

Social and environmental inequalities in rural England: spatial distributions and the effects of scale

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1. Introduction

Research on inequalities in the UK has concentrated on urban communities where the majority of the population is based. This paper describes new research from a UK Research Councils Rural Economy and Land Use (RELU) project, Social and Environmental Inequalities in Rural Areas (SEIRA), which is investigating the methods and data used to identify inequalities in rural England. Various studies, primarily in the USA, have attempted to investigate the impact that scale has on the assessment and identification of social and environmental inequalities. The paper describes the initial findings from the project on the existence and extent of inequalities in rural areas and will demonstrate the impact of changing the scale of the unit of analysis upon the identification and distribution of inequalities in an English context.

2. Deriving spatial data for assessing inequalities

2.1. Defining rural England

Rural England is defined according to the definition developed by Bibby and Shepherd (2004) that is based upon the distribution of population and consequent settlement density and morphology across the country. This allows for the identification of rural areas according to different census geographies ranging from Output Areas (OAs) upwards in scale to Local Authorities and ensures consistency with regional and national policy initiatives.

2.2. Describing rural England

The spatial dataset for describing social and environmental conditions in rural areas (SECRA) was developed under a previous RELU project. The SECRA dataset was compiled with a base unit of Lower Layer Super Output Area (LSOA). LSOAs are compiled from smaller census output areas (OAs) and have relatively consistent populations of approximately 1500 people. They were chosen as the SECRA base unit for a number of reasons. The coarsest data thought essential for inclusion in the dataset are held at LSOA level. The use of this base unit also ensures that the SECRA dataset has the potential for being updated in the future (as LSOA boundaries, unlike previous census geographies, are intended to remain constant). LSOAs are also the smallest units for which social information is readily available that avoids issues of individual confidentiality. This ensures that the SECRA dataset could be made available freely to students, policy makers and researchers to inform their thinking on rural England.

LSOAs are consistent in terms of their population size. However, for rural England their areal extent varies from 0.16km² to 684km². LSOA boundaries have no relation to the physical

environment or people's linkages to the environment (Dorling and Fairbairn, 1997). The selection of LSOAs as the base unit for the dataset ensured that social information gathered from the census was readily available; however, the varying size of the base units meant that various geographic analysis techniques had to be employed to incorporate other social facets and specifically the environmental dimension of rural England. A variety of case-specific techniques were employed to interpolate information of different types to the LSOA base unit. These included area-weighted averaging techniques, counts and proximity measures. For example, the proximity of landfill sites to the LSOA centroid was used to assess the relative impact of these facilities on the people living within that area (Huby, Cinderby and Owen, 2005).

An overview of these techniques will be described in this paper where they relate to the identification of inequalities in the distribution of services and impacts in rural England.

3 Inequalities and scale

3.1. Identifying inequalities

The SEIRA project is utilising the SECRA dataset with a variety of interdisciplinary methodological approaches to identify inequalities. The project team is investigating geographic and statistical techniques from the social, economic and environmental fields to assess which approaches provide the most robust assessment. This paper discusses the implications for the identification of inequalities based on the varying results generated by different measures such as Lorenz curves, Gini coefficients, and inter-quartile range ratios. Examples of environmental and social inequalities identified in rural England using these complementary techniques are presented. For example, inequalities in bird species richness are associated with inequalities in socio-economic and environmental conditions at a regional scale.

3.2. The impact of scale

In the environmental justice movement of the US there has been considerable debate on the appropriate scale at which to assess environmental inequalities (Liu, 2000). Different geographies have revealed how the unit of analysis can affect the identification of inequalities. In this paper we discuss similar findings for rural England by assessing inequalities at various geographic hierarchies (built up from the LSOA base units). Preliminary results illustrate the importance of the resolution of the base units in the quantification and interpretation of inequalities.

4. Conclusions

The preliminary results of the study indicate that the holistic analysis of inequalities using the combined social, environmental and economic variables contained in the SECRA dataset is well-suited for identifying the interrelationship and interaction between spatial distributions of inequalities in rural England. The approach holds particular appeal from a policy perspective where initiatives to reduce social inequalities may be complemented by schemes designed to conserve rural ecosystems and *vice versa*. Better socio-economic conditions can improve the take-up and effectiveness of conservation and management programmes, while high quality environments and healthy ecosystems may work in turn to promote further social well-being.

The scale of analysis has an important effect on the identification of inequalities. Inequalities in the distribution of ecological, socio-economic and environmental factors are more marked when we study smaller units. This finding has particular resonance in rural England where pockets of deprivation are often hidden in areas that, at a coarser resolution, appear to be marked by affluence and high environmental quality. Improved understanding of the associations on different spatial scales between the ecological and socio-economic aspects of

environmental inequality could provide an important framework for rural development policy. The findings in this paper illustrate how such a framework could be developed.

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Biographies

Steve Cinderby is Deputy Director of the Stockholm Environment Institutes York Centre. Steve was part of the team that developed the SECRA dataset. He is currently collaborating on an expansion of the dataset and utilising it for the identification of inequalities. These will then be ground-truthed with rural communities using participatory GIS techniques.

Annemarieke de Bruin is Research Assistant in the project team of SEIRA at the University of York. With her background in GIS and Tropical Land Use she is responsible for the projects data gathering and spatial analysis. In addition, she will be involved in development and execution of the participatory GIS activities.

Meg Huby is a Senior Research Fellow at the University of York. She worked with Steve Cinderby in developing the SECRA dataset and is the principal investigator on the SEIRA project. Her research experience reflects longstanding interests in the linkages between social and environmental problems and policies.

Piran White is a Reader in the Environment Department at the University of York, and is a co-investigator on the SEIRA project. His research interests span wildlife ecology, biodiversity and ecosystem function, ecosystem health and social and environmental inequalities.