378	956
Roscommon	1092	922	84	914	2006
Sligo	706	576	82	493	1199
Tipperary	1080	912	84	560	1640
Waterford	404	324	80	279	683
Westmeath	644	575	89	395	1039
Wexford	499	423	85	317	816
Wicklow	301	217	72	124	425
Total	23445	19002	81	13153	36598

Table 2 shows that there are 36,600 farmers participating in REPS with 23,445 of them in REPS 2. Some 13,409 farmers have been accepted into REPS 2 in the past 12 months. This is more than the peak year in REPS 1 when 13,200 joined REPS in 1996. Nevertheless this was about 5,000 below the target level. The highest uptake is in Mayo and Galway. Table 2 shows that participation levels in counties in the west, north and midlands of the country is much greater than for counties in the east.

Numbers of Planners

The Department has approved 1,285 planners for REPS 2 (see table 3). However, only 656 of these have had plans approved up to October 2002. During the first 20 months of REPS 2, about 25,000 applications were made to the Department. This represents an average of about 38 plans prepared per active planner over the 20 month period, or about two REPS plans per month. It is estimated that 85% of REPS 2 participants were also in REPS 1. If the REPS 2 targets are to be achieved, it is estimated that at least 6,000 new farmers must join REPS 2 each year up to 2006 in addition to 85% of REPS 1 participants rejoining.

The data in Table 3 shows that less than 100 planners have prepared more than 50 REPS 2 plans, while over 900 approved planners have 20 plans or fewer. While some REPS planners have a full workload with their existing clients, most farmers who wish to join REPS should be able to engage the services of an approved planner. While higher output from some planners would help to accelerate the take up of REPS 2, the quality of plans cannot be

sacrificed for quantity. For long-term success and continued funding by the EU, REPS must be seen to deliver environmental benefits.

Table 3 REPS 2000 DATA ON PLANNER PRODUCTIVITY SINCE DEC 2000

Number of Plans Approved	**Number of Planners**
None	629
1 to 10 plans	199
11 to 20 plans	199
21 to 30 plans	78
31 to 40 plans	75
41 to 50 plans	65
51 to 70 plans	66
71 to 100 plans	38
101 to 150 plans	22
151 to 200 plans	6
Total	1,285

POSTAL SURVEY RESULTS

Of the 32,000 farmers who have completed their REPS 1 agreements about 19,000 have rejoined REPS 2. The Quality Services Unit within the Department carried out a postal survey of 1,000 farms who have not rejoined to seek their views on their main reasons for not doing so and also to determine satisfaction levels with REPS 2. The following are some of their findings:

The main reasons given for not joining were

Payment levels (too low)	20%
Planners costs (too high)	9.4%
Inspection levels	13.6%
Penalties imposed	13.6%
Age/Health	7.4%
Other (various)	36%

When asked specifically if they were considering joining REPS 2, 63% said, "Yes".

Satisfaction levels

- Overall the majority of farmers were very satisfied (18.5%) or satisfied (53.7%). Of the remainder 10.18% were dissatisfied, 7.5% were very dissatisfied. A further 10.32% failed to complete this section of the survey.
- When the farmers who are no longer actively farming were asked how satisfied were you with the REPS scheme while farming, 72% were either very satisfied or satisfied. Of the remainder 16.7% were dissatisfied.

UPDATE ON PENALTIES

Table 4 gives a breakdown of reasons why penalties were applied. The highest number of penalties (561) were applied to farmers for non-compliance with undertakings relating to the visual appearance of the farmyard. Some 657 farmers did not comply with Measure 5 involving stock proofing of farm boundaries (274) and hedgerow/stonewall maintenance (383). Also high in the rankings of offences were undertakings in respect of the nutrient management plan. However the majority of these penalties were associated with a failure by the client to provide adequate animal housing and waste storage facilities in place to control pollution arising on the farm. This would indicate that compliance with chemical and organic fertiliser limits is usually not a problem for REPS farmers who are usually relatively extensive in their production methods. It also highlights the critical importance of controlling point

sources of pollution on the farm especially in the current environment where water quality and the improvement of water quality are of major importance.

Table 4: NUMBER OF REPS PENALTIES IMPOSED FOR NON-COMPLIANCE IN 2002

Measure	Number of Failures
Visual appearance of the farmyard	561
Undertakings in respect of nutrient management	329
Hedgerows/Stonewalls not maintained as specified in plan	383
Farm boundaries not stock proofed	274
Late application for payment	290
Bovines not excluded from watercourses/wells	240
Stock not wintered as set out in plan	159
Any other reason	160
Total	**2396**

Conclusion

There are currently about 36,000 farmers in REPS. For environmental and socio-economic reasons a much higher level of participation is desirable. Teagasc Farm Survey results show that REPS plays a major role in improving farm incomes – in the order of about €100 per ha. It is also very clear that both nitrogen and phosphorus is more efficiently used on REPS farms. Our target in the Rural Development Plan 2000-2006 is for 60,000 – 70,000 farmers participating in REPS for each of the next four years.

The decision to make available to REPS Planners, the LPIS maps, parcel numbers and parcel areas, in addition the change in the land ownership requirements and the introduction of a simpler planning document for smaller and less intensive farmers should speed up the planning process. Clearly if the target of 60,000 farmers in REPS is to be achieved the role of REPS planners in the process is pivotal.

Future Role of REPS under a Changing CAP

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Introduction

The Commission's Mid-Term Review (MTR) proposals in July 2002 (Commission, 2002) have received a mixed, indeed hostile, reception in Ireland. The Commission argues that the changes are necessary to respond to the concerns that EU citizens express about the effectiveness of the CAP. Critics have argued that they will lead to reduced production, a fall in net receipts from the Common Agricultural Policy, and undermine long-term public support for transfers to the farming sector. The purpose of this paper is not to evaluate the overall impact of the MTR package on Irish agriculture, but to focus on those aspects which have implications for agri-environmental policy and specifically REPS. There is broad agreement about the need for tighter integration of environmental objectives into agricultural policy, and it is likely that some movement will be made in this direction regardless of what happens to the overall package.

The paper first outlines some of the significant agri-environmental changes introduced by the Agenda 2000 and which form the starting point for the MTR. Three aspects of the MTR are then discussed for their environmental impact: decoupling of direct payments, eco-conditionality and modulation. In the light of this discussion, the paper concludes by speculating on the implications for REPS and those farmers who participate in REPS, and on the future for agri-environment schemes, were the Commission's proposals to go through.

Agenda 2000: The starting point

The Commission's proposals begin with a restatement of the objectives that agricultural and rural development policy should promote, based on the principles established in Berlin and enhanced at the European Summit of Gothenburg:

- a competitive agricultural sector;
- production methods that support environmentally friendly, quality products that the public wants;
- a fair standard of living and income stability for the agricultural community;
- diversity in forms of agriculture, maintaining visual amenities and supporting rural communities;
- simplicity in agricultural policy and the sharing of responsibilities among Commission and member-states
- justification of support through the provision of services that the public expects farmers to provide

The justification for its strategy is a concern for the maintenance and promotion of the European model of agriculture. This European model is seen as multifunctional in nature. Agriculture produces not only commodity outputs which are sold in normal commercial markets, but also non-commodity outputs such as landscape, biodiversity, safeguarding of the rural environment, food security, rural viability and even cultural heritage. A characteristic of these non-commodity outputs is that they are not priced or bought and sold in open markets. They have the characteristics of what economists call 'public goods'. If society wants these goods produced, then it

may have to make a direct transfer to remunerate farmers to ensure their production. There is a subtle shift in emphasis in the rationale for support to the agricultural sector in this argument. The MTR recognises explicitly that market revenues alone are not enough to ensure an acceptable standard of living for many farm households, and that direct payments continue to play a central role in ensuring a fair standard of living and stability of income for the agricultural community. However, increasing emphasis is being put on the role of market failures, the inability of the market to ensure the supply of public goods which society demands, as the justification for farm transfers in the future.

To support this changing emphasis, Agenda 2000 created the "second pillar" of the CAP, the "first pillar" being market support. The second pillar is based around the rural development regulation (1257/99), a set of 22 measures available for use for rural development. These embrace

- the accompanying measures of the 1992 reform (agri-environment scheme, afforestation, early retirement) plus the Less Favoured Areas scheme;
- all types of measures supporting structural adjustment (former objective 5a measures) and rural development (former objective 5b measures) plus measures to diversify agriculture and to support income earning activities going beyond agricultural production.

Agenda 2000 also made a significant step towards the integration of environmental goals into agricultural policy.[1] To ensure that direct payments made under the first pillar do not undermine the environmental objectives promoted in the second pillar, there is a general principle that environmental conditions should be attached where feasible to all direct supports in the first pillar. As far as direct payments are concerned, this was introduced in Article 3 of the common rules for direct support schemes (1259/99) which requires Member States to "take the environmental measures they consider to be appropriate". These measures may include support in return for agri-environment commitments; requiring the observance of general mandatory environmental requirements as a condition for receiving direct aid; or introducing specific environmental requirements as a condition for receiving direct payments. The latter two options can be enforced by reducing direct payments granted under the first pillar of the CAP in the event of non-compliance.

Following the implementation of Agenda 2000, the integration of environmental objectives into agricultural policy can be represented as a pyramid with several steps (see Figure 1). At the bottom tier, Tier 0, all those farmers in receipt of direct payments must observe farming standards set out in the Code of Good Farming Practice (GFP). GFP currently defines the threshold between what can reasonably be expected from a farmer without extra payment and activities for which he should be compensated.

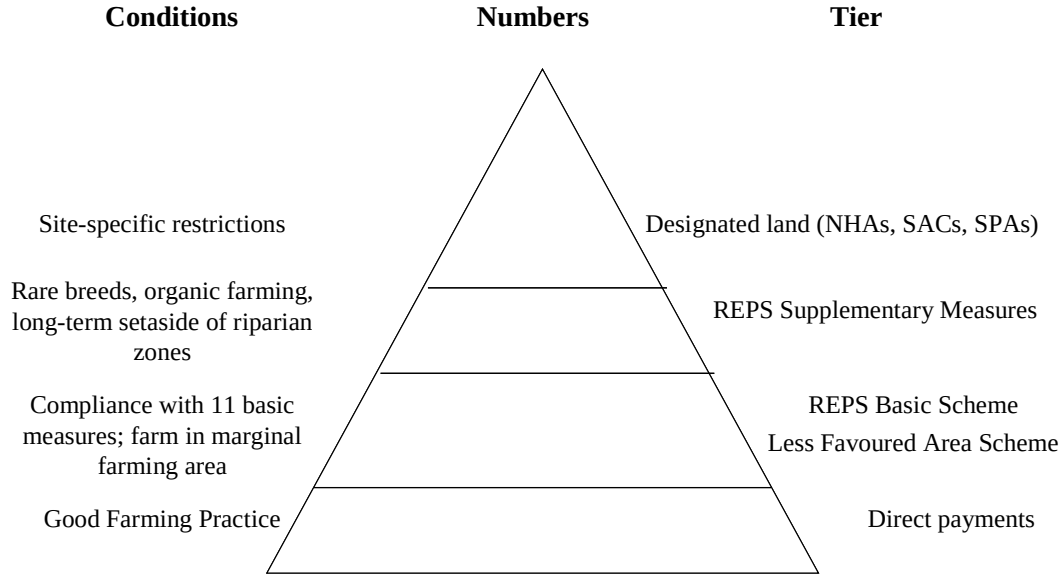
At Tier 1, those farmers who enrol their land in REPS receive additional payments in return for following environmentally-friendly farming practices which go beyond the GFP standards. Payments to farmers in less-favoured areas are also included at this level. Farmers in receipt of the compensatory allowances in LFAs are required only to "apply usual good farming practice compatible with the need to safeguard the environment and maintain the countryside, in particular by sustainable farming". In this sense, the environmental demands are no higher than for Tier 0 payments. However, the justification for LFA payments is to maintain the rural population and to

[1] See the DAFRD (2001) Report on Eco-Friendly Farming for a comprehensive account.

prevent the abandonment of land in marginal farming areas, and because the additional payments are made to secure these objectives, they are included as Tier 1 payments in Figure 1.

A smaller number of farmers will enrol to achieve specific and additional environmental objectives under the REPS Supplementary Measures (except Measure A), which we refer to as Tier 2. Finally, there are farmers whose land is designated as areas of particular nature quality under the EU Habitats or Birds Directives or under national legislation. These farmers are paid a higher REPS premium under Measure A or can apply for individual compensation based on a farm plan, in recognition of the fact that their compliance with higher environmental standards is compulsory rather than voluntary as is the case with the rest of the REPS participants.

Figure 1. Agri-environment schemes in Ireland post-Agenda 2000



Decoupling: environmental implications

The Mid-Term Review of the Agenda 2000 strategy has three main axes: market measures (mainly confined to the cereals sector), decoupling of direct payments, and strengthening of the second pillar. There will be some environmental impacts arising from the market measures (in particular, arising from the proposed rule changes introducing compulsory long-term set-aside on arable land instead of the present rotational set-aside) but these are not discussed further here. In this section, we look at the environmental impact of decoupling direct payments.

The Commission's proposal is the introduction of a single decoupled payment per farm, based on historical payments adjusted to take into account the full implementation of Agenda 2000. Six reasons are given for this proposal.

- It would simplify the process by which a farmers gets support in a manner which is neutral with respect to payments to producers.

- It would allow farmers to better respond to what the market demands by delinking the level of support and production decisions. Direct payments would no longer steer the production decisions of farmers.
- In many cases it would improve the efficiency of transfers to farmers, and should help to improve their income situation.
- Decoupling will contribute to environmental integration by removing production specific incentives, which potentially damage the environment
- Decoupling will facilitate the integration of the new Member States into the Common Agricultural Policy.
- Because decoupled payments fall into the WTO Green Box, they could not be challenged by other WTO Members in international trade negotiations.

The environmental benefit arises because decoupling should lead farmers to more extensive production, thus reducing pressure on rural resources. The Commission proposal does recognise some risks. Reduced production could have a knock-on effect on the processing sector and it could lead to the abandonment of land in some marginal farming areas. From the Commission's perspective, reduced production (particularly in beef) is a desirable outcome anyway, while it believes the threat of land abandonment could be met by more targeted policy instruments, such as less favoured area or agri-environment payments.

There are three issues to be addressed in this debate. First, is the Commission right to expect that decoupling direct payments will lead to more extensive production? Economic logic supports this outcome, as farmers will now use inputs only up to the point where their use is justified by the market price return, and not by the combined market price and direct payment. Empirical studies are less clearcut. A recent review of the impact of the MacSharry and Agenda 2000 reforms on extensification commissioned by the UK Ministry for the Environment, Food and Rural Affairs came to a somewhat ambiguous conclusion (DEFRA, 2002). Second, some observers fear that decoupling will lead farmers not just to more extensive production but to abandon farming, while still retaining their payments. The Commission responds that payments will be conditional on cross-compliance which will require continued farming. Third, farmers worry whether there will be long-term public support for decoupled direct payments which have, at best, only limited and indirect environmental benefits. This may, paradoxically, increase the political attraction of more targeted agri-environmental schemes where the environmental benefits can be more clearly demonstrated.

Eco-conditionality

Eco-conditionality for direct payments and the associated system of penalties was introduced in Agenda 2000, but suspicions remain about the commitment of Member States to enforcing this conditionality. The Commission has sought to tighten up its monitoring of Member States' activity in this area under Regulation 963/2001 requiring, *inter alia*, an annual progress report on the implementation of the measures and penalties, including an assessment of their environmental effects. The issues for discussion under this heading include:

The scope of the standards: The MTR proposes that eco-conditionality would include environmental, food safety and animal health and welfare standards, as well as occupational safety requirements for farmers. The Irish GFP covers most of these areas apart from food safety although, for cattle farmers at least, this aspect is now covered by the National Beef Assurance Scheme.

The level of the standards: The Commission, while recognising that standards of good farming practice may vary across regions, is also concerned that differences in standards, and differences in the enforcement of such standards, could lead to distortions of competition within the single market. It proposes that Member States should define and enforce standards, "following a common framework providing basic implementation criteria". It is not clear whether this implies that the Commission will pursue the harmonisation of standards or seek agreement on some minimum set of standards. There is also some confusion in the level of standards to be aimed at, with the Commission arguing at one stage that good farming practice is defined as meeting mandatory standards, and elsewhere as the standard of farming that a reasonable farmer would follow in the region concerned. The level of GFP standards has a knock-on effect on the REPS, because the philosophy of REPS is only to reward farmers for practices which go beyond GFP. Nevertheless, it does not appear that anything in the MTR will require a major revision or upgrading of the GFP standards agreed by the Department of Agriculture and Food with the farming organisations and now in use.

The monitoring of standards: Partly to address the issue of lax enforcement of standards, the Commission proposes a Community-wide system of farm auditing for compliance with GFP for commercial farms, to be defined by Member States on the basis of economic size. It proposes that, initially, farm audits will be mandatory for all producers receiving more than €5,000 in direct payments, while allowing other producers to participate on a voluntary basis. It proposes to make available financial support for farm audits under the rural development regulation. As farmers are already open to Department inspections for conformity with GFP, the additional requirement of farm audits should not be too onerous an imposition.

Modulation: Budget rebalancing

Modulation is designed to address a major criticism of the two-pillar structure set up under Agenda 2000, namely, the relative lack of funds available for the second pillar. The MTR document points out that only 16% of total FEOGA expenditure, and only 10% of FEOGA Guarantee expenditure, is currently used for rural development. As there is no prospect of additional funds by raising the agricultural budget ceiling agreed for Agenda 2000, the transfer of funds from Pillar 1 to Pillar 2 through the modulation mechanism is put forward as the alternative. In order to increase resources for the second pillar, the Commission proposes introducing a system of dynamic modulation on a compulsory basis for all Member States replacing the

current optional arrangements from 2004 onwards. Under this system, all direct payments should be reduced progressively in arithmetic steps of 3% per year to reach 20%, the maximum agreed in Agenda 2000. Acknowledging the higher labour intensity of small farms, a franchise dependent on the employment situation on each farm would be introduced. For up to 2 full time annual work units (AWU) the franchise will be €5,000 per AWU and for each additional AWU an additional €3,000 may be granted on an optional basis by Member States. After the application of modulation, the total amount paid per farm should not exceed €300,000 plus the franchise.

Agenda 2000 already included modulation as a voluntary option at the Member State level, but few Member States have applied it or appear to have any intention of doing so. Whether the Commission will succeed in making it mandatory remains to be seen. Problems in persuading Member States to shift funds to the second pillar include:

- Distributional issues within farming. The larger farmers who face reductions in their direct payments resulting from modulation are not necessarily those who will benefit from increased second pillar spending. These difficulties within farming might be faced down if there was a recognition that there were national gains from pursuing this route, but not all Member States feel they will benefit for the following reasons.
- Distributional issues among Member States. A major obstacle to converting agricultural policy into a more integrated rural policy are the distributional effects among Member States provoked by reducing the first pillar and increasing the second one. The Commission proposals attempt to limit this redistribution while improving the contribution to economic and social cohesion by setting criteria (area, employment, prosperity) for the way modulated funds will be redistributed to Member States.
- Countries in a weaker economic position find it difficult to find the counterpart funds required for second pillar schemes, unless the level of Community co-financing in the second pillar is very high.
- Second pillar schemes have higher transaction costs. Plans must be drawn up, compliance with measures needs to be monitored, evaluations must be undertaken, etc. Studies show that between 5 and 30% of programme costs can be lost in this way, reducing their attractiveness to Agricultural Ministries.
- Agricultural Ministries are not necessarily familiar or comfortable with running environmental or rural development schemes, and may not have responsibility for these areas. Thus there is little incentive for Agricultural Ministers to agree to a transfer of first pillar funds.
- There have been problems in the rural development area in finding worthwhile projects to support, thus leading to fears whether second pillar funding could be absorbed by a country even if it qualified for additional funding under the redistribution criteria.

If dynamic modulation is agreed, then additional funding would become available for Pillar 2 measures in Ireland. This additional funding could be used to reinforce rural development programmes on the basis of needs identified within the framework of the mid-term evaluation of these programmes. The Commission is also proposing new rural development measures to address food quality, to help farmers to meet higher environmental food safety and animal welfare standards as well as support for farm audits.

With respect to agri-environment schemes such as REPS, the MTR proposes the possibility to offer animal welfare payments for efforts that go beyond a mandatory reference level. It also proposes to increase the fixed co-financing rate for agri-environment schemes by a further 10 percentage points, to 85% in Objective 1 areas and 60% in other areas.

Conclusions: Implications for REPS

Having examined the possible environmental implications of the MTR proposals, we turn in this final section to speculating on their likely implications for the future of REPS.

A key point to note is that all of the changes examined – decoupling, eco-conditionality and dynamic modulation – only affect farms producing commodities where some support is provided through direct payments. Commodities whose support is provided entirely through market price support, such as milk and sugar, remain unaffected by these changes,[2] although dairy producers will find themselves included as direct payments are phased in beginning in the 2005/6 marketing year. From this perspective, the proposals do not appear to make it any more or less likely that producers of these commodities, who are currently underrepresented in REPS, will participate in REPS in the future.

If decoupling of direct payments does reduce the intensity of agricultural production on cattle, sheep and arable farms, it may make it marginally more attractive for these farmers to consider entering REPS by reducing the opportunity cost of complying with REPS conditions.

Proposals to set EU-wide minimum standards for good farming practice could potentially have an adverse effect on REPS participation if they raised the bar above which Tier 1 payments took effect. However, my view would be that the Irish GFP guidelines would not require to be changed even if new EU-wide standards came into force.

Dynamic modulation potentially can make additional resources available for rural development schemes in Ireland, among them REPS. Raising the rate of EU co-financing would make it easier for the Irish Exchequer to consider more generous funding levels where these were justified by the rules of the scheme.

In the longer-term, if the rationale for paying decoupled payments to farmers were questioned by the wider public, more targeted agri-environmental schemes (including the less favoured areas scheme under this heading) would seem easier to defend and could become politically more attractive agricultural policy instruments.

Of course, the greater the funding put into the REPS scheme, the more it will be asked to justify the environmental benefits it provides to a wider public. This is partly a matter of demonstrating that there are clear environmental benefits, and that the scheme is not just paying farmers for practices they might have engaged in anyway. But it is also that, in the broader debate on multi-functional agriculture, there is still great uncertainty about the value which the public puts on these environmental benefits and how much it is willing to pay to obtain them. Opinion poll data shows

[2] Some 5,000 dairy farmer participants in the Dairy Hygiene Scheme could be marginally affected by any changes to eco-conditionality.

broad support for transferring agricultural support from products to producers and public goods, but does not answer the question of how valuable in absolute terms these benefits are to the public. Some studies show relatively minimal willingness to pay for the multifunctional benefits of agriculture. However, REPS payments at current levels appear to have wide political acceptance and higher levels of payment would also appear sustainable, particularly if this was financed by enhanced Community co-financing.

In summary, the environmental implications of the MTR package appear to pose few threats to Irish farmers and the prospect of greater funding for REPS will be seen as a positive element. Of course, whether the MTR package is considered positively or negatively will depend on much more than its environmental implications. To hazard a guess at the likely outcome of the negotiations, it may be that decoupling will not be accepted on this occasion, but strengthened eco-conditionality and some form of modulation are likely to be elements of the final package agreed.

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REPS Review and Outlook Based on Teagasc National Farm Survey

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Preliminary analysis of the 2001 Teagasc National Farm Survey (unpublished) estimates that 37,623 farms received a REPS payment within that year. The non-REPS farms were divided into two sub groups – extensive farms that qualify for REPS on the basis that they produce less than 170 kg/ha of organic nitrogen (N) per annum and intensive farms that produce more than 170 kg/ha N per annum. The NFS estimated that there were 71,485 farms and 11,419 farms in the non-REPS extensive and intensive groups respectively.

The survey highlights once again the environmental and economic benefits of REPS. REPS farmers receive a payment of €158 per ha to cover compliance costs. These costs are significant particularly in the areas of nutrient management, fencing, lime application and habitat maintenance. At the same time, REPS improves income by compensating farmers for management changes and labour while facilitating more efficient use of inputs, particularly fertilisers.

Family farm income on REPS farms in 2001 was €413/ha compared with €377/ha on comparable non-REPS extensive farms and €946/ha on non-REPS intensive farms (Table 1). The corresponding income figures for 2000 were €408/ha, €358/ha and €799/ha respectively. The figures also show the recovery in farm incomes after the poor performance in 1999. However, the income gap between the REPS and extensive non-REPS farms has narrowed. Incomes on intensive farms which are mainly involved with dairying surged ahead in 2001 though this is likely to be reversed in 2002.

Table 1 Family Farm Income on REPS and non REPS Farms (€/ha)

	REPS Farms	Non-REPS Extensive	Non REPS Intensive
1999	344	276	702
2000	408	385	797
2001	413	377	947

Teagasc National Farm Survey (2001 data)

Stocking rates remained almost unchanged across the different farm types in 2001. REPS farmers had a marginally higher stocking rate (1.26 LU/ha) than the non-REPS extensive farmers (1.23 LU/ha) did but much lower than the intensive category (2.41 LU/ha). Chemical nitrogen (N) usage on REPS farms at 68 kg/ha fell by 1kg in 2001 after a very significant fall of 8 kg in 2000. N usage fell by 8kg on non-REPS extensive farms to 90kg/ha. This is the first time this group has shown a significant reduction in N use. N usage on non-REPS intensive farms at 222 kg/ha was unchanged in 2001.

While chemical phosphorus (P) usage at 8kg/ha was unchanged on REPS farms there was a fall of 1.4 kg on the non-REPS extensive farms. This coincides with the reduction in chemical N usage discussed above. At 18 kg/ha there was a small increase in P usage on the non-REPS intensive farms. Expenditure on fertilisers in 2001 was €63/ha, €83/ha and €180/ha for REPS farms, non-REPS extensive and

non-REPS intensive farms respectively. Though the gap is narrowing, REPS farms continue to support similar stocking rates using significantly less fertilisers compared with their extensive non-REPS counterparts.

There are significant overhead and maintenance costs associated with REPS. Farmyard investment is high on the agenda while land maintenance including stock-proofing of farm boundaries, fencing of watercourses and habitat maintenance are also significant. Farmyard investment including maintenance amounted to €47/ha on REPS farms in 2001 compared with €25/ha and €87/ha on non-REPS extensive and intensive farms. Comparable investment levels were €55/ha, €50/ha and €84/ha, respectively, in 2000. The figures show a 50% decline in investment in the non-REPS extensive farms which is indicative of the tight financial position on many of the 41,000 cattle farms in that grouping.

Investment in land improvement/maintenance was highest on REPS farms at €12/ha compared with €8/ha and €7/ha in the other two categories. This represented a small decline across all three groups compared with 2000. Machinery investment was €47/ha, €58/ha and €134/ha for the three survey categories, respectively. Investment in machinery was unchanged on the REPS and non-REPS extensive farms while there was a 36% increase on the intensive farms.

Encouraging Greater Uptake of REPS

From an early stage it was clear that a proportion of farmers completing REPS 1 contracts were not actively seeking to sign up for REPS 2. Various explanations for this have been advanced. These range from non-compliance resulting in penalties or refund of payments to disillusionment among certain participants with what they perceive as the interference of the scheme rules with traditional trading flexibility associated with cattle systems in particular. Cattle systems account for 50% of REPS participants. Clearly, the impact of inflation on REPS payments is also a significant factor. There are also those who have not fully made up their minds and a further significant group in the planning queue. The backlog situation has a negative effect. It is frustrating for farmers and damages the image of the scheme. It also inhibits planners promoting the scheme and seeking to follow up clients who are lukewarm about the scheme.

Proposals to simplify the proof of ownership and mapping procedures have the potential to free up the planning process and are to be welcomed. On the other hand the impact on planning efficiency of the proposals to simplify/shorten the plan format for extensive farms is less certain. It seems any increase in the payment levels is less imminent and can only be considered as part of the mid-term review. In spite of the negative impact of inflation REPS payments are still attractive in the context of the level of family farm income of the majority of REPS 1 and potential REPS 2 farms. It must be a difficult decision for participants, particularly in the hard-pressed cattle sector to forego the income boost. The economic facts should be made available so that informed decisions can be made.

Potential for New REPS Participants

Turning to the potential for new participants, there are 71,000 non-REPS extensive farmers with the option of joining the scheme on the basis of low organic N production (<170 kg/ha). However, there are inhibiting factors which are likely to limit the number of applicants. These are examined and an estimate is made of the likely participation level in each enterprise category. Attention is drawn in the first instance to 41,000 (58%) farmers in the survey defined ‘cattle rearing’ and ‘cattle+other’

categories. While average farm income (Table 2) is low at €5,906 and €6,822 respectively compared with €11,301 and €9114 for the same categories in REPS the low average farm size in the 'cattle rearing' category makes the payments less attractive (Table 3). Also, a high proportion in both categories have less than 10 ha.

Table 2. Family Farm Income (FFI) - REPS and extensive non-REPS farms (€)

	Cattle Rear	Cattle/Oth	Sheep	Tillage	Dairy	Dairy/Oth	All
FFI REPS	11,301	9,114	11,749	15,627	31,430	25,382	14,040
FFI non-REPS (Ext)	5,906	6,822	12,070	27,555	30,554	25,126	13,755

Teagasc National Farm Survey (2001 data)

While stocking rate is similar to the equivalent REPS groups, gross output excluding REPS payments is much lower. In general, the characteristics suggest farming is run down. Investment level is low and facilities are likely to be poor. The farmers are older and the number in receipt of pensions is higher. Twice as many are single compared to the REPS groups. Further frontloading of payments up to 25 ha would assist uptake but this is unlikely to exceed 10,000 or 25% of the farms in these categories.

Table 3. Farm Size and Stocking Rate - REPS versus extensive non-REPS farms

	Cattle Rear	Cattle/Oth	Sheep	Tillage	Dairy	Dairy/Other	All
REPS Farms							
Size (ha)	33	28	35	40	38	46	34
S.Rate (LU/ha)	1.1	1.3	1.3	0.7	1.6	1.5	1.3
Non-REPS Farms (Ext)							
Size (ha)	2 6	30	43	63	43	51	37
S.Rate (LU/ha)	1.1	13	1.2	0.6	1.6	1.5	1.2

Teagasc National Farm Survey (2001 data)

The 'mainly sheep' category has the highest participation level at 9,736 (58%) in REPS. Almost all remaining sheep farms, 6,970 (42%) are in the extensive non-REPS group. These have a lower stocking rate but the average farm size is much larger than the REPS sheep farms. The majority are likely to be hill farms awaiting clarity on de-stocking levels arising from framework plans. A significant proportion, possibly 3,000, are expected to join REPS. The attractiveness or otherwise of the proposed Duchas scheme may affect the number.

More than 2,100 (28%) of the 'mainly tillage' category joined REPS. They farm an average of 40 ha. The remaining 5,400 tillage farmers have very large enterprises. They farm up to 63 ha on average. The number attracted to REPS is likely to be small probably less than 1,000.

Chemical N Constraint

There is a reservoir of potential REPS farms in the two remaining categories: 'dairying' and 'dairying+other'. While these are reasonably intensive farms we should be aiming to attract a significant number into REPS. Though they are well within the REPS organic N limit of 170 kg/ha, high chemical N use poses a problem (Table 4). So far, only 3,485 (18%) of all farms in the 'dairying' category and 3,125 (22%) of the 'dairying +other' categories have joined REPS.

Almost 9,000 (45%) non-REPS farms in the 'dairying' category have an organic N level below REPS requirements. These farms have an average stocking rate of 1.6 LU/ha, similar to the dairying category in REPS. The average number of cows is 37 and 30 respectively. Farm size is similar. While organic nitrogen is relatively low in the dairying category at 133kg/ha, chemical nitrogen application is high at 159 kg/ha. This exceeds of REPS limit by 22 kg/ha. It also exceeds normal nutrient advice. The corresponding REPS group carries 131 kg/ha organic N using 125 kg/ha of chemical N. Assuming strategies to curtail chemical N usage can be encouraged (these are discussed below) perhaps a further 2,000 farmers in this category can be encouraged to join REPS. This assumes the significant number expected to leave dairying will be willing to join REPS.

Table 4. Organic and Chemical N - REPS and non-REPS extensive farms

	Cattle Rear	Cattle/Oth	Sheep	Tillage	Dairy	Dairy/Oth	All
REPS Farms							
Org. N (kg/ha)	83	100	85	53	131	120	94
Chem N (kg/ha)	49	67	40	87	125	108	68
Non-REPS Farms							
Org. N (kg/ha)	82	96	80	47	133	123	94
Chem N (kg/ha)	45	60	34	130	158	140	90

Teagasc National Farm Survey (2001 data)

About 8,300 non-REPS farms in the 'dairying + other' category meet REPS organic N criteria. These have a dairying and a cattle enterprise. The average number of dairy cows is 22 compared with 16 for the same category in REPS. The area farmed is also greater at 51ha and 46 ha respectively. Organic N level (123 kg/ha) is slightly higher than for the 'dairying' category but less chemical N (140 kg/ha) is used. This group would have to make an average reduction of the order of 13 kg/ha in chemical N to comply with REPS. The comparable group in REPS manage to keep a similar stocking rate using 108 kg/ha chemical N. The conclusions drawn earlier for the 'dairying' category could also apply to this group. However, the present poor participation level of the 'dairying + other' category in REPS would point to 2,000 additional participants as a significant success.

The foregoing analysis projects an additional 18,000 new REPS participants by 2006. This is considered an optimistic assessment dependent on action on a number of fronts. These include immediate implementation of measures to improve planning efficiency especially the removal of the proof of ownership burden. The midterm review needs to examine the payment issue especially front loading for smallholders. As planners we need to promote the positive aspects of REPS. We need to limit the drop out from REP1 by convincing the farmers with an open mind that it is in their best interest to join REPS 2. It is still not too late to minimise the overall dropout from

REPS 1. If 18,000 new participants can be added to the estimated current participation rate, the tally at the end of REPS 2 ought to be at least 53,000 participants.

There are agronomic strategies that the more intensive farmers can use to overcome the barriers created by the REPS chemical N limit. There are other strategies to deal with the organic N restrictions such as increasing milk yield per cow and reducing numbers. Planners and farmers have to work together to enable productive agriculture co-exist along side the environmental requirements of the scheme.

Coping with REPS Chemical N Limit

Lime application allows the N supply built up in the soil organic matter to be tapped. Research has shown that the lime effect on nitrogen supply can be as high as 50-70 kg/ha. This may partially explains why REPS farms can maintain stocking rates while using significantly less N than farms of similar intensity who do not participate in REPS. In grazing trials animals had 18-36% more herbage available on limed plots. It is also acknowledged that on certain soils lime may have a detrimental effect on the bearing capacity of the sward.

Nitrogen from Spring Slurry

Slurry applied in March to the silage ground can supply up to 25kg/ha N to the immediate crop. Assuming 60 % of the farm is closed for silage this is equivalent to 15 kg/ha over the whole farm. This is similar to the average amount the non-REPS extensive ‘dairying + other’ category was found to exceed the REPS chemical N limit. The N contribution to the immediate crop is negligible when slurry is applied in mid season and the back end due to the atmospheric losses.

Lengthening Grazing Season Helps N Budget

Lengthening the grazing season reduces the winter feed requirement. This means a smaller area has to be closed off for silage. As the silage area requires high N levels (110 kg/ha) any reduction leaves more land for grazing and more N for the grazing area. This facilitates the maintenance of a higher stocking rate. This approach is particularly important for dairy farmers who want to maintain a reasonably high stocking rate and join REPS. Strategies for lengthening the grazing season are well documented elsewhere.

Sward Quality and N Use Efficiency

One suspects that sward quality is poor on many low to medium stocked farms where high N levels are being used. Teagasc researcher Dr Noel Culleton sees the availability of new types of mid season perennial ryegrasses as a major benefit to REPS farmers. They have the potential to grow early in spring and provide a good silage crop. The new varieties remain leafy in mid summer and their open swards are favourable to clover. On suitable soils clover is a major asset in REPS given its ability to fix more than 75 kg/ha N annually. It is feasible to carry up to two cows per ha with a good clover sward while maintaining chemical N within REPS limits.

REPS of the Future

There is the view that REPS places too much emphasis on pollution control and nutrient management (Measure 1) and not enough on habitat enhancement. It is argued that the polluter pays principal should take care of the current Measure1 issues and that manure and nutrient management is the remit of national legislation and EU Directives. An alternative view is that water in its many manifestations is our most important habitat. The quality of this habitat is fundamentally linked to the management of nutrients on farms and will ultimately be the acid test of sustainable farming. We also know from experience the legislation on its own has had a poor track record in protecting water quality in Ireland. REPS, on the other hand, is considered to be making a major contribution.

There is pressure to rebalanced REPS payments in favour of habitat enhancement and creation. The National Biodiversity Plan published last April by the Department of Arts, Heritage, Gaeltacht and the Islands calls for conservation and sustainable use of biodiversity as a priority in any future revision of REPS. While it is agreed that REPS must upgrade its biodiversity measures and move from retention to enhancement as an objective, caution is urged in any dilution of the water protection measures. There is also the risk that if the focus of the scheme is unduly narrow it will become the preserve of the few.

Irish / Scottish Comparison of Environmental Protection

Catherine Keena, Countryside Management Specialist, Teagasc

As part of the Farming Independent / Teagasc travel bursary awards to study grazing management in the uplands in Scotland, other biodiversity issues were observed. Statistics comparing Scotland and Ireland are in Appendix 1. This paper compares the following areas of environmental protection in the two countries:

1. National Biodiversity Plans
2. Arable Aid Scheme: Field Margins
3. Arable Aid Scheme: Set-Aside
4. Agri-Environmental Schemes
5. Good Farming Practice
6. Designated Area Schemes
7. Corncrake Schemes
8. Plastic Recycling

1. National Biodiversity Plans

In June 1992, the Convention of Biological Diversity was signed by 159 Governments at the Earth Summit, which took place in Rio de Janeiro. It entered into force on 29 December 1993 and was the first treaty to provide a legal framework for biodiversity conservation. It called for the creation and enforcement of national strategies and action plans to conserve, protect and enhance biological diversity.

Scotland (UK)

Biodiversity: the UK Action Plan was published in 1994. It established fundamental principles for future biodiversity conservation in the UK. These are:

- **Partnership** - action involving the mutual co-operation of statutory, voluntary, academic and business sectors at both national and local levels.
- **Targets** - the establishment of measurable outcomes that address the needs of species and habitat types of most concern to biodiversity conservation.
- **Policy Integration** - recognise that shifts in policy are needed to reverse the decline in the UK biodiversity resource and to support sustainable development in all sectors of society.
- **Information** - while sound science and knowledge should underpin decisions, recognise that new approaches are required to fill information gaps and understanding and to manage the information already available more efficiently.
- **Public Awareness**- public understanding and action is needed to support the changes needed to maintain biodiversity.

Action plans to conserve species and habitats were drawn up. There are now 391 species action plans and 45 habitat action plans.

Ireland

In April 2002, the National Biodiversity Plan was published, addressing the conservation of habitats, species, genetic diversity and the natural heritage.

A key component to implementing the National Biodiversity Plan will be the Biodiversity Action Plans drawn up by each relevant Department (including Agriculture) and agency (including Teagasc). These Sectoral Action Plans will aim to ensure the conservation use of biodiversity is actively pursued by each Government Department and agency. These plans will be subject to a review after a period of five years.

As the main land use in Ireland, agriculture is the most important factor affecting terrestrial biodiversity. It is necessary not only to minimise adverse effects on biodiversity due to agriculture, but also to ensure agriculture makes a positive contribution to the conservation and sustainable use of biodiversity.

Key issues relate to:

(a) the role of protected areas;
(b) reducing and eliminating damaging effects of agriculture in general (e.g. overgrazing, water pollution);
(c) encouraging and supporting farming which is compatible with biodiversity;
(d) providing supports for the conservation, including the enhancement, of specific biodiversity habitats/features.

2. Arable Aid Scheme: Field Margins

Farmers in Ireland who retain field margins are penalised by loosing arable aid on this area. The scheme in Scotland pays arable aid on field margins.

Scotland

Uncropped Field Margins:
From SEERAD Arable Area Payment Scheme 2002: Explanatory Booklet

27. The field boundary is considered to be the area between the recognised centre of the boundary (the fence or midpoint of a hedge, ditch etc) and the edge of the crop or forage area. The current IACS Regulation allows you to claim the total FIS area of a field where it is fully utilised according to customary agricultural practice.

28. AAPS aid may normally only be paid on field margins where the distance from the centre of the boundary to the edge of the crop is no more than 2 metres at all points throughout its length. However, you may exceed that 2 metres limit and base your AAPS claim on **full** field areas (including any traditional field margins, i.e. hedges, walls and ditches) where these have long been an important element of the landscape and managed under good agricultural practice.

Ireland

Net area of parcel:
***From* DAFRD EU Area Aid Applications 2002 Helpsheet / Terms & Conditions**

In the case of each parcel for which Arable Aid is claimed:
you must enter the actual area sown
or,
where the parcel is claimed as set-aside, the actual **eligible** area being set aside. Again, necessary deductions must be made for areas under buildings; woods; ponds;

paths; farm roads; expanses of bare rock; boglands; permanent or horticultural crops; trees; pylons; ditches; drains; rock outcrops; wet or waste land; areas of difficult trafficability or headlands.
Headlands are measured from the centre of the boundary fence to the edge of the crop or set-aside area.

3. Arable Aid Scheme: Set-Aside

The Scottish scheme promotes the management of set-aside for birds, as a management option. In Ireland it is possible to seek permission by written application to the Department of Agriculture to carry out such management.

Scotland

Management of Set-Aside Land:
***From* SEERAD Arable Area Payments Scheme 2002: Explanatory Booklet**

The main ways of establishing a green cover are through natural regeneration, sowing a grass cover or sowing wild bird cover.

Wild Bird Cover

90. Wild bird cover is generally left in place for 2 years, and should not be cut but be left to reseed itself in the autumn. It must be replaced if one crop group comes to dominate so that the cover is no longer a mixture where the components could not be harvested separately. It may be destroyed after one year only if you need to do so, e.g. because you wish to rotate your set-aside.
91. Wild bird cover can provide valuable feeding grounds for both seed-eating and insect-eating birds, **especially if it is left in place for 2 years or more**. However, where the land remains set aside for more than one year, this cover must be replaced during the second calendar year after it was sown. For example, if the cover was sown in the spring of 2001, it must be replaced by the set-aside year commencing on 15 January 2003. However, if the cover is replaced after the first year, it need not be replaced again after the second year. You should consider wild bird cover on those parts of the farm where you wish to encourage seed-eating birds, including wild game birds, and it might usefully be sown on field margins.

What type of wild bird cover can I sow?

92. Wild bird cover must be a mixture of at least two crop groups, e.g. cereals and brassicas, other than legumes. The mixture chosen must be one which is not normally grown as a mixture for agricultural production and it is not practicable to harvest the components separately, i.e. a mixture of cereals and grass or of rape, kale and turnips is not acceptable. Whether or not you intend to harvest or graze it is irrelevant. What matters is whether the mixture is **capable** of being harvested or grazed. The mixture must be sown on the same land; you cannot sow alternate rows, or blocks, of each seed. You may add up to 5% (by weight) of legumes to the mixture. Mixtures of cereals alone or brassicas alone are not acceptable. You must ensure that the mixture remains an unharvestable mix. This is particularly important if the land is to remain in set-aside. If one component of the mix deteriorates, you must write to your local Area Office immediately and reinstate the mixture by replacing either the lost components or the whole mixture as soon as possible. Infringements will be penalised.

What steps must I take to establish a cover?

93. Wild bird cover is generally best established in the spring following natural regeneration over winter, although you may also sow a cover in the autumn. Up to 30 kg of nitrogen per hectare may be applied to help establishment. You are not required to cut the cover, **provided** that you follow in full all the rules in paragraph 99; but if you do take advantage of this derogation you must **not** graze, or allow the cover to be grazed, or use it in any other way, after the end of the set-aside period. If you do, you will be penalised.

Uptake of Wild Bird Cover option in Scotland

In 1999, the area of set-aside in Scotland was 76,754 hectares. Of this 1,185 hectares (1.5%) consisted of wild bird cover. It tends to be concentrated on shooting estates and farms with a particular interest in pheasants or partridges.

Research on Wild Bird Cover

An ongoing study, funded by the MAFF and carried out by the British Trust for Ornithology, the Game Conservancy Trust and the Allerton Research Trust, found significant differences in the use of crop species by different birds:

- Greenfinch used sunflower, linseed and kale
- Yellowhammer used triticale, wheat and oats more than other crops
- Skylark used wheat and triticale
- Chaffinch used sunflower, quinoa, mustard teasel and kale
- Linnet used quinoa and mustard
- Goldfinch used sunflower, linseed and teasel

Among winter bird crops, kale and quinoa are the two crops that support the greatest range of species in the highest densities. These two species were also found to be holding birds in late winter. Turnip stubbles, bare ground and cereal stubbles were found to attract grey partridge and reed buntings. Overall higher densities of birds were associated with weedy winter crops.

Ireland
Management of Set-Aside Land:
***From* DAFRD EU Area Aid Applications 2002 Helpsheet / Terms & Conditions**

(9)(a)(i)A green cover must be established either through the sowing of a mixture of grasses or mustard, phacelia, fodder rape or by natural regeneration before 15 January 2002.

There are over 30,000 hectares of set-aside in Ireland. A very small number of farmers got permission from the Department to sow wild bird cover. This is accommodated in **9(e)(v).** Farmer's may seek by means of a written application the permission of the Department to follow their own management plans outside these options on environmental or conservation grounds.

4. Agri-Environment Schemes

The Rural Stewardship Scheme (RSS) replaced the Environmentally Sensitive Scheme (ESA) in Scotland in 2001. Like REPS it is voluntary, available in all areas of the country and undertakings are for 5 years.

Compared to REPS, one difference is the choice within the scheme. There are 29 management options. In addition there are special measures for small units, including traditional cattle breeds. There are also payments on capital items such as ponds, fencing and rejuvenating hedges.

Farmers can opt for any number of relevant options. None are compulsory. There are no individual ceilings on payments. However all payments for management agreements above certain hectarage limits will only be paid at 80 per cent of the full rates. With wide variation in options and amount of habitat management chosen, there isn't a typical scheme. Payments vary hugely between farms.

With no nitrogen limits, intensive farmers are not excluded, or never were from previous agri-environmental schemes in Scotland. As payment is on the area managed, farm size is not relevant either.

Another major difference is, there is no guarantee of acceptance into RSS. It depends on the number and value of applications submitted each year and the level of resources available. A Ranking System has been developed to facilitate selection of applications.

A criticism of European agri-environmental schemes, comprising management options is that while a farmer can be paid for managing one habitat, harmful practices on other habitats or pollution issues on that farm are not addressed. The RSS has addressed this. The Standard of Good Farming Practice and General Environmental Conditions apply to the whole farm involved in the scheme.

Environmental Audit
This is an inventory of habitats on the farm. A descriptive map shows all habitats, while a management map shows those subject to payment under the scheme. If sufficiently knowledgeable about conservation, a farmer can do the audit. If a professional adviser carries out the audit, 50 to 75 per cent of the cost is covered under the scheme.

Farmer Opinion
Consultation with farmers on land management schemes in Loch Lomond and the Trossachs National Park, found the RSS was less effective than the ESA scheme it replaced. Problems identified included: its competitive nature; lack of funds; too bureaucratic; too hard to get in; changing goalposts making it hard to plan and it encouraged point scoring rather than best management practice.

Farmers liked the ESA scheme because of its simplicity, not too much paperwork and it provided extra income. It encouraged farmers to improve the wildlife value of their farms and educated farmers on the wildlife potential of their farms. The HLCA (Headage) was also well regarded.

Rural Stewardship Scheme

Prescriptions and Rates of Payment (£ Sterling)

Birds (5)

- **Extensive management of mown grassland** (£150 per ha)
  Avoid the disturbance of ground nesting birds by machinery operations and delays cutting to 1 July.

- **Management of open grazed grassland** (£100 per ha)
  Avoid the disturbance of ground nesting birds and exclude livestock from 1 April to 15 June.

- **Extensive management of mown grassland for corncrakes** (£190 per ha)
  Delay mowing to 1st August and cut from centre out.

- **Management of early and late cover for corncrakes** (£160 per ha)
  Leave areas between 0.15 - 1 ha with clumps of tall vegetation such as iris, nettle, cow parsley or rush, adjacent to mown grassland managed for corncrakes.

- **Management of wet grassland for waders** (£100 per ha)
  Exclude livestock from 1 April to 15 June, or stock at less than 1.4 LU per ha, to provide suitable breeding grounds for wading birds.

Species rich areas (5)

- **Management of species rich grassland** (£100 per ha)
  To encourage the growth and spread of flowering plants, do not graze or cut between 15 March to 15 August. No lime or fertiliser applied.

- **Bracken eradication programme for species rich grassland, coastal or lowland heath** (£25 per ha)
  Control bracken, using Asulam or other approved herbicide or by cutting.

- **Creation and management of species rich grassland** (£250 per ha)
  Convert arable or improved grassland to species rich grassland by reseeding with a low productivity grass and herb mix.

- **Management of coastal heath** (£80 per ha)
  To encourage native vegetation, exclude livestock from 1 April to 31 August, and graze from 1 September to 30 November. No fertiliser applied.

- **Management of lowland heath** (£115 per ha)

Graze at less than 0.3 LU per ha and exclude livestock from 1 November to 28 February to maintain the heather, dwarf gorse and cross-leaved heath.

Moorland (4)

- **Moorland management** (£1 per ha)
  Carry out additional management practices, including shepherding, stock management and feeding practices.

- **Stock disposal** (£45 per ha)
  Reduce an agreed number of ewes to encourage the regeneration of suppressed heather or other vegetation.

- **Muirburn and heather swiping** (£11 per ha)
  Carry out a planned programme of burning or swiping to create blocks of heather at different growth stages.

- **Bracken eradication programme for moorland** (25 per ha)
  Control bracken, using Asulam or other approved herbicide or by cutting.

Wetland (5)

- **Management of wetland** (£100 per ha)
  To enhance wet grassland for birdlife and botanical diversity, exclude livestock from 1 April to 31 August.

- **Management of lowland raised bogs** (£70 per ha)
  To enhance bird life and botanical diversity, do not graze with cattle. Stock at less than 0.05 LU per ha and exclude from 1 November to 28 February. Block existing drains at intervals to raise or maintain the water table.

- **Creation and management of wetland** (£250 per ha)
  Convert arable or improved grassland to wet grassland by raising water levels to ensure it is normally saturated for a significant proportion of the year.

- **Management of water margin** (£400 per ha)
  Maintain a margin of 6 to 24 metres along watercourses. Livestock must normally be excluded.

- **Management of flood plain** (£25 per ha)
  Natural flooding must not be hindered.

Field margins and boundaries (4)

- **Management of grass margin or beetle bank in arable fields** (£736 per ha)
  Create strips between 1.5 and 6 metres around or across arable fields. Establish by sowing a suitable mix of grass seed.

- **Management of conservation headlands** (£70 or £150 per ha)
  No herbicides or pesticides to a minimum headland width of 6 metres to allow the natural development of a varied flora and habitat for insects, birds and small mammals. The higher rate is payable where no nitrogen is applied.

- **Management of extended hedges** (£500 per ha)
  Exclude livestock and arable cultivations from a hedge margin between 3 to 6 metres from the centre of a hedge. Exclude fertiliser, slurry and pesticides.

- **Management of hedgerows** (£1 per m^2)
  Trim between 1 December and 1 March, no more frequently than every third year. Rejuvenate gaps by laying, coppicing or planting.

Arable (3)

- **Introduction or retention of extensive cropping** ((£120 or £140 per ha)
  Arable crop between 4 and 8 ha in the Less Favoured Area. No pesticides and a maximum of 250 kg of compound fertiliser. Higher rate if same site for 3 or more years.

- **Management of cropped machair** (£200 or £240 per ha)
  Arable crop on previously cropped machair, to encourage birds and after the crop has been harvested the site must be left fallow to revert to natural grassland for 2 to 3 years, encouraging a range of annual plants to grow and flower.

- **Unharvested crops** (£600 per ha)
  Spring sow a cereal based mixture including at least one legume, in plots of up to 1 ha and totalling no more than 4 ha and do not plough down until after 15 March the following year, to provide cover and feeding area for birds.

Woodland and Scrub (2)

- **Management of scrub** (£55 per ha)
  Cease grazing suppressed scrub and control rhododendron.

- **Management of native or semi natural woodland** (£100 per ha)
  Manage native or semi-natural woodland to enhance the woodland and associated flora and fauna.

Historic and Archaeological Sites (1)

Management of a site of archaeological or historic interest (£80 per 0.25 ha)

5. Good Farming Practice Guidelines

Regarding wildlife habitats, in both countries, farmers must comply with the requirements of designated sites and the relevant Wildlife Acts. There is a variation in the requirements with regard to boundaries:

Ireland

Maintenance of External Field Boundaries
***From* DAFRD Good Farming Practice**

- All external farm boundary and roadside fences (whether walls, hedges or post and wire fences) on land occupied by livestock, excluding commonage land and unenclosed land, should be stockproof.

Scotland

Linear Features
***From* SEERAD Good Farming Practice Guidelines**

- Hedgerows: trimming of hedgerows on the farm must not be carried out between 1 March and 31 July.
- Field Boundaries: removal or destruction of any hedges, stone walls or other boundary features outlined in any environmental audit will not be permitted except with the prior written agreement of SEERAD or other appropriate Government Agency.

6. Designated Area Schemes

Scotland

1447 Sites of Special Scientific Interest (SSSI): 1,007,260 ha (12.8%)
226 Special Areas of Conservation (SAC): 869,207 ha
135 Special Protection Areas (SPA): 520,028 ha

Ireland

1100 Natural Heritage Areas (NHA): 750,000 ha (10%)
363 Special Areas of Conservation (SAC): 996,000 ha
110 Special Protection Areas (SPA): 223,000 ha *and* 25 proposed.

Scottish Natural Heritage (SNH) has individual management agreements with farmers. Natural Care contracts are available to land owners and managers for the appropriate positive management of SSSI and Natura sites. Natural Care management schemes are being developed. Examples are the Peatland Management Scheme, the Moorland Management Scheme and the Goose Management Scheme. It is expected to maximise use of the Rural Stewardship Scheme, where appropriate, before or at the time of joining the SNH scheme.

Peatland Management Scheme

Aim: To secure adequate protection for the internationally important peatland habitats, to build public support for that objective, and to provide a financial incentive for the continued management of peatland in a traditional and sustainable way in sympathy with natural heritage interests.

Natural heritage interest targeted:
Blanket bog, wet heath and peatland breeding birds.

Management requirements and payments

Applicants sign up to a 5-year Peatland Management Scheme (PMS) agreement, which covers acceptable levels and practices for:

- Management of sheep and cattle
- Muirburn
- Management of grazings
- Peat cutting
- Use of vehicles
- General land and water management

The basic annual payment is calculated according to the following scale, subject to a minimum payment of £200 and a maximum of £4000:

- First 50 hectares: £10 per ha
- Next 100 hectares: £5 per ha
- Next 500 hectares: £1 per ha
- And thereafter: £0.25 per ha

Moorland Management Scheme

Aim: To maintain and promote improvements to upland moorland habitats which are of interest in their own right and support important breeding populations of hen harriers and other moorland birds. To provide a financial incentive for the sustainable management of moorland in support of the natural heritage interests.

Natural heritage interest targeted:
Upland heathland habitats and a range of moorland breeding birds, including hen harriers.

Management requirements and payments

The Forest of Clunie Scheme is the first of a suite of Moorland Management Schemes to be developed by SNH. Applicants sign up to a 5-year management agreement; prescriptions are arranged in four levels and all applicants must participate in levels One and Two. Applicants will also supply an annual record of moorland management undertaken. The following prescriptions and payment rates apply to Forest of Clunie only.

Level 1: £1.50 per ha up to max of £1250

Moorland management plan

- A moorland habitat condition assessment,
- Integration of farming, sporting and conservation objectives
- Programme of actions

Level 2: £110 per ha

Muirburn

- Payments for muirburn made annually on receipt of a map showing the location and extent of individual burns.
- Individual fires must be between 0.4 ha and 1.0 ha.

Levels 3:

- **Bracken control**: (£120 per ha); Where bracken is spreading and areas of heath may become over-shaded and lost.
- **Away-wintering and stock disposal**: (£0.70 per week); Payment for every additional away-wintered ewe or hogg. Payments calculated on the basis that every ewe disposed of will benefit 0.8 ha of moorland
- **Crow control**: (£40 per crow trap); Payment for every crow trap purchased for use on or near the SSSI
- **Diversionary feeding**: (£220 per nest); Payment for every hen harrier nest fed in accordance with best practice guidelines
- **Fence marking**: (£1.50 per m); Payment towards cost of fence marking where there is a risk of fence-strikes by black grouse

Level 4: Negotiated rate items including:

- **Heather restoration**
- **Fencing** (where appropriate)
- **Wetland creation** (e.g. blocking moor grips)
- **Scrub protection/ development**
- **Creation of nest sites**
- **Fox control**
- **Deer management**

Goose Management Scheme

Aim: The four local Goose Management Schemes aim to help integrate productive farming with the conservation of wild geese and their grazing on farmland. The Schemes provide payments towards the maintenance of disturbance free feeding areas where geese are resident whilst encouraging the scaring of geese from other parts of the farm.

Natural heritage interest targeted:
Populations of wintering Greenland white-fronted geese and wintering barnacle geese.

Management requirements and payments

Applicants sign up to a 5-year management agreement, which covers the establishment and management of:

- **Feeding zones**: (£195 - £301 per ha)
  Refuge area where gees can graze undisturbed. No audible scaring within 100 m of boundaries of feeding zone fields. Grassland maintained according to good agricultural practice.

- **Buffer zones**: (£50 - £228 per ha)
  Non-audible goose scaring permitted, whilst minimising disturbance to adjacent feeding zones.

- **Scaring zones**: (£100 per farm)
  The farmer or his agent actively scares geese. Audible scaring is encouraged through loan of scaring equipment or grant towards equipment purchase.

Different rates are offered by the four local Goose Management schemes for each of these prescriptions. This reflects differences in farming practices and profit margins between different localities.

7. Corncrake Schemes

The Corncrake is the only Irish breeding bird, which is threatened with global extinction. They were once common in Ireland. By the late 1960's, the population had declined to about 4,000 singing males. By 1994 numbers had fallen further, to 129, restricted to three core areas in Ireland - the Shannon Callows, North Donegal and Co Mayo (the Moy Valley and the Mullet). As a result of concentrated conservation measures, however, numbers rose. In 1998, the national census recorded 151.

The 2002 season has been poor in the callows with the flooding. Despite an increase of 17 in Donegal to 97, overall numbers in the three core areas were down to 137.

There is similar interest in the corncrake in Scotland. The western and northern islands of Scotland are the only remaining strongholds in the UK. Populations seem to be responding to conservation measures. After nearly a century of decline, corncrakes have begun to increase. In 1998, the national census recorded 589, of which 543 were in core areas. In these core areas, 660 were recorded in 2002.

Conservation Measures
In order to increase corncrake breeding success, BirdWatch Ireland, with the support of Dúchas, the Heritage Service and the Royal Society for the Protection of Birds, have operated a Corncrake Conservation Project in Ireland since 1991.

BirdWatch Ireland fieldworkers in each of the core corncrake areas count singing male corncrake, and advise farmers on corncrake-friendly farming methods. Farmers with corncrakes in their meadows are eligible for entry to the Corncrake Grant Scheme. Grants are paid to those who delay mowing of hay or silage until 1 August, by which time most corncrakes should have hatched two broods. There is also a grant for mowing from the centre of the field outwards, which gives young corncrakes a chance to run towards the edges, to safety, under cover of the remaining grass.

There is often a shortage of cover available for corncrakes when they arrive in Ireland in spring. Nettles and Iris patches provide suitable early cover, and BirdWatch Ireland has been working with farmers in the corncrake areas to increase the area of such cover available.

Similar schemes operate in Scotland. A striking observation is the difference in the size of the organisations. Since its founding in 1889, the RSPB has grown into Europe's largest wildlife conservation charity, with more than a million members. In Scotland there are 170 staff employed, compared to 15 in Birdwatch Ireland.

8. Plastic Recycling Scheme

The recycling of waste farm plastic in Ireland is recognised as a major success. In 1997, farmers and the plastics industry formed Irish Farm Films Producers Group (IFFPG), to recycle plastic silage film used on farms. The latest figures for January to August 2002 show 5,225 tonnes or 40% of all film sold last year was recycled.

This plastic is recycled in a plant in Scotland. There is no similar UK recycling scheme. The reason for the success in Ireland is the Irish legislation, which places obligations on manufacturers and importers of farm plastics to arrange for environmentally acceptable ways of collecting and disposing of used plastic film.

The IFFPG was formalised under the Waste Management (Farm Plastics) Regulations, 1997 - S.I. No. 315 of 1997. These Regulations impose obligations on persons who supply packaging (i.e. packaging materials, packaging or packaged goods) to the Irish Market, whether as retailers, packers/fillers or manufacturers. An exemption from these obligations is available only to persons who participate in a packaging waste recovery scheme operated by an Approved Body.

Conclusions

- There is high awareness and understanding of biodiversity, among farmers, advisers and the industry in Scotland. This may be due to the fact that the agri-environment is an option for all farms; environmental aspects of other

schemes; or general public awareness of the existence of species and habitat plans under the UK National Biodiversity Plan.

- Positive aspects of Irish agri-environmental scheme:
  - Strong agricultural emphasis emphasising the importance of farming for the environment
  - Guaranteed acceptance into the scheme
  - A single scheme in the country, well known by farmers, advisers and the industry
  - Simple management prescriptions, continuing present practices
  - Courses integrating biodiversity into farming
- Positive aspects of Scottish agri-environmental schemes:
  - Positive management options
  - Available to intensive and extensive farms

Appendix 1

	Scotland	Ireland
No. of holdings	41,914	143,900
Average size of holding (ha)	131	29
Dairy cows	195,840	1,279,000
Suckler cows	488,630	1,175,800
Breeding ewes	3,266,380	4,121,500
Crops (ha)	651,522	401,000
Forestry %	14	10
LFA %	84	75
Agriculture as a % of GDP	1.3	3.2

Commonage:

Scotland:

- 500,000 ha in the Highlands and Islands (12%)
- Over 50% of land area in Shetland and the Western Isles.
- Average size 617 ha; Range 10 ha – 10,550 ha.

Ireland:

- 491,923 ha
- 9% of area farmed in the country; 19% in the West. (Census 1991)
- 12,000 farmers with 40 ha approximately

The Impact of the REPS on Biodiversity: Are Measures Benefiting Plants and Insects on Farmland?

Dr. Jane Feehan, European Environment Agency, Former Research Scientist, Teagasc/Trinity College

Introduction

Little ecological evaluation of the Rural Environment Protection Scheme (REPS) has been done to date, and in particular, evaluation of the scheme's impact on farmland biodiversity has been neglected. As part of a Teagasc Walsh Fellowship project, the effects that certain REPS measures may be having on plant and insect species diversity were examined.

When the scheme was first devised one of its stated objectives was 'to protect wildlife habitats and endangered species of flora and fauna', but throughout the scheme's specifications the overwhelming emphasis is on water pollution reduction and extensification, and the word 'bio-diversity' appears only once in the REPS handbook, despite several revisions. One of the objectives of this research is to make specific, practical recommendations for ways in which the REPS could be improved with regard to the protection and maintenance of agri-biodiversity. Several such recommendations are presented and discussed in this paper.

REPS measures and biodiversity

Amongst the compulsory REPS measures, four were selected as having particular relevance to the biodiversity of wild flora and fauna on farmland. These measures are as follows (Department of Agriculture, Food and Rural Development, 2000):

Measure 3 - Protect and maintain watercourses and wells
Measure 5 - Maintain farm and field boundaries
Measure 6 - Cease using herbicides, pesticides and fertilisers in and around hedgerows, ponds and streams
Measure 9 - Tillage crop production

Measure 4, under which habitats are retained, was not examined because it is not currently applied on the majority of REPS farms.

In order to assess these measures, fieldwork was conducted on 60 grassland and tillage farms in Counties Laois, Offaly and Wexford during 1999 and 2000. Equal numbers of REPS and non-REPS farms were included in the study. Selected REPS farms had been in the scheme for at least four years. Hedges, field margins and watercourse margins were surveyed using quadrat methods and pitfall trapping.

In the light of the data collected, the success of each of these measures in maintaining or enhancing flora and insect fauna species diversity is discussed, and recommendations are summarised.

Measure 3 – 'Protect and maintain watercourses and wells'

The principal objective of this measure is to reduce water pollution, but it also states that streams and watercourses should be fenced off to protect the flora and allow it to develop.

Impact of Measure 3

The average number of plant species per farm in 11 fenced REPS watercourse margins and 11 unfenced non-REPS watercourse margins were compared (Fig. 1). Higher numbers were found on non-REPS unfenced margins, but the difference is not significant.

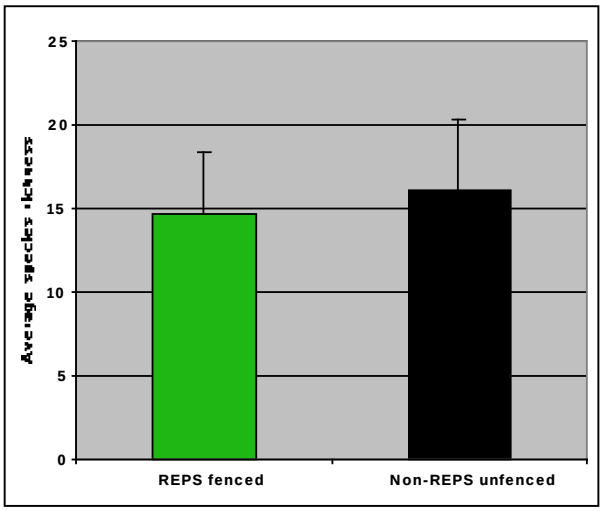

Figure 1: The average number of plant species per farm in 11 fenced REPS watercourse margins and 11 unfenced non-REPS watercourse margins.

Figure 2 shows the relationship between fence distance and plant species diversity on surveyed watercourse margins. There is no significant correlation between fence distance and plant species diversity. Wider fences don't have higher numbers of plant species. These findings correspond with research elsewhere which concluded that concludes that grazing and cutting are important factors in the maintenance of plant and invertebrate diversity, both in field margins and alongside watercourses (Bakker and Berendse, 1999; Schmid and Wiedemeier, 1999).

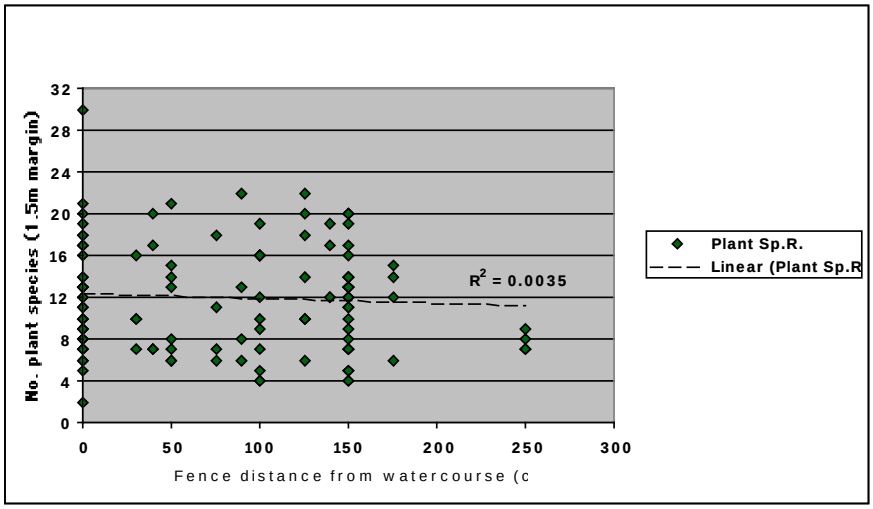

Figure 2: The relationship between fence distance and plant species diversity in the 1.5m margin area of watercourse margins on surveyed grassland farms.

Measure 3: Recommendations

It is concluded that this measure should not require the compulsory fencing off of every watercourse that is wet for nine months of the year. Some of the smaller drains and streams should be left unfenced to allow the streamside vegetation to be grazed, keeping the watercourse free-flowing and maintaining the flora that persists alongside it.

Measure 5 – 'Maintain farm and field boundaries'

This measure specifies guidelines for hedgerow maintenance and protection. It has been expanded and altered since the early days of the scheme.

Impact of Measure 5

Amongst the hedges that were surveyed on grassland, it was found that fewer beetle species were recorded from alongside gappy hedges. It appears that gappy hedges are less effective in providing shelter and protection to beetles. This is a tentative endorsement of the gapping-up that is being done on many REPS hedges.

Gappiness emerged as being more important in relation to the carabid community than to the field margin flora. Hedge age and height were important in explaining variation in the field margin plant data, but there was not a simple relationship between these variables and species diversity.

Measure 6 – 'Cease using herbicides, pesticides and fertilisers in and around hedgerows, ponds and streams'

A spray limit of 1.5m around hedgerows and streams is specified by this measure. The main challenge to assessing the impact of this measure is the fact that 1.5m is very little – it is similar to what most farmers would be doing anyway.

Impact of Measure 6

Only 27% of the grassland REPS farmers surveyed said that the REPS incurred a reduction in field margin inputs on their farm. Many were unaware of the need to do so at all, and some of those who were aware of the measure appeared to assume that it applied to herbicides and pesticides and not to fertilisers. On tillage farms, most REPS farmers said that they were reducing inputs in the margins, and indeed P levels were significantly lower in the REPS inner field margin area ($p=0.013$).

Focusing on the diversity of this 1.5m field margin area on surveyed farms, the following results were obtained.

- Non-REPS grassland field margins had significantly more (14.2±3.5) plant species per farm than REPS (12.5±3.3) grassland margins (1-tailed t-test, $p=0.009$) (Fig. 3). When the total of all REPS and non-REPS species were pooled together (ie not just farm averages), slightly more plant species were recorded from the REPS farms than from the non-REPS farms (Fig. 4).

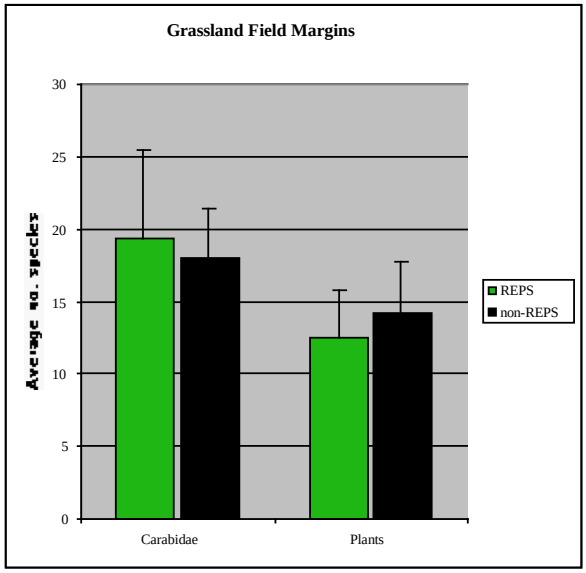

Figure 3: Plant and ground beetle species diversity was compared in 15 REPS and 15 non-REPS farms.

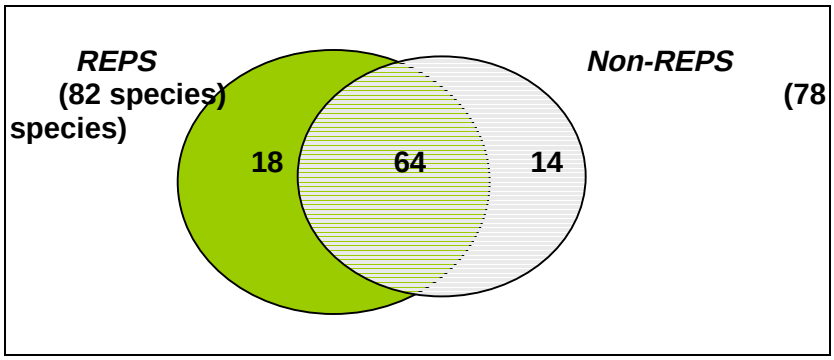

Figure 4: The collective plant species richness of all grassland REPS and non-REPS field margins (n=30 farms).

- *On tillage field margins, average plant species richness did not significantly differ between REPS (11.1±3) and non-REPS (10.8±3.8) farms (2-sample t-test p=0.66). A total of 81 species were recorded in all the surveyed REPS tillage field margins together, 72 on non-REPS margins.*

- *There were no significant differences between the ground beetle species richness of REPS and non-REPS margins, either on grassland or tillage farms.*

It is concluded that input reductions are either not being achieved in the surveyed grassland field and watercourse margins, or if they are, no significant impact on floral diversity is observed. In tillage field margins, it would appear that input reductions are being achieved, and species richness in REPS margins is indeed higher than on REPS margins, but not significantly so.

Measure 6: Recommendations

It is strongly recommended that the 1.5m limit be extended to at least 3m. A 1.5m limit does not allow for the spray drift that inevitably occurs on occasion. The same applies during fertiliser application. It has been demonstrated elsewhere that a 3m buffer strip reduces spray drift into ditches and hedges, lessening the disturbance to field margin flora from farming operations (De Snoo and De Wit, 1998). With some spraying apparatus the sprayer can be turned in or switched off on one side so that drift can be minimised when the outer perimeter is being sprayed. It is recommended that this be done wherever possible.

Measure 9 – 'Tillage crop production'

One of the requirements of Measure 4 is that an uncultivated strip of at least 1.5m be retained at the margin of the field.

Impact of Measure 9

On surveyed tillage farms, REPS fields (average 181cm) had significantly wider margins than non-REPS fields (average 145cm) ($p<0.001$). The surveyed REPS field margins were also significantly lower in P (5.94 units±3.98) than those of the non-REPS farms surveyed (9.19 units±6.53) ($p=0.025$).

Wider uncultivated field margins did not significantly benefit either the plant diversity or the beetle diversity data on surveyed farms.

Although the wider margins did not appear to enhance beetle diversity, slightly higher abundances of beetles (particularly *Harpalus rufipes*) and shrews (*Sorex minutus*) were recorded. This is an encouraging sign that the wider tillage margins may provide a very real benefit, because many of these beetles are predators of crop pests. For example, *Bembidion lampros* is an important predator of root fly eggs, *Harpalus* species consume large numbers of weed seeds, and several carabid species reduce aphid populations in the crop (Thiele, 1977; Kromp, 1999).

Measure 9: Recommendations

A recommended improvement to this measure is the widening of the uncultivated strip to 3m, and the introduction of occasional 6m-wide reseeded strips in selected locations. Research in the UK has found that widening margins to several metres does benefit flora (Moonen and Marshall, 2001). It is thought that the widening of tillage margins to 3m or more would indeed see an increase in plant species numbers. There is also a need to introduce cropping and removal of vegetation in tillage field margins, e.g. by grazing them after harvesting, in order to bleed nutrients and accelerate the development of less weedy, perennial flora.

Summary of results and recommendations

1. Non-REPS grassland field margins were found to be significantly richer in plant species richness than surveyed REPS farms.
    - Effective communication of the rationale behind eliminating inputs in the field margins, and practical advice on how best to achieve this, are needed. It is recommended that on all grassland REPS farms, a minimum area of 3m (rather than 1.5m) from the hedgerow should be kept input-free, and grazed/topped as usual. A key problem that

needs to be tackled is the spreading practices of contractors, particularly the spreading of slurry in field margins.

2. REPS tillage field margins were found to be significantly wider and significantly lower in P than non-REPS field margins. However, this had no apparent effects on plant or beetle species richness. There were higher numbers of beetles and shrews though, which is an encouraging sign that the wider margins may be having some beneficial impact.
    - On tillage land, the current 1.5m field margins width is simply too narrow for the establishment of a less invasive perennial vegetation. The uncultivated margin area should be increased to at least 3m, with a much wider input-free buffer zone to allow for drift. Restoration options such as reseeding, and occasional wider 'beetle banks' for pest-eating beetles.

3. Fenced watercourse margins are not higher in plant diversity. In fact, higher numbers of species were recorded in unfenced margins.
    - It is not necessary for all watercourses on REPS farms to be fenced off. The results of this study have shown that universal fencing of watercourses would be likely to incur a loss of plant species, particularly those low-growing species which depend on the continuation of grazing management to retain their place in the community.

Essential monitoring still not being done

There is a statutory requirement to monitor all EU agri-environment schemes, including the REPS. Although the REPS has been subject to several once-off, small-scale surveys examining aspects of its ecological impact, there is no co-ordinated system of ongoing monitoring in place. Furthermore, there is a failure to define specific targets. Without targets and quantified objectives it is not possible to relate the results of evaluation back to the scheme. The REPS and its sister programmes elsewhere are innovative schemes which will need to be appraised and modified if they are to realise their full potential (Hamell, 1999).

The need for clear objectives and verifiable targets cannot be overstated. These facilitate effective scheme design and objective-led monitoring, the results of which can then feed back into improved scheme design. It would take only a tiny proportion of the REPS budget to tackle this properly and thus secure the future of the scheme.

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The impact of REPS on biodiversity: the contribution of hedgerow structure to the value of REPS farms for breeding birds.

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Introduction

There has been a dramatic decline in farmland bird populations across Europe in recent decades. Ecological studies have shown that these declines are closely linked to agricultural intensification. Agri-environment schemes such as the REPS aim to ameliorate the adverse effects of agricultural intensification by promoting more extensive and environmentally friendly farming practices.

However, effective monitoring and assessment is crucial if benefits are to be measured. The REPS has been in place for 8 years yet, no comprehensive ecological monitoring system has been established to date.

As one of a number of Walsh Fellowship studies designed to examine the impact of REPS, this project focused on farmland birds. This paper provides an overview of some if its findings in relation to bird species diversity and abundance of breeding birds with particular reference to hedgerow structure.

REPS measures and birds

While all 11 compulsory REPS measures are designed to realise environmental benefits, several measures are of particular relevance to the biodiversity of wild flora and fauna present on farms. Measures pertaining to field boundaries and hedgerows are of particular significance. On the majority of farms, hedgerows are the only semi-natural habitat remaining.

A bird census conducted on a sample of REPS and non-REPS farms in 1999 confirmed that hedgerows held a greater number of breeding birds than any other farmland feature. Hedgerows have several important roles for birds; they provide feeding, nesting and roosting sites, movement corridors and cover from predators (Lack 1992). Hedgerow management considerations are thus of prime importance in the conservation and maintenance of farmland birds. Of the 11 REPS measures, 4 relate to field boundary elements including hedgerows and hedgerow/field margins. They are as follows (Department of Agriculture, Food and Rural Development 2000):

- Measure 4-Retain wildlife habitats (hedgerows are one of the listed habitats in this measure)
- Measure 5- Maintain farm and field boundaries
- Measure 6- Cease using herbicides, pesticides and fertilisers in and around hedgerows, streams and ponds
- Measure 9-Tillage crop production (an uncultivated strip of at least 1.5m retained at the margin of the field).

The quality of hedgerow is variable. Factors such as the structure, botanical composition and management of hedgerows, combined with adjacent land use have

been shown to influence the value of these field boundaries for birds (Parish et al. 1994 & 1995, Chamberlain and Wilson 2000).

In 2000, 10 farms (5 REPS, 5 non-REPS) located in counties, Wexford, Offaly, Meath, Galway and Cork were selected for study. The REPS farms had been in the scheme for at least 4 years. A complete bird census was conducted on each farm using the well-established territory mapping method. This provided information on birds present on the entire farm and also on individual hedgerows. A comprehensive hedgerow survey was also conducted on each farm. Various hedgerow structural variables including, hedge height and width were measured. Botanical composition was examined and adjacent hedgerow margin was measured.

Data collected was examined at the whole farm and hedgerow level. The relationship between bird population variables and measured hedgerow variables was examined.

Results

Hedgerow structure

In a comparison of hedgerow density (total hedgerow length (m) divided by area of farmland surveyed (ha)) there was no significant difference between REPS (median value = 163.47) and non-REPS (median value = 141.59) farms examined (U= 10, n_1=5, n_2=5, P>0.05). This result showed that the farms were well-matched in terms of hedgerow cover and facilitated further comparison in relation to hedgerow structure.

Data from all study farms were pooled and 290 hedgerows were included in analysis (162 REPS and 128 non-REPS).

There were significant differences in hedgerow structure between REPS and non-REPS hedges.

- REPS managed hedgerows were significantly wider (P<0.001) and hedgerow area of the REPS hedges was significantly greater than non-REPS hedges (Fig. 1).

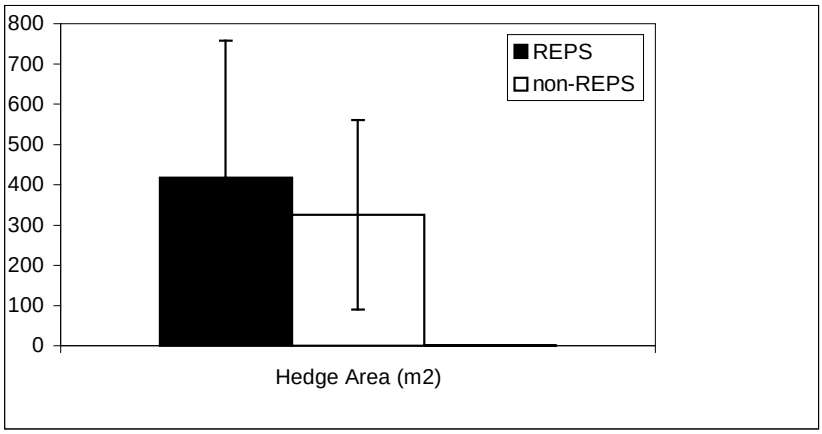


Figure 1. Mean ± SD of hedgerow area of REPS and non-REPS Hedgerows.

- REPS hedgerows had significantly wider field margins (P<0.01).
- REPS hedgerows had less gaps (P<0.001) than the non-REPS sample.
- In relation to hedge composition, REPS hedgerows had greater percentage cover of the dominant shrub.
- A greater number of herb groups were recorded on REPS hedges (P<0.01) and there was greater percentage cover of herb layer on REPS hedges.

- Of the surrounding habitat variables, only percentage cover of surrounding scrub area was significantly different between the management types with more scrub areas recorded adjacent to REPS hedges.

Bird species richness and abundance of breeding birds

Data collected during the bird census was examined at two levels: at the whole farm level and at the finer scale, hedgerow level.

- There was no significant difference in the average number of bird species recorded on the REPS (23.8 ± 2.5, n= 5,) and non-REPS farms (21.4 ± 3.1, n=5).
- A total of 44 bird species was recorded during the bird census in 2000. Of the 44 species, 30 were found on both REPS and non-REPS farms. Eleven species were recorded on REPS farms only and 3 species were recorded on non-REPS farms exclusively (Fig. 2). The species that were recorded exclusively on either farm type occurred at low frequencies and had specific habitat requirements (Appendix 1).

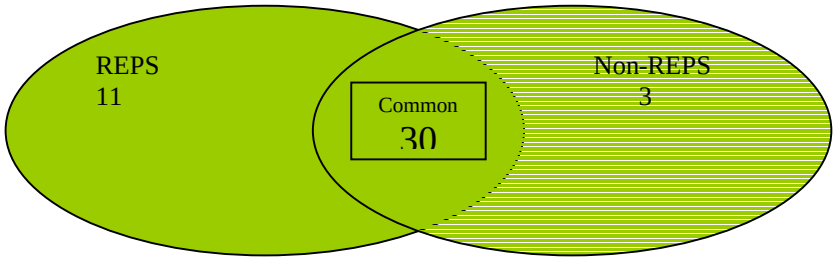


Figure 2. The collective bird species richness of REPS and non-REPS farms. Numbers of bird species common to both REPS and non-REPS farms, and the number of species recorded exclusively on both farm types.

- Of the birds recorded during the census, 32 of the 44 were utilising hedgerows in some way.

Hedgerow birds

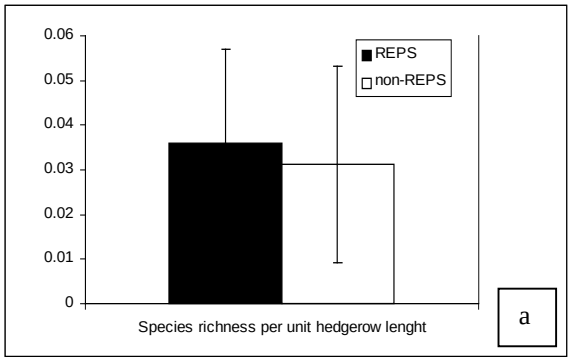
Further analysis of bird data was conducted at the hedgerow level. Data collected on all hedgerows on the study farms was combined and bird species richness and breeding bird density (total no. of birds/hedgerow area) were compared between REPS (n=162) and non-REPS (n=128) hedges.

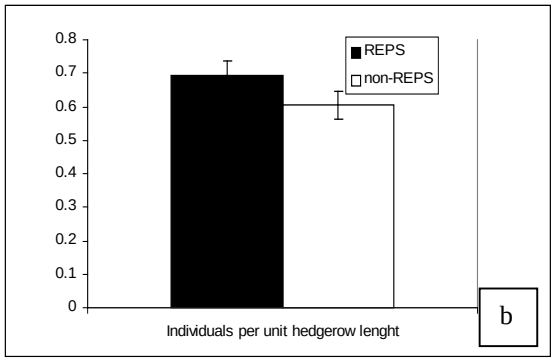
- There was no difference between the average number of species recorded on REPS hedges (5.6±2.6) and non-REPS hedges (4.7± 2.59) (Fig 3).
- There was no significant difference in the density of birds (per unit hedgerow area; REPS= 0.031±0.02, non-REPS =0.037±0.03) between management types despite the fact that REPS hedgerows were generally larger.

Figure 3. The number of bird species recorded on REPS and non-REPS hedgerows.

However, when bird variables were examined per unit hedgerow length, a greater number of significant differences between farm types could be seen.

- REPS managed hedgerows had significantly higher species richness (0.036±0.02) than non-REPS hedgerows (0.031±0.02).
- The number of birds (per unit hedgerow length) was higher on REPS hedges (0.69 ± .04) than on non-REPS hedges (0.605±0.04) but failed to be significant at the 0.05 level.





Figures 4 a and 4b. Species richness and numbers of birds per unit hedgerow length on REPS and non-REPS hedgerows.

Hedgerow structure and its influence on bird species on REPS and non-REPS managed hedgerows.

Correlation analysis between the bird population variables and the measured hedgerow variables highlighted many significant associations.

Multivariate statistical methods were employed to model the relationship between bird variables and the measured hedgerow characteristics.

REPS Sample:

- Almost 50% of variation in bird species richness were explained by a combination of measured hedgerow variables. Species richness was primarily influenced by hedgerow tree variables on the REPS sample. Hedgerow size variables were also significant.
- Over 60% of variance in the total number of breeding birds were explained by a combination of measured hedgerow variables. Of these, hedgerow size was

most significant and had a positive influence on the total number of breeding birds in the hedgerow (Fig. 3).

Non-REPS Sample
Over 40% of variance in bird species richness of hedgerows on non-REPS hedges were explained by a combination of measured hedgerow variables. Hedgerow area was the most significant of these, with species richness increasing with increased hedgerow size. The presence of hedgerow trees was also very significant.
Almost 50% of variation in the total number of breeding birds were explained by a combination of measured hedgerow variables. Of these, hedgerow size was most significant, having a positive influence on the total number of breeding birds in the hedgerow (Fig. 4).

Discussion

REPS farms did not differ from non-REPS farms with respect to the number of species present. However, REPS farmed surveyed, did hold a greater numbers of certain species, with 11 species recorded on REPS farms exclusively. Many of these species have specific habitat requirements and it appeared that REPS farms held more variable habitat than the non-REPS farms sampled. Results showed that REPS farms had more scrub areas associated with them than conventional farms. This is perhaps an indication of less intensive management as scrub growth is generally cleared on more intensive farming systems. This habitat is beneficial for many of the bird species recorded on REPS farms.

The project was designed by selecting farms of similar size and hedgerow density (both REPS and non-REPS) in order to examine the influence of hedgerow structure and management on breeding birds.

REPS farms had wider hedgerows, with wider associated field margins than conventional farms. REPS hedges were also shown to have less gaps. All of these features are known to affect the farmland bird community (Green et al. 1994, Parish et al. 1994), particularly species associated with woodland or woodland edge.

Differences in hedgerow structure between the management types did not translate into significant differences in the bird population variables. Rather, it was hedgerow length, which determined differences between REPS and non-REPS hedgerows with species richness per unit hedgerow length was shown to be higher on REPS hedgerows. While species richness is a useful index, the total number of breeding birds is probably a better reflection of habitat availability. When the total number of breeding birds and density of breeding birds was compared between management types, no significant difference was evident although REPS hedges did hold more birds.

Regression analysis showed that hedgerow size variables (including length) were the most significant in determining the total number of breeding birds on both REPS and non-REPS hedgerows. Species richness was heavily influenced by the presence of hedgerow trees and overall structural diversity.

The results of the hedgerow survey are encouraging, and while it is difficult to determine whether the differences are solely attributable to REPS, the scheme undoubtedly plays a significant role in maintaining hedgerow quality. However, the lack of difference in breeding birds suggests that other unmeasured factors may also be significant in determining the number of breeding species present such as

cropping practices, off farm enterprises and bird food resources. Hedgerows are not completely independent structures and there may be much interchange between birds on adjacent hedgerows and between adjacent REPS and non-REPS managed hedgerows. A demographic study of the breeding birds present was beyond the scope of this project. However, REPS farms may be more productive, thus providing surplus birds for adjacent farmland, a factor that would not be picked up in a bird census. It is also the case that Ireland has a higher density of hedgerows than comparable UK studies and that hedgerow size *per se* may not be a limiting factor in the numbers and diversity of farmland birds in Ireland.

Hedgerow quality is important in determining avian diversity on farmland. Recommendations given by Feehan (2002) for promoting botanical and invertebrate diversity have been shown to benefit birds in other studies (Vickery *et al*, 2001, 2002). Increasing hedge margin width on grassland and tillage fields to buffer the effects of agricultural inputs increases the uncultivated area that can be exploited by birds and provides cover and food resources.

REPS, therefore has a role in maintaining good quality hedgerows on farms and should move towards a more restorative and enhancement role in terms of hedgerow habitat. The higher number of bird species recorded on the REPS sample reinforces this. The specific habitat requirements of these species indicate that these farms can provide greater habitat diversity for birds, a fact that could be important for the conservation of rare and threatened bird species.

However contribution of the REPS to hedgerow quality and bird diversity and abundance is difficult to evaluate at this stage. REPS measures were not tailored for specific biodiversity considerations, and the broad nature of the measures within the scheme makes it difficult to evaluate the effectiveness of those measures. In the absence of baseline data it is not possible to directly measure how breeding bird populations have changed on REPS farms since enrolling in the scheme. This is compounded by a continued lack of specific ecological targets, which could be used in an evaluation of the scheme. The statutory requirement for environmental monitoring and evaluation of agri-environment schemes has not been fulfilled by a number of member states. The most recent developments in agri-environment under the composite Rural Development Regulation 1257/99, puts even more emphasis on monitoring and evaluation than in the past (Bignal and Baldock 2002).

The urgent need for monitoring and evaluation combined with clear objectives and targets cannot be overstated. Only then can the true impact of these agri-environment schemes on the natural biodiversity of farmland be elucidated.

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Appendix 1.

From Figure 2. The numbers of bird species common to both REPS and non-REPS farms, and the number of species recorded exclusively on both farm types.

Birds recorded exclusively on REPS sample	Birds recorded exclusively on non-REPS sample
Long tailed Tit	Moorhen
Reed bunting	Cuckoo
Stonechat	Black-headed Gull
Tree-creeper	
Spotted flycatcher	
Blackcap	
Sedge Warbler	
House Martin	
Hooded Crow	
Snipe	
Grey Heron	

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