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The move from policy based evidence to evidence based policy: an example from agricultural subsidy

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Introduction

This paper looks at the challenges facing rural Wales and how the National Assembly use GI data to try and meet these challenges with policy firmly based on evidence. In the past the GI system has held standard data sets and allowed for the interrogation of them, however there has been no economic information about the agricultural industry available spatially. The economic data model addresses this and by building in administrative data from various schemes, we have added a valuable new policy tool.

Challenges facing rural Wales

Rural Wales is a beautiful country of great physical diversity that faces many challenges. The country is dominated by its mountain ranges and the upland nature of much of rural Wales has a marked effect on the type of land use. Around 80% of the land in Wales is in agricultural use, with forestry and woodland covering a further 12% and the remainder under urban, industrial or other use.

The limitations imposed upon rural Wales are shown in the designation of the West Wales and the Valleys Objective 1 area that covers 1,312,900 hectares and a population of 1,907,195. Objective 1 is aimed at promoting the development and structural adjustment of regions whose development is lagging behind. The diverse nature of the area, its economy, its culture and its environment are some of the many attributes that make it unique. Unfortunately its remoteness also results in the region being disadvantaged and marginalised from many economic and social opportunities. This disadvantage is seen in:

- extremely low and declining GDP per head of population relative to EC average;
- unemployment, especially the long-term at very high levels;
- declining economic rates; with high levels of social deprivation mainly in the urban areas;
- relatively few dynamic indigenous medium sized businesses with growth potential
- High share of elderly in rural areas, as a result of low birth rate and high out-migration of young adults.
- There is also an over - dependence on declining industries

The region is dominated by the crucial role of the agricultural industry.

The high altitude, rainfall and poor soils restrict the range of agricultural enterprises. These physical limitations warrant the designation of some 77% of Wales as Less Favoured Area, 52% of it as Severely Disadvantaged, showing that the agricultural production within those areas is disadvantaged in comparison to the rest of Wales the UK and EC. The agriculture industry of Wales is reliant on pastoral enterprises. The lack of diverse land types in rural Wales and the availability of Common Agricultural Policy Subsidy's have encouraged a monoculture of sheep and beef farms. Of the 28,410 farm holdings in Wales, around 60% are beef and sheep farms and 14% are dairy farms, the remainder being a mixture of

horticulture, arable, pigs and poultry. (Agricultural Census, 2000) Eighty three percent of land is under some type of grazing with just 14% of land used for arable production. Traditional farming practices in Wales have had a profound influence on the intrinsic character of the countryside, having worked over thousands of years to produce interesting and valuable habitats.

The Welsh Assembly Government is committed to enabling the sustainability of rural Wales. Farming For the Futures (National Assembly for Wales, 2001) suggests that Wales needs to maximise the role that agriculture, food and the environment plays within the rural economy focusing on three key areas: economic, environmental and social. The challenge that the Welsh Farming Industry faces is to move in a new direction which reconciles more effectively what the public want from farming and what can be paid for by consumers and government.

The Rural Development Plan for Wales (2000) sets out the Welsh Assembly Government commitment to furthering the needs of rural Wales in a sustainable manner. Meeting the challenges of Farming for the Future for the agriculture industry is a key part of this agenda. These challenges need to be met in the context of the proposed reforms suggested in the Mid term Review of the Common Agricultural Policy.

Policy formulation – best use of data

The National Assembly for Wales collects and uses much data to help in the formulation of policy. Key data sets include the annual collection of the Agricultural Census and the Farm Business Survey (University of Wales (2000)). Other specific surveys on certain sectors are collected and used to target specific policy areas as required. The Statistic branch, Economic Advisory Departments and the technical agricultural specialists are extremely skilled at using this data to model the impact of proposed policy changes and existing schemes.

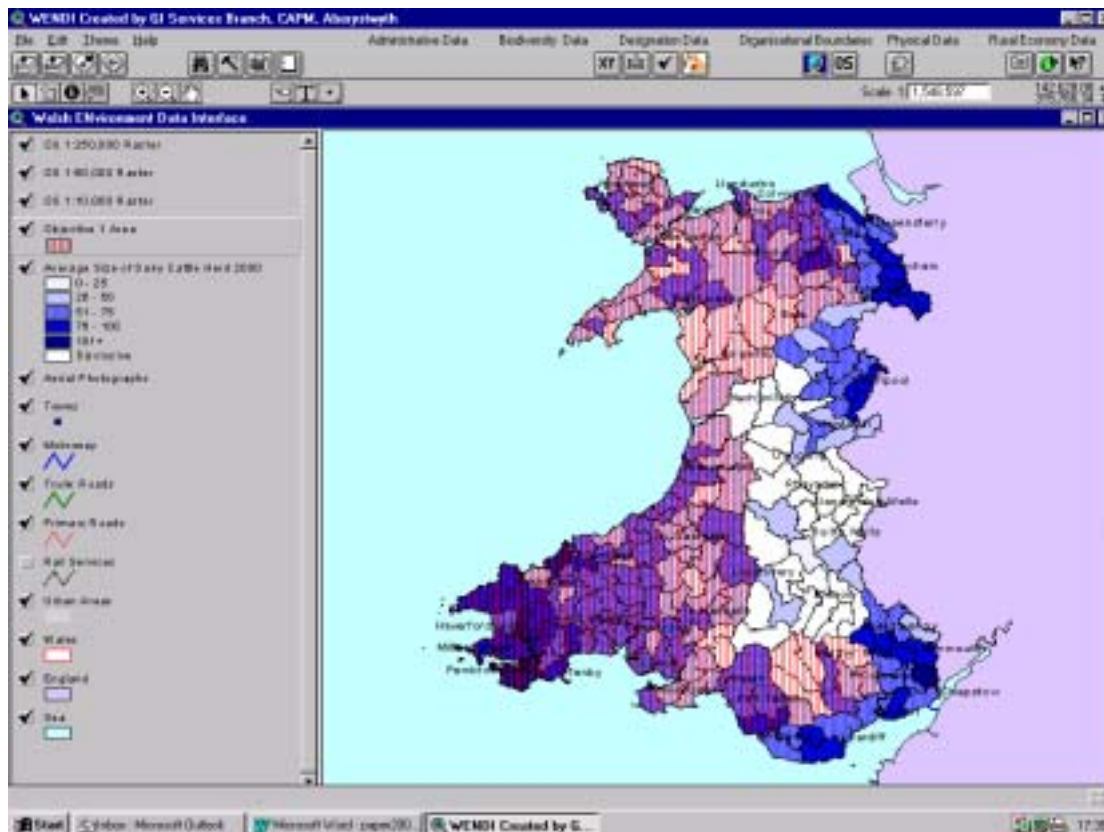
A GI tool was built about 4 years ago to display the various data used for policy making. This system has evolved into a corporate GI for the Agriculture and Rural affairs Department called WENDI (Welsh Environmental Data Interface). Plotting the statistics from the agricultural census on a GI system gives a very powerful policy aid. When this is combined with administrative boundaries at different scales and data on the wider rural economy such as the location of dairies or cheese processors the data is given a significant additional value. Trends and areas of high activity are shown which are extremely important when considering the impact of policy on the whole of rural Wales. These trends are extremely difficult to spot from tabular data.

The agri-environmental land-based schemes administered by the Agriculture and Rural Affairs Department are mapped digitally and stored on the WENDI system. WENDI has long been used for monitoring and evaluating these schemes. For example, it is easy to see the numbers of farms in the scheme in a region. This information can be superimposed on other land use features such as forestry, lakes and common land. This performs a number of important functions: It allows linkages to be made across the scheme agreements to analysis the development and spread of important habitats protected under the scheme. It can be used to see where gaps of scheme uptake are present and therefore where it would be particularly advantageous to target recruitment of additional farmers into the schemes. It allows managers to assess whether all the project officers working on the scheme are achieving similar levels of agreements by revealing concentrations of agreements in a project officers work area.

GIS the enabling tool

GI has already proved an extremely valuable tool in the development of policy advice through; the quality of the advice, the time taken to report on proposals and exponential time saving when answering requests for data. Prior to the introduction of the WENDI system, evaluating the possibility for a scheme using the Objective 1 area to benefit an agricultural sector such as dairying would have taken hours of wading through tables and consulting practitioners on the ground to get their view of the agricultural industry. Now such analysis is a few seconds away and a clear answer can be given (See figure 1). In this way GI significantly enhances the delivery of evidence based policy making.

Figure 1: Screenshot from WENDI showing distribution of dairy cattle and the Objective 1 boundary.



However, one area that was missing in the WENDI system was the financial implications of policy proposals on farming. The financial health of the agriculture industry was expressed as a series of graphs and tables from the Farm Business Survey but there was no mechanism for mapping this to identify areas of advantage or disadvantage. The economic data model was therefore developed to begin to meet some of these requirements.

The payment of subsidies to farmers under the CAP Schemes were also evaluated in tabular data. Until the development of the economic data layer there was no mechanism for looking at the distributions of payments under the various schemes and using this to formulate amendments to the schemes.

Building the model to predict the spatial effects of policy changes

The need for the economic data model has been outlined above. However, the data needed to accurately model the economy of Welsh agriculture on a small area basis was not available. We have therefore had to look at building the model in a series of stages. Phase One was to build a pilot model even though this had major limitations. Phase Two was to demonstrate this model and show its potential and thereby secure access to other administrative data. This would lead Phase Three, which is the building of a more robust system.

The Pilot Model

The pilot model uses the Farm Business Survey linked to the Agricultural Census in order to model the potential economic output of different farm types in Wales. Farm classifications in the Farm Business Survey can be likened to seven of the Main Farm Types of the Agricultural Census. These seven Main Farm Types represent livestock classifications most pertinent to the agricultural economy of Wales and equate to 18,830 of the 28,410 main holdings in Wales. For each of these holding types, the model provides a series of economic indicators.

The theory of the model relies upon the influence of farm size on economic output. The Farm Business Survey data contains average values of farm businesses for each Main Farm Type and each Farm Size Unit. The average farm size in the Farm Business Survey is divided to generate per hectare data. This is then used according to size of the farms on the Agricultural Census to generate figures for individual farms. The model has been developed in a Microsoft Access database. Data from the model is aggregated into Small Area boundaries and presented in ArcGIS.

The model allows factors to be input to change the economic drivers on the individual holdings for each class of farm. Thus, if the economist judge a certain policy may have a worse effect on medium sized farms than larger ones this can be taken into account in the analysis factor and the result mapped across Wales.

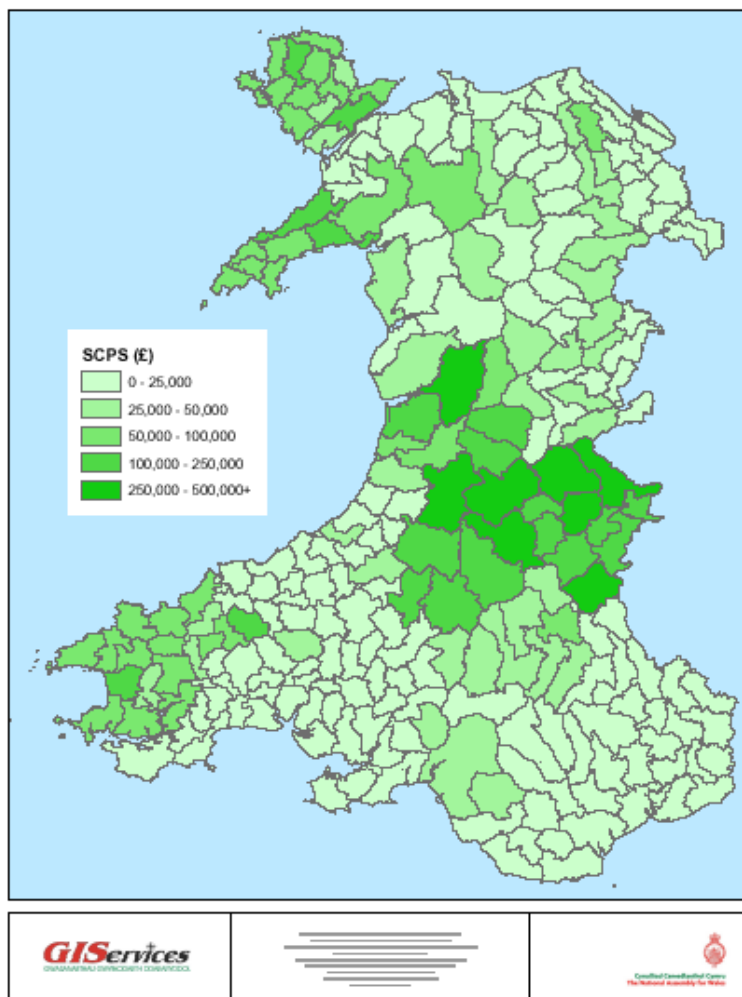
The main limitation of this approach is the very small number of sample farms in the Farm Business Survey compared to the number of farms recorded on the Agricultural Census. The Farm Business Survey provides a general picture of the economic output of Welsh agriculture. Due to the spatial nature of the agricultural economic data model it is important to remember that a representative figure for Wales is not necessarily a representative figure for a particular County or region.

The results of the initial pilot model were interesting. Although they need to be treated with some scepticism the Economist found the maps useful for generating hypotheses. Different patterns of economic activity were apparent across the Principality. The question was whether this was a feature of the agricultural activity of the region, which needed to be taken into account, or an artefact of the model.

Phase 2 Administrative data

The results of the pilot were encouraging and allowed access to the administrative data for the payment of subsidies. This data was accurate, factual and extremely robust. The economic subsidy data shows the actual subsidy distribution throughout Wales. This has generated much interest from the policy makers. Patterns of subsidy 'take up' are very clear across Wales and the model is moving into a new direction as we try to use data available to explain these patterns. Figure 2 below shows the distribution of Suckler Cow Premium Scheme (SCPS) payments across Wales:

Figure 2: Distribution of Suckler Cow Premium Scheme Payments



Phase 3 Growing the model

The acquisition of administrative data in Phase 2 has provided many business benefits, much modelling work is being done with this data set. The results from the pilot model are now being expressed in a different way to avoid the problems of artefact generation.

Our awareness of different data needs has resulted in us targeting new scheme development to ensure we have access to the data reflecting the economics of farming in Wales. The ultimate aim is to have a predictive model that has some robustness and will allow the spatial elements of the economic effect of different policies to be seen across Wales.

Lessons learnt

GI is an extremely powerful tool for Policy makers. By adding administrative data to the system a new type of evidence is available against which to judge and model policy formulation. The initial pilot model was extremely simplistic and basic yet it had a number of very positive benefits. It began to show the power of an economic layer on GIS. It showed patterns that could be explained by agricultural practices on the ground which could not have been readily identified previously. It also saves time on scenario modelling. The power of a model, even with limitations, is an extremely useful way of generating enough interest to drive data acquisition and the developments of GI models forward.

In fact one of the most useful aspects of the project are the generation of much debate and creative discussion around the ideas of spatial presentation of economic data and how the model can be generated.

For example, one of the issues to come out of the model is the fact that maps are good at showing geographically related data but may be misleading in presenting information about people. The map of the share of the population that speaks Welsh is dominated by the higher rates of Welsh speakers in Ceredigion and Gwynedd, covering about half the map. The low rates around Cardiff and Newport look less significant but in fact contain a much larger number of people who can speak Welsh. Clearly therefore we need to use map outputs thoughtfully.

The challenges ahead

There is much potential for the use of administrative data sets for modelling schemes and their effects and for data to be amalgamated into non-disclosive units to be used for policy making. When administrative data is collected this potential use needs to be born in mind. This is not just a case of physically having fields in a data base that can reference to a geocodable object but that relevant legislated procedures are followed that ensure the data can be amalgamated and used. The big challenge is to add aspects of the wider rural economy into a model. To do this much more data would be needed and scoping this will be a real challenge.

Conclusion

GI technology has been used by the Agriculture and Rural Affairs Department of the National Assembly for Wales for many years to help formulate evidence based policy making. The building of the economic data model added a new and extremely useful tool to the search for better evidence. Although only in its second iteration the economic data model and the use of subsidy data for scheme evaluation and policy planning is proving extremely valuable. We have learnt some important lessons in the study and are applying these to the future data collection.

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