

Modelling the environmental impact of farmers in REPS

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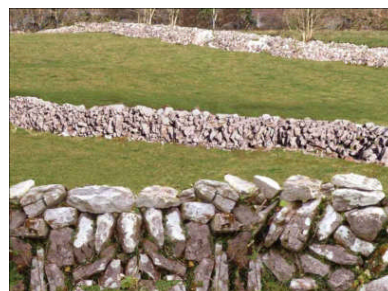
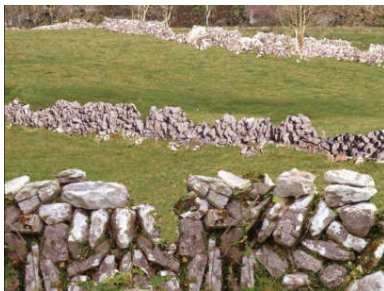


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Overview

- Rational for the study
- How can we assess the schemes environmental impact in the absence of any baseline study pre 1994?
- A solution to this problem using NFS and habitat GIS data



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Two areas of analysis in the study

- One looking at change in environmental externalities over time due to REPS
- Second looking at participation decision of farmers given the dominant habitat types in their local area



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Rational for the Study

- In the absence of any comprehensive environmental baseline study prior to the commencement of the scheme, it is virtually impossible to evaluate the impact the scheme has had on the rural environment since its inception.
- The achievement of conservation goals in agri-environmental schemes requires detailed information about the ecology of the habitats being managed.



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Rational for the Study

- This study examines the extent of change due to REPS, in certain negative externalities, using 11 years of the NFS.
- By incorporating habitat data into a logit model of REPS participation we also examine what types of habitats are most likely being protected under the agri-environmental programme.



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Data

- The data source for this study is the National Farm Survey, 1995 to 2005.
- The farm externality variables analysed are organic nitrogen production per hectare, organic phosphorous production per hectare and methane emissions.
- Also use Forest Inventory Planning System and Irish Forest Soils (FIPS–IFS) landcover dataset.

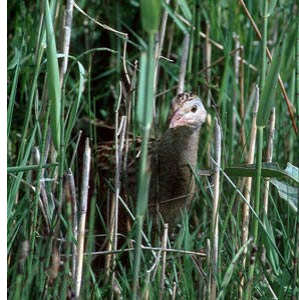


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Methodology to assess impact of REPS on the production of negative externalities

- It was assumed that the externality production on REPS farms would have changed in a similar way to the externality production on Extensive Non-REPS farms in the absence of REPS.
- We develop an Extensive Non-REPS farm index for 3 reference periods for the environmental externality variables.



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Methodology

- The Extensive Non-REPS farm index is then applied to the base year figures for REPS farms to establish a benchmark for the externality production in some subsequent year.
- The proportionate difference between the benchmark figure in the chosen year and the actual figure are then attributed to the presence of REPS.



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Results

Table 1. Percentage change in Negative Externalities due to REPS

Farm Activity	1995 - 2000	2000 - 2005	1995 - 2005
Organic Nitrogen (kg/hectare)	-12.84	-17.02	-2.60
Organic Phosphorous (kg/hectare)	-13.01	-17.11	-13.26
Methane Emissions (kg/hectare)	-12.17	-19.00	-5.00

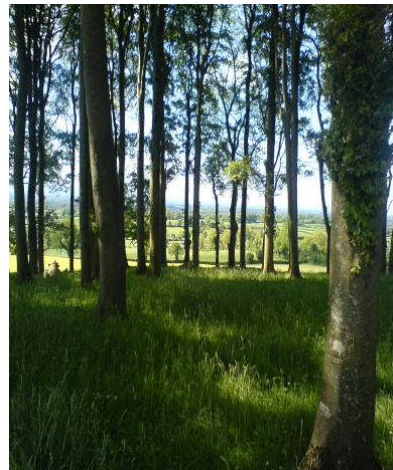


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Modelling Participation in REPS

- Modelling participation is the key to understanding the success of agri-environmental schemes
- Doesn't on its own tell us if a scheme is meeting its environmental objectives



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Modelling Participation in REPS

- Although we also model the success of the REPS scheme using farmer uptake as the main indicator variable we do so using a spatial microsimulation tool.
- Incorporates information of farmer participation in agri-environmental schemes with habitat data allowing us to make a judgement on whether the REPS scheme is protecting alternative habitat types



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A logit Model of REPS Participation

- Use a binary choice model to examine participation decision of farmers in the REPS
- The main aim of this analysis was not just to model the participation decision of farmers in the REPS agri-environment scheme but to investigate what habitat types (if any) are positively and significantly associated with the probability of Irish farmers participating in the REPS agri-environment scheme.
- This is done using a binary choice model in conjunction with the RERC SMILE model.



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Logit Model of REPS Participation

Explanatory Variable		SMILE Farm Population	
		Coefficient	Coefficient
Size of Farm	-0.014	Shallow Water	0.001*
Dairying/Other	0.578	Rocky Complex	0.004
Cattle Rearing	0.186	Forest & Scrub	0.007
Cattle Other	0.772	Built Land	-0.008
Sheep	0.832	Fen	0.04*
Tillage	1.199	Cut over Fen	-0.772
Family Farm Income	0.008	Upland Blanket Bog	0.004
Age	-0.006	Lowland Blanket Bog	0.005
Part Time Farmer	0.266	Heath	-0.004
Wet Grassland	0.007	Constant	-0.789
Dry Grassland	-0.001		

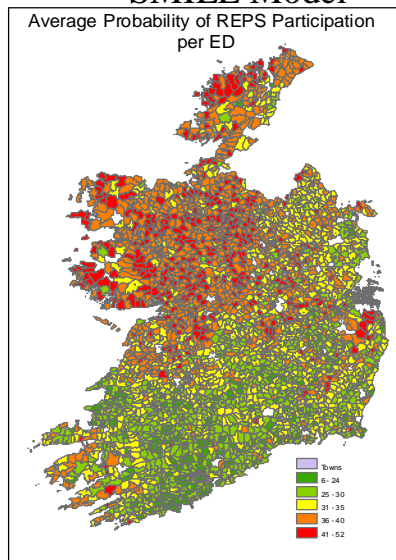
* indicates insignificant at 5%



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Mapping Probability of REPS Participation using SMILE Model

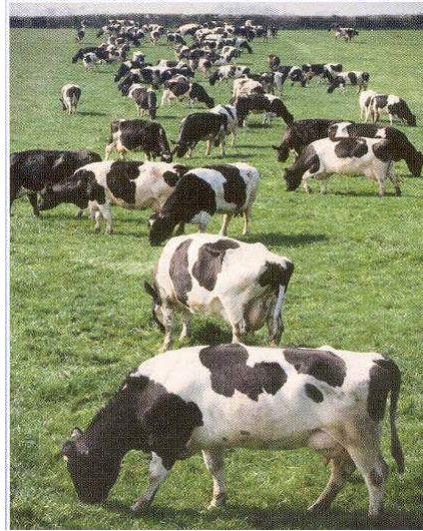


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Conclusions

- The impact of REPS on negative externalities that influence the environment has been positive.
- Secondly, it is very evident from our microsimulation model results that habitat types associated with what would be considered more marginal farmland are much more likely to be protected under the REPS agri-environment programme.



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Conclusions

- We speculate that farmers in these areas are more willing to participate in REPS compared to other farming areas in the country because the financial return is greater from farming under the specifications of the scheme than what may be earned from attempting more intensive agricultural production on these land types.



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Conclusions continued

- The third main finding of the study, in terms of habitat conservation, was the fact that those areas of the country where grassland was the main habitat type were negatively associated with participation in REPS.
- The negative sign on the dry grassland coefficient suggests that the higher the percentage of dry grassland as a habitat type in an ED the lower the probability that a farmer in that ED will participate in the REPS scheme. This is an interesting result considering the dominant land cover type across Ireland is dry grassland (approximately 60%).
- Finally, it is very evident from the map that farmers in EDs found in the west, south west and border areas of the country have a higher probability on average, of participating in the REPS programme.



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