



An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine

13/RURAGRI/1 - Towards Rural Synergies and Tradeoffs between Economic Development and Ecosystem Services

Final Report

This project was funded under the Department of Agriculture,
Food and the Marine Competitive Funding Programme.

SUMMARY

Economic development in rural areas and the provision of ecosystem services are closely interconnected in rural areas. However, this relationship can be quite complex, with economic development impacting on the provision of ecosystem services while the ecosystem services available can stimulate economic development in a region. The main aim of the TRUSTEE project was to improve our understanding of the relationship between economic development and ecosystem services while focussing on three key areas:

- does an optimal spatial organisation exist for rural areas that will lead to economic development while also maintaining ecosystem services
- what is the role of government and policy in achieving sustainable land use
- when and how can ecosystem services provide an opportunity for rural development

The TRUSTEE project examined the factors that influence economic development and ecosystem services across rural Europe and how economic development and ecosystem services can be mutually beneficial.

The project adopted an interdisciplinary approach that brought together economists, geographers, agronomists, and ecologists from a range of countries in order to work collaboratively and to engage with a variety of stakeholders at different governance scales.

UCD's involvement was in workpackage 7 "Validation, training, and consensus building" the aim of this workpackage was to facilitate the dissemination of information to stakeholders as well as providing stakeholders with the opportunity to provide feedback. As part of this workpackage the UCD team members were collaborating with members of the CAPRI (Common Agricultural Policy Regionalised Impact) model to carry out model validation and organise an annual CAPRI training workshop.

KEYWORDS

Agricultural Environmental Policy

ACRONYM

TRUSTEE

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Section 1 - Research Approach & Results

Start Date

01 September 2013

End Date

30 November 2016

Research Programme

Research Stimulus Fund

TRL Scale

TRL 1: Basic Principles Observed

NRPE Priority area

Sustainable Food Production and Processing

Total DAFM Award

€99,758.00

Total Project Expenditure

€99,798.91

Rationale for undertaking the Research

Population and production locations, commodities, and flow of people are critical components of the relationship between economic development and ecosystem services. Such a relationship has three major unresolved questions:

- Does an optimal spatial organisation of activities, leading to rural economic development while ensuring the provision of ecosystem services, exist?
- How does one combine market mechanisms and policies to reach sustainable spatial allocation of activities?
- Under which conditions do ecosystem services constitute opportunities for rural development?

The TRUSTEE project sought to explore the trade-off/synergy dilemma between economic development and ecosystem services as it pertains to sustainable rural development.

An additional but very important benefit of this project is that it will significantly enhance the existing linkages between UCD and the CAPRI modelling network. The CAPRI model is ubiquitous in an EU context, since it is used heavily by the European Commission and related agencies in evidence based policy development. By engaging in this research project it is allowing an Irish involvement within the CAPRI project. This project will support an extensive review of the CAPRI model from an Irish perspective as well as model validation and review of the baseline results for Ireland. This will allow a more direct input of Irish specific issues such as the growth targets set in the Food Harvest 2020 report into the model.

Methodology

The CAPRI (Common Agricultural Policy Regionalised Impact) model is a global, comparative static, partial equilibrium model. The model is widely used for policy analysis examining a range of issues from CAP reform, trade policy and agri-environmental issues. The model consists of a supply module and a market module which are solved iteratively and is designed for ex-ante impact assessment. The market module is a global spatial multi-commodity model, where about 50 commodities and around 40 trade blocks (individual countries or country groups) are modelled as a constrained equation system. The supply module consists of a set of regional agricultural supply models for the EU-28 (NUTS 2 level) and models farming decisions as well as the interactions between production activities, the environment and agricultural and environmental policy measures.

The UCD partners collaborating with the Thunen Institute and the University of Madrid used the CAPRI model to carry out an examination of the potential impact of the CAP "greening" measures (crop diversification, retention of permanent grassland and maintaining ecological focus areas) which were introduced as part of the 2013 reform of the CAP on a range of agricultural, economic and environmental indicators considered for a number of member states at both the national and NUTS II regional level.

- The impact of the crop diversification measure is modelled using the Shannon Index, the Shannon Index measures the diversity of cropshare with higher numbers indicating a large number of crops with relatively small shares and lower numbers indicating a smaller mix of crops or one or two crops dominating the crop mix.
- The retention of permanent grassland is included as a restriction on the conversion of arable land to grassland.
- The inclusion of Ecological focus areas were modelled as adjustment in the area of set aside.

Project Results

The potential impact of the greening measures were examined using the CAPRI model the results focussed on both the economic and environmental implications of the Greening measures and so were consistent with the wider theme of the TRUSTEE project which focussed on the interactions between economic development and ecosystem services. The analysis focussed on the results for the EU 28 with specific attention on the potential impact of the Greening measures on Irish and Spanish agriculture. The overall conclusion from this analysis was that the impact of the greening measures on different countries would be limited due to the modest nature of the greening measures themselves and as a result while any negative economic impact would likely be small so too would the environmental benefits arising from the measures.

- The crop diversification measure was found to be beneficial for the EU28 and both Spain and Ireland, however the positive impact was limited due to the large amount of arable hectares and holdings already exempted from this measure.
- The percentage of agricultural land in permanent grassland remains largely unchanged under the Greening scenario when compared with the baseline scenario and this would suggest that the environmental benefit of the measure is relatively small.
- The measure relating to the inclusion of ecological focus areas was projected to lead to a marginal increase in the proportion of set aside on arable land across the EU 28 due to many holdings being exempted from the measure. The projected increase in Ireland in the proportion of land in set aside is greater due to the very low proportion of arable land in set aside prior to the introduction of the Greening measures.
- The CAPRI model estimates a small positive effect on income for all agricultural activities in the EU - 28 under the greening scenario. Specifically, the projected growth in income per hectare in EU - 28 is approximately 1.7% (+€10.61 per hectare) which was largely due to the projected increase in agricultural prices especially for cereals, in the Republic of Ireland the projected growth in income is more limited (+1.25%; +€4.15 per hectare/head). Within Ireland the South and Eastern region of Ireland is projected to experience a marginally higher rate of income growth than the Border, Midlands and Western region, due to its higher prevalence of cereal producers.
- The greening scenario is projected to result in a decline in *CH4* emissions as a result of a reduction in the number of beef cattle under the greening scenario. In the EU28 the beef cattle numbers are projected to decrease by 1.6% compared to the baseline, while beef cattle numbers in the Republic of Ireland are projected to decline by 0.68%.
- While *N2O* emissions decrease as a result of a reduction in the area of cereals cultivated. In EU28 the area of cereals cultivated under the greening scenario, compared to the baseline, declines by 3.06% and for Ireland the area of cereals cultivated is projected to decrease by 7.97%.

Section 2 - Research Outputs

Summary of Benefits / Improvements of Project Findings

N/A

Summary of Staff Outputs

Research Output	Male	Female	Total Number
Post Doctorates	1	0	1

Summary of Academic Outputs

Research Outputs	Total Number	Details
Peer Reviewed Conference Papers	2	

Intellectual Property

N/A

Summary of other Project Outputs

N/A

Potential Impact related to Policy, Practice and Other Impacts

Impact	Details
Socio-Economic	A review and comparison of the CAPRI model baseline with the baseline results of other agricultural policy models including the FAPRI-Ireland model.

Dissemination Activities

Activity	Details
Workshops at which results were presented	As part of this project three CAPRI training workshops were held each of which had approximately 25 to 30 participants. The training workshops were as follows: 2013, Braunschweig, Germany 2014, Madrid, Spain 2015, Dublin, Ireland

Knowledge Transfer Activities

N/A

Section 3 - Leveraging, Future Strategies & Reference

Leveraging Metrics

Type of Funding Resource	Funding €	Summary
Exchequer National Funding	€499,478.75	The CAPRI-Green project (15/S/756) was funded under the 2015 Department of Agriculture, Food and the Marine Research Stimulus Fund.

Future Strategies

One of the reasons for participating in this project was to strengthen links between UCD and members of the CAPRI modelling network with a view to building a capacity within Ireland to utilise the model in the future. As a result of this project funding was sought and secured under the 2015 Department of Agriculture, Food and the Marine Research Stimulus Fund project for the CAPRI-Green project (15/S/756), this project is a collaboration between staff at UCD, Teagasc and UCC and will allow for further development and utilization of the CAPRI model by Irish researchers.

Project Publications

- (1) Bubbico A., Martínez P., Blanco M., Breen J. (2015). Impact of CAP green payment on different farming systems: the case of Ireland and Spain. 148th EAAE Seminar "Does Europe need a Food Policy?", Brussels, Belgium, November 30-December 1, 2015
- (2) Bubbico A., Breen J. and Renwick, A. (2015). Greening the CAP: Environmental and economic impact in Ireland and UK. 89th AES Annual Conference Programme, Warwick, England, April 13 -15, 2015