Irish Rural Structure and Gaeltacht Areas

National Spatial Strategy

This report has been prepared jointly with the Centre for Local and Regional Studies – NUI Maynooth and Brady Shipman Martin.
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Table of Contents

Summary and Implications for Policy

1 Introduction

This is the report on a background study for the National Spatial Strategy (NSS) regarding the Irish Rural Structure. The main objective of the study was to "develop, using demographic, economic and geographical data, a typology of rural areas in Ireland and their main characteristics. The typology should be developed at a geographical scale that enables practical regional and sub-regional comparisons to be made".

The study also examined: trends within these areas and the outlook for them; the relationship between urban and rural areas; and the role of infrastructure in rural area performance. This Summary presents selected principal findings only. More detailed results are contained in the Main Report.

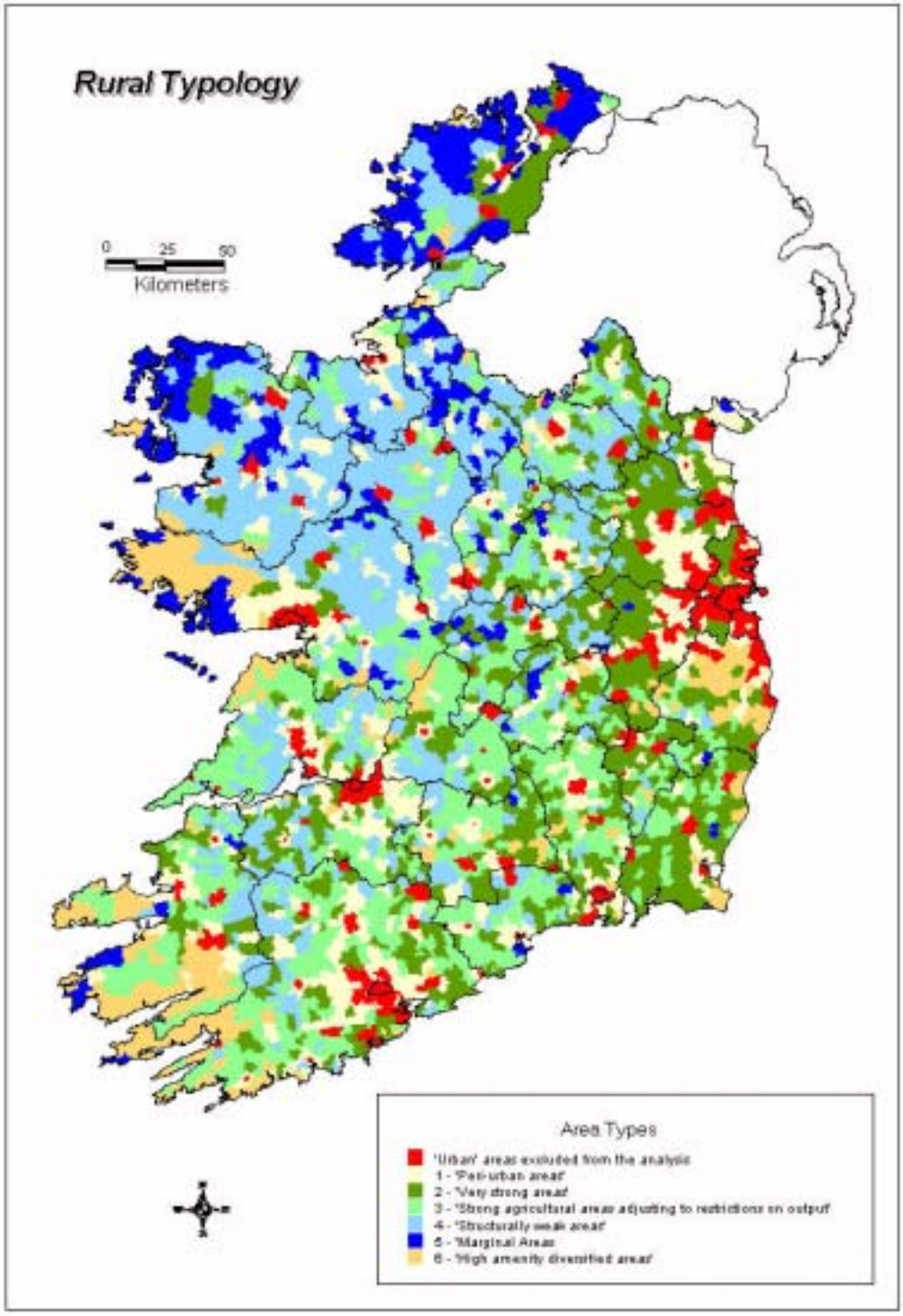
The overall study approach has been one of a high level of quantification, drawing mainly on the Census of Population 1996. This focus reflects a desire to contribute analytically to much discussed but seldom systematically assessed issues of rural development and rural performance in Ireland.

"Rural" is defined as District Electoral Divisions (DEDs) with no population centre above 1,500 people, with a population density below 150 per sq. km, and which are not part of an urban district or borough, ie it broadly refers to open countryside and rural villages.

2 Rural Area Typology

The first task was to develop a "typology", ie a series of categories, of rural areas in Ireland. This was done using a process of statistical analysis which allows for systematic identification and grouping of DEDs with common socio-economic characteristics. The results are shown in Map 1.

MAP 1


Rural Typology
0
25
50
Kilometers
Area Types
'Urban' areas excluded from the analysis
1 - 'Peri-urban areas'
2 - 'Very strong areas'
3 - 'Strong agricultural areas adjusting to restrictions on output'
4 - 'Structurally weak areas'
5 - 'Marginal Areas
6 - 'High amenity diversified areas'

A series of six distinct "rural area types" are identified. These cover all 2,716 rural DEDs, and all 1.4m people living in these (in 1996) – 39% of the national population. The remainder of Ireland is classified as urban.

Rural Area Type 1	Peri-urban Areas
No. DEDs 443 Population No. 408,876 % National Population 11.3	Rural areas close to the main urban centres, broadly corresponding to immediate urban areas of influence. High population density, relatively low reliance on farming, and high levels of commuting to work. The largest single Area Type in population terms.

Rural Area Type 2	Very Strong Areas
No. DEDs 628 Population No. 375,493 Population No. 375,493	Large areas of the country, mostly in the South and East, where farming continues to be strong. A relatively less "urbanised" population profile than Area 1, ie lower average education levels, lower female participation, and more manufacturing than services
Rural Area Type 3	**Strong Adjusting (to output restrictions) Agricultural Areas**
No. DEDs 612 Population No. 204,039 % National Population 5.6	DEDs throughout much of the East and South also with strong agriculture, but with a less advanced transition to non-agricultural activity. Areas are generally experiencing the challenge of adjusting to agricultural output restrictions.

Rural Area Type 4	Structurally Weak Areas
No. DEDs 644 Population No. 239,535 % National Population 6.6	A large number of DEDs involving disadvantaged rural areas, with high levels of dependence on directly subsidised agriculture (as opposed to price supports). Concentrated in the North West but also extends into parts of the North Midlands, the South and Mid West. Defining attributes are older farmers, small farms, declining farmer numbers, and a low level of non-manufacturing employment.
Rural Area Type 5	**Marginal Areas**
No. DEDs 201 Population No. 107,026 % National Population 3.0	These are more agriculturally disadvantaged than Type 4, and are clustered mainly in the most remote West and North West. While overall demographic viability is somewhat stronger than Type 4, perhaps due to a high incidence of part-time occupations, unemployment nevertheless remained high in 1996.

Rural Area Type 6	Highly Diversified Areas
No. DEDs 188 Population No. 91,378 % National Population 2.5	This type, involving a relatively small number of people, represents an almost "post-agricultural" rural economy. It involves areas of high natural amenity, which attracts high levels of tourism and recreational usage, and in some cases high levels of non-farming residents who have in-migrated. Areas involved include Connemara, Clare, Wicklow, and areas along the Shannon.

3 Outlook for Rural Areas

In relation to the outlook to 2020 for the labour force position of rural areas, agricultural employment and requirements for off-farm employment creation our main findings were:

- if recent population trends continue the labour force of rural areas is likely to decline by 11,500 or by 1.8% to around 627,000 in 2020;
- agricultural employment is estimated to decline by between 33,500 to 39,000 or by 30 - 35%. Across area types the rate of decline will range from around 23 - 27% for Area Types 1 and 2, to 40% and over for Area Types 4 and 5;
- depending on assumptions about future population trends the requirements for off-farm employment creation range from about 20,000 to 192,000 jobs. If all area types were to retain their present share of national population there would be considerable requirements for off-farm employment creation in Area Types 3, 4 and 5. However if recent population trends continue requirements for off-farm employment creation will be greatest for Area Types 1 and 2.

4 Urban-Rural Relationships

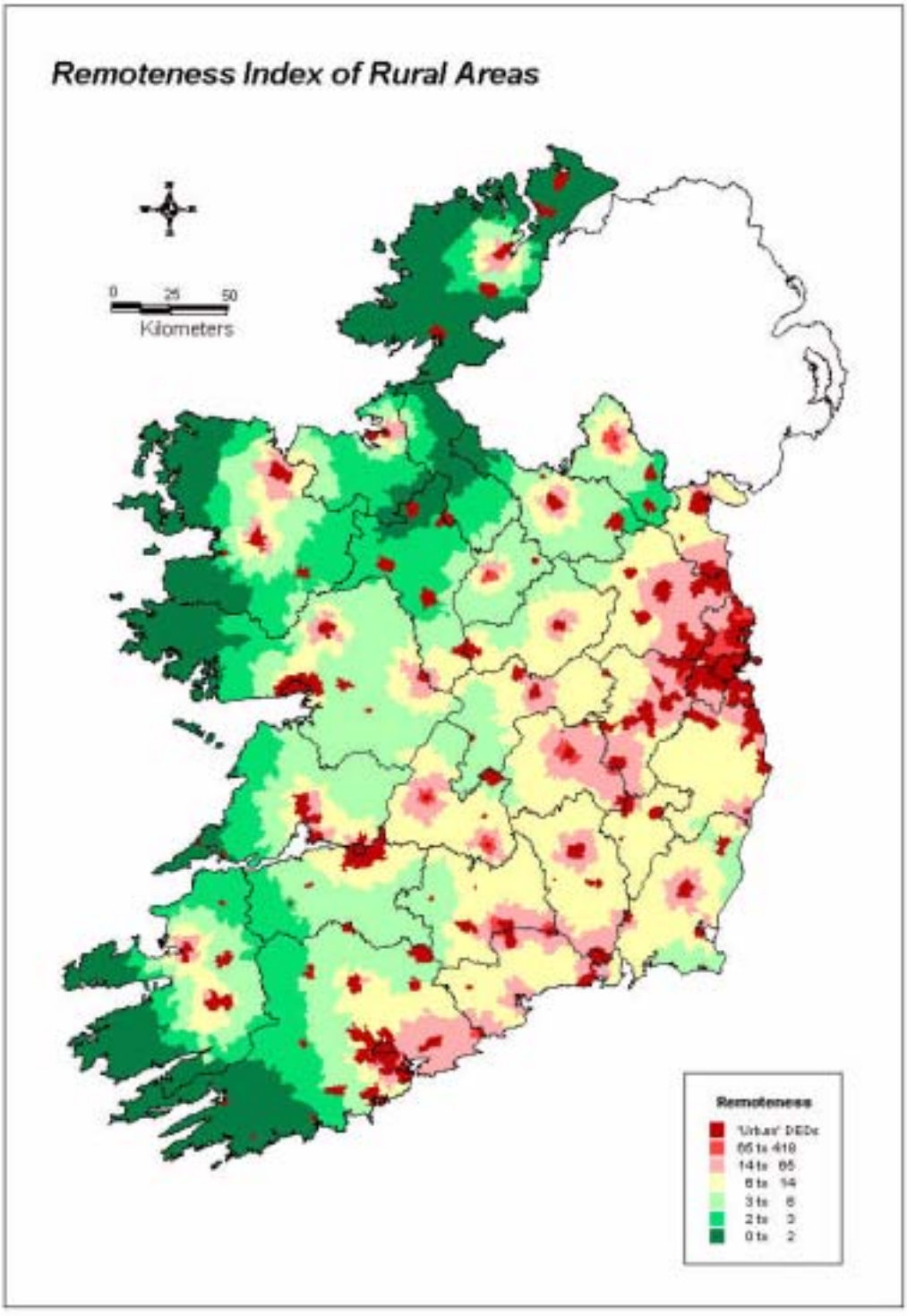
To explore the relationship between cities and towns and rural areas, rural DEDs were classified according to their degree of "remoteness". This involved a composite scoring of each DED in terms of its distance from larger urban centres and the size of those centres (in population terms). The result is shown in Map 2. As shown, "remoteness" tends to increase as one moves westwards, with interspersed less remote "pockets" of DEDs around the cities and towns.

The remoteness of DEDs was compared to their economic performance, as measured by percentage employment growth 1991-96. This, of course, refers to employment of people resident in the location and not necessarily to employment located there. The main findings were:

- employment in rural areas grew at an average rate 1.7% each year over the 1991-96 period. However, the overall performance of rural DEDs varied, with one in five rural districts experiencing a decline in employment;
- the average employment growth rate of the three most remote groups (districts covered by one of the three shades of green in Map 2) was significantly lower than that of less remote groups (a difference of about one percentage point per annum);

- rural DEDs in the most remote group (the dark green areas in Map 2) on average performed better or at least as good as those in the 2nd and 3rd most remote groups (the light shades of green in Map 2). This may be due to a number of factors, such as the fact that we are dealing with growth rates rather than absolute changes or to some unique feature of these areas, eg tourism;
- differences in performance between the various groups in remoteness terms appears to be most pronounced for DEDs in the smallest population size category, ie the negative impact of remoteness comes into play most strongly in the case of rural areas which also have small populations. Remoteness and sparse populations are, of course, also themselves related to each other.

MAP 2


Remoteness Index of Rural Areas
0
25
50
Kilometers
Remoteness
'Urban' DEDs
65 to 419
14 to 65
6 to 14
3 to 6
2 to 3
0 to 2

5 Rural Infrastructure

There is considerable evidence "on the ground" that much recent economic activity is related to the quality of infrastructure – and that the infrastructure of urban areas in terms of ports, airports, telecoms, energy, third level facilities etc helps explain the concentration of much economic activity to urban areas. The obvious corollary is that rural areas can be seen as infrastructurally and (as a result) economically "disadvantaged".

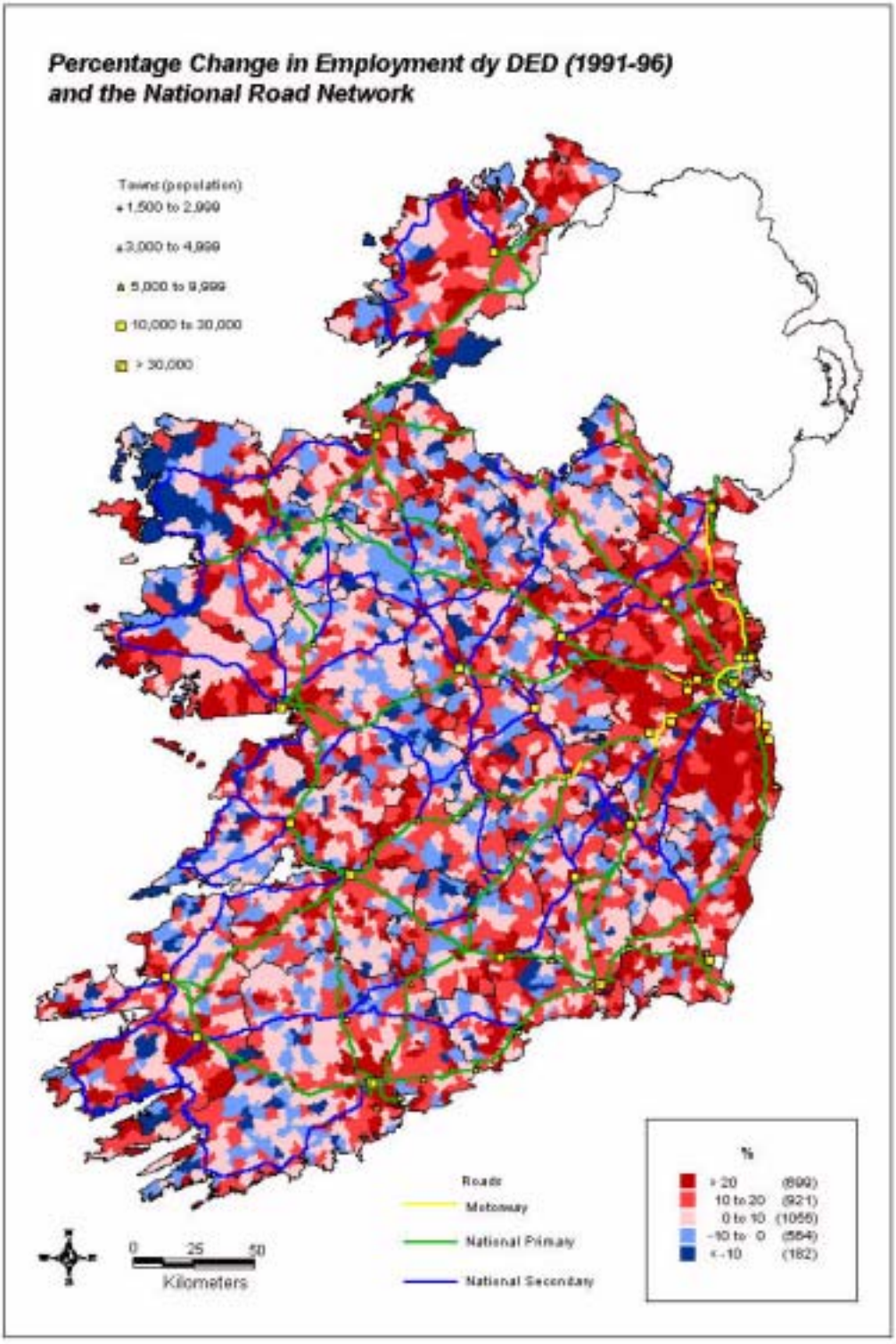
To explore this hypothesis, the percentage increase in the number at work who reside in each rural DED was compared with access to infrastructure, measured by DED proximity to the national primary road system. The results are shown in Map 3.

The most obvious pattern is once again the large concentration of well performing DEDs (those with positive employment growth) extending in a semi-circular fashion out from Dublin. This pattern mirrors the radial nature of the national road network which is centred on Dublin. Strong jobs growth is also seen to extend out along national routes around the larger towns and cities (Cork, Limerick, Galway, Athlone, Drogheda, Dundalk), which generally represent the convergence of a number of national routes. While it can be deduced from Map 3 that most growth over the 1991-96 period was urban concentrated, there are also therefore some indications that the spatial spread of this growth was facilitated by national roads extending in a radial manner out from the urban centres.

In order to examine this more closely, the rural areas were divided into four groups based on their distance from the nearest national road, ie the first "quartile" represents the 25% of rural areas furthest away from a national road network, and the fourth quartile contains the 25% of DEDs nearest a national road. The average annual employment growth rate for rural areas in this group was 2%. Rural areas furthest from the national road network had an average annual growth rate of 1.4%.

Caution must be exercised in interpreting these results, however, as the nature and direction of causality is difficult to establish. For example, as evidenced in Map 3, the national road network directly connects the large urban centres in the country. Rural areas that are closer to national roads will generally also be closer to urban centres, or will be positioned along corridors connecting urban centres. Furthermore, national primary roads tend to be better near to such centres.

MAP 3


Percentage Change in Employment dy DED (1991-96)
and the National Road Network
Towns (population)
1,500 to 2,999
3,000 to 4,999
5,000 to 9,999
10,000 to 30,000
> 30,000
Roads
Motorway
National Primary
National Secondary
%
> 20 (699)
10 to 20 (921)
0 to 10 (1055)
-10 to 0 (584)
< -10 (182)
0 25 50
Kilometers

6 Implications for Policy

Key policy implications arising from the rural typology are:

- the spatial structure of the Irish rural economy and society is complex and multi-layered. We have tried to reflect this in our typology. However, any typology necessarily involves some degree of simplification. In developing spatial strategies it is therefore important to recognise the underlying diversity and complexity of rural areas;
- the boundaries of the rural areas types do not correspond with established administrative boundaries, including regions, counties, and Gaeltacht Areas. It is therefore important to devise mechanisms that will on the one hand allow nuancing of policies within such administrative areas to reflect their diversity, and on the other facilitate co-ordination in policy across administrative boundaries;
- the existence of distinctive rural area types also suggests the need for customisation of "bundles of policies" to address area-specific issues;
- outside the relatively clearly delineated peri-urban areas (see Map 1, Type 1) any wider definition of spatial planning or functional areas as concentric circles drawn around towns must be treated with caution from a rural perspective. Such urban-defined areas are likely to encompass more than one rural area type;
- some rural areas that were previously regarded as strong on the basis of their agricultural profile may have recently entered a new phase in their development which will require considerable diversification over the medium term;
- some previously very weak rural areas have moved into a "post-agricultural" phase with new types of development associated with rural diversification in high amenity areas, involving high levels of tourism and leisure usage, and new resident inflows. The social and environmental consequences of these adjustments will require close attention.

A number of important issues with regard to off-farm employment requirements to 2020 are:

- the requirement to replace agricultural jobs is most critical in the first decade when growth of the labour force will be strongest (mainly through natural increase and migration rather than participation rates) and the decline of agricultural employment will be the greatest. Requirements are modest thereafter;
- if the population of rural areas continue on a similar growth (or decline) path to that experienced in the early 1990s, then the need for additional employment is relatively modest;

- however, if rural areas are to maintain their share of the State population (an unlikely scenario), then requirements are bigger and, predictably, more onerous on the relatively weaker rural areas.

With regard to the performance of rural areas and urban/rural relationships, a number of key issues emerge:

- the research shows that remote areas, especially ones with small populations, tend to perform economically relatively poorly. An exception is some high amenity areas which have diversified into a new tourism, amenity and residential role. The future of remote, often inland, areas with less natural attractions will present a particular challenge in the future;
- the relationship between employment growth and accessibility raises questions in relation to appropriate rural transport policies, both infrastructure and services, to complement the national roads strategy;
- policies to improve rural transport will need to be part of a co-ordinated policy framework which will also guide the provision of other support infrastructures;
- the environmental and sustainability aspects of spreading the benefits from urban centres into rural areas will require careful consideration. Rural growth based along national primary routes may not always be the most desirable spatial pattern of development. In many instances it may involve urban sprawl, inappropriate housing in rural areas, and increased car-based commuting;
- "semi-rural" towns in the 1,500-5,000 population category can play a very important role. They are in danger of "falling through the cracks" in any urban/rural analytical or policy split;
- the spatial implications of the vision for rural Ireland contained in the government's White Paper on Rural Development will require detailed assessment in the light of the empirical findings presented here. As is true in relation to all areas of public policy, but perhaps even more so, clearly defined operational objectives will be a prerequisite to success in any spatial policy towards the complex system that is rural Ireland;
- relationships between rural and urban structures are not all "outward" from urban areas, as urban-focused analyses often presumes. In particular, it is likely that underperformance of certain towns reflects weakness and transition in the surrounding rural economies, notably in Area Type 3.

The analyses presented in this study are based on data for 1996. Clearly there have been very significant changes since then. Furthermore, the patterns of rural differentiation reflect the underlying structure and vibrancy of agriculture. However, the best available data for this sector relates to 1991, prior to the introduction of the 1992 CAP reforms. The analyses therefore need to be updated as soon as appropriate data becomes available from the 2000 Census of Agriculture and the 2001 Census of Population. Availability of comparable data for Northern Ireland will also make it possible to undertake an 'island wide' analysis of the spatial structure of rural areas in the future.

1 Introduction

1.1 Report Structure

The report is structured as follows:

- Chapter 2 deals with preparation of a typology of Irish rural areas as of 1996;
- Chapter 3 deals with population and employment projections;
- Chapter 4 examines urban-rural links;
- Chapter 5 examines the role of infrastructure in rural area performance;
- Chapter 6 contains the main conclusions of the analysis.

1.2 Study Context

This study is one of a series prepared as part of the background research to the National Spatial Strategy (NSS). These studies constitute Stage 2 of the four-stage approach being adopted in preparation of the NSS. Stage 2 of the overall NSS process involves description and analysis of the spatial structure and functioning of Ireland. The aim is that this stage will lay down the information basis for the subsequent preparation of the strategy. The aim of this study, and other background studies, is therefore one of information provision and analysis rather than the drawing of policy conclusions and recommendations.

The present study is one of two studies commissioned under the theme of "rural Ireland and balanced regional development". As its title indicates, this study relates to the rural structure, while the other concerns rural enterprise. Both studies are being undertaken by a team led by Fitzpatrick Associates. In addition to the parallel rural enterprise study, this team (Fitzpatrick Associates, NUI Maynooth and Brady Shipman Martin) has also contributed to a third study, led by Brady Shipman Martin, on the Irish urban structure.

1.3 Study Objectives

The objectives of the Study as set out in the Brief are to: *"develop, using demographic, economic and geographical data, a typology of rural areas in Ireland and their main characteristics. The typology should be developed at a geographical scale that enables practical regional and sub-regional comparisons to be made".*

Within the rural areas, the study is designed to:

1. identify the current socio-economic trends within each of the types of rural area identified;
2. establish the position of these rural areas based on a continuation of current trends for the years 2010, 2015 and 2020;

3. identify the impact of continued reform of the CAP on the rural areas identified above;
4. quantify in general terms the amount of off-farm employment required;
5. establish the nature and extent of the physical and functional relationships to the urban centres;
6. establish the nature and extent of the influences of the major urban centres on smaller urban centres in the rural area;
7. identify any deficiencies in the provision of physical infrastructure including transportation and communications which act as barriers to economic activity.

In relation to the Gaeltacht areas, the purpose is to examine current socio-economic trends in these areas as far as they affect the distinct language and cultural integrity of the areas.

1.4 Approach and Method

Our overall approach has been to group the issues in the Terms of Reference (see Section 1.2 above) into six analytical steps. These are set out in Figure 1.1:

- Step 1 involved a review of literature on rural typologies. The outcome of this was presented as separate Working Papers;
- Step 2, which constituted the core quantitative analysis, involved the use of statistical techniques to group Irish rural DEDs into a six-part typology, based on a combination of their current status and recent socio-economic trends;
- Step 3 involved the preparation of socio-economic projections for these areas, based on past trends, and the impact of the CAP and other factors on future employment requirements;
- Step 4 involved supplementary statistical analysis which examines the relationships between the performance of rural areas and their relationship to urban centres;
- Step 5 explored the relationship between the performance of rural DEDs and their access to infrastructure, proxied by reference to road infrastructure;
- Step 6 involves integration, synthesis and reporting of the research carried out in Steps 1-5.[1]

The method involved use of quantification and of statistical techniques, drawing mainly but not exclusively on data available at DED level from the Census of Population. This approach reflects the view that while there is extensive

1. See Walsh and McHugh reference, Annex B.

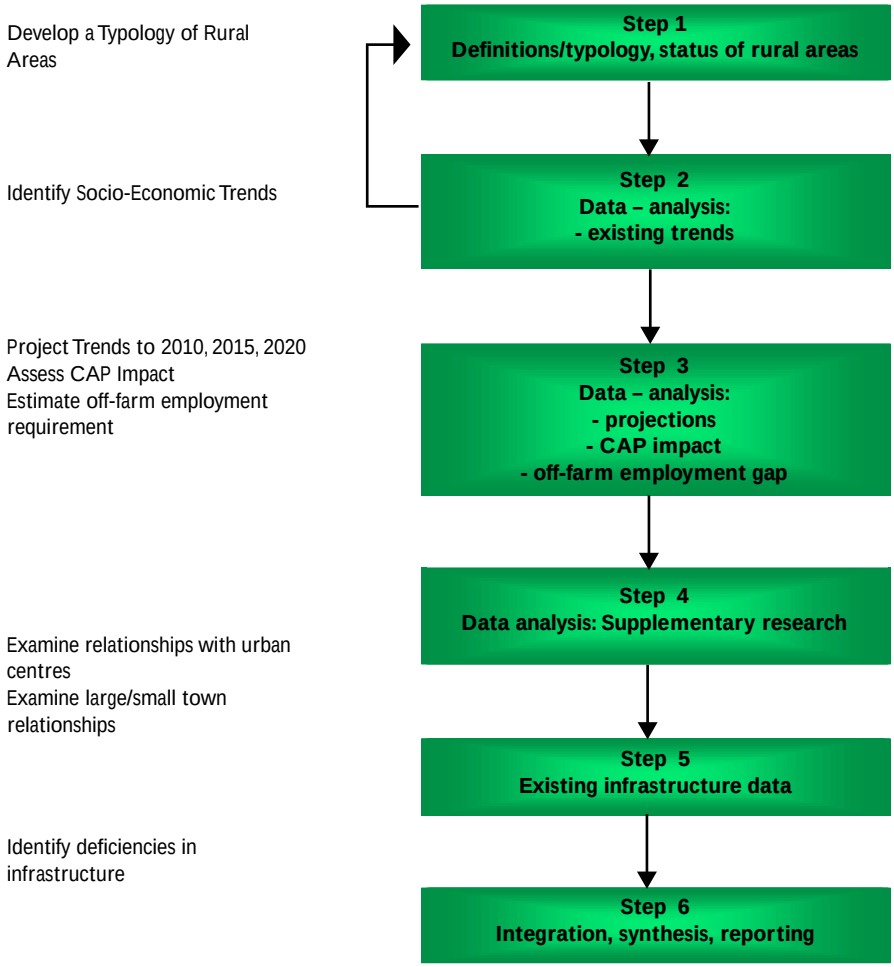
qualitative comment and evidence on the issues raised by the Terms of Reference, the amount of quantification carried out in Ireland is relatively small. The information available from the Census of Population at DED level provides a relatively rich source, certainly rich by Irish standards, on the nature and performance of rural areas, and offers potential to explore the extent to which urban-rural relationships help to explain this performance. The analysis is conducted for all rural DEDs .[2]

The main statistical techniques used have been "principal component" and "cluster analysis", two techniques mainly used in geography. We also use simple correlations, scattergrams, cross-tabulations and various statistical tests (independent t-tests and ANOVA tests). Presentation techniques used involve principally mapping and scatter diagrams. Further details on the techniques used are given in the respective chapters.

2. A rural area is any DED that: is not an urban DED as defined by the CSO (ie a DED that can be aggregated to form an urban district or borough); has a population density of less than 150 people per square kilometre; does not contain a town with a population of 1,500 or over.

Figure 1.1: Analytical Framework

Study Requirements



2 Developing an Irish Typology

2.1 Introduction

This Chapter develops a typology of rural areas of Ireland utilising socio-economic data. This emphasis on data analysis and quantification is a central distinguishing feature of our work and contrasts with previous attempts to develop such typologies in Ireland which have generally involved strongly qualitative and judgemental elements.

As described in Chapter 1, the construction of such a typology – using demographic, economic and geographical data – is a core objective of the 'Irish Rural Structure' component of Stage 2 of the overall NSS preparatory process.

Having reviewed different approaches and methodologies, and established a rationale for undertaking such an analysis for the rural context, we developed an approach for the construction of a rural area typology of Ireland (see annex A and Working Paper 1). Several criteria were deemed relevant to the design of the typology:

- "policy-relevance": recognising the distinct policy function as outlined in the NSS documentation, the classification of areas should be policy relevant, ie sensitive to issues raised in the NSS Study Brief, the Government White Paper on Rural Development and other studies;
- "sustainability": as such, it was deemed essential that the typology should have a clear focus, based on an underlying theme that is 'policy relevant'. The theme adopted relates to the notion of socio-economic sustainability and 'potential', whereby rural areas are differentiated on the basis of their current and future ability to:
    a. sustain a vibrant population;
    b. activate entrepreneurship and exploit indigenous potential;
    c. maintain (where feasible) a strong agricultural base;
    d. access employment opportunities and services in urban areas;
- "multidimensional": in order to accommodate the multidimensional concepts of socio-economic sustainability and potential, the typology should be multivariate, with variables/indicators chosen to reflect the aspects of socio-economic sustainability listed above;
- spatially detailed: the typology is a descriptive analysis. However, it also has an additional function in that it can assist in the tailoring of policies not only to address particular types of rural problems common to some areas, but also to facilitate effective spatial targeting of policies. To this end, it is desirable that the typology should be as spatially precise as possible. This effectively means that the analysis and presentation of results will be quantitative, visual and conducted at a detailed spatial scale.

2.2 Outline of Methodology

2.2.1 Overview

The development of a rural typology involve three core stages as illustrated in Figure 2.1. The following sub-sections outlines these stages in more detail.

Figure 2.2: Overview of Methodology

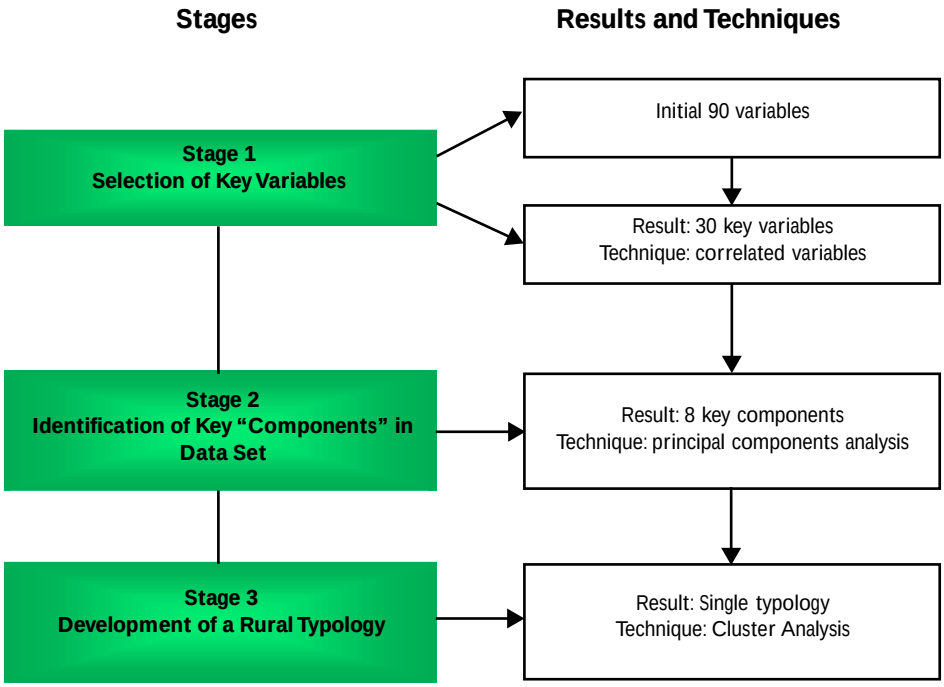


Figure 2.3: Stage 1 - Selection of Key Variables

We initially chose 90 variables so as to broadly represent several dimensions of the socio-economic profile of the rural population. Given the desirability of using data at the most detailed level the choice of variables was restricted to the latest Census of Population (1991 and 1996) and the Census of Agriculture (1991). The initial selection of variables is contained in Annex A.2, with variables organised under the following broad headings:

- demographic structure;
- labour force characteristics;
- unemployment and economic dependency;
- education levels;
- incidence of commuting;
- sectoral employment characteristics;
- structure and performance of the agricultural sector;
- indicators of change.[3]

The 90 variables initially selected were subsequently reduced to 30 in order to remove duplicating and 'redundant' variables from the data set (see Annex A.2 for details). Variables were selected for all 2,716 rural DEDs. [4]

2.2.2 Stages 2 and 3 – Statistical Analysis

Two statistical techniques were employed to generate the spatial typology, a Principal Components Analysis (PCA), followed by a Clustering procedure.

The objective of the PCA stage analysis is to achieve a more parsimonious description of the large data set by reorganising the variables as 'components', each of which represents a combination of statistically inter-related variables. The objective of the cluster analysis is to take the newly derived set of components and group/classify rural DEDs on the basis of their similarities across all of the components to develop a single typology.

2.3 Key Variables and Components

2.3.1 Key Variables

Table 2.1 presents the final selection of 30 "key" variables which are used to develop the typology.

Table 2.1: Variables Selected at Stage 1 and used to Develop "Components"

Category	Variable Description
Demographic Structure	Population Density
	Persons aged 0-14 yrs as a % of the total population
	Persons aged 65+ yrs as a % of total population
	% of total males aged 25-44 years who are married
	Vitality Ratio (20-39 year olds to persons aged 60+) - 1996
	Couple+kids households as % of all permanent private households
Labour Force Characteristics	All persons labour force participation rate
	Female labour force participation rate
	% of females 15+ involved in 'home duties'
	Persons self-employed as % of all persons At Work (excluding agr)
	Males at work part-time as a % of total males 15+ at work
	Females at work part-time as a % of total females 15+ at work
	Persons at work as a % of all persons 15+
	Unemployment rate, all persons
Education and Social Class	% Total Population in Social Class 1&2
	% Persons 15+ finished full-time education - no form to lower secondary

3. The 'change' variables were confined to those covering the 1991-1996 period.This is because changes that were occurring during this period were markedly different from those of the 1980s..
4. A rural area is any DED that: is not an urban DED as defined by the CSO (ie a DED that can be aggregated to form an urban district or borough); has a population density of less than 150 people per square kilometre; does not contain a town with a population of 1,500 or over.

Table 2.1: Variables Selected at Stage 1 and used to Develop "Components"

Category	Variable Description
	% Persons 15+ finished full-time education - post grad degree
Sectoral Employment profile	At Work - Agriculture, forestry and fishing as % of all pers at work
	At Work - Manufacturing industries as a % of all persons at work
	At Work - Comm, ins, fin & business ser as % of all pers at work
	At Work - Professional services as % of all persons at work
	At Work - Other ind or ind not stated as a % of all pers at work
Structure/performance of the farming sector	Males At Work Occupation Farming 50+ acres as % all males at wk.
	Average ESU (European Size Units) per farm, 1991 (CofAg)
	Percentage of farm holders aged over 65 yrs, 1991 (CofAg)
'Change' variables	% Population Change 1991 to 1996
	% Change in size of 20-29 yr cohort between 1986 and 1996 (net migration)
	% Change in numbers at work 1991 to 1996
	% Change in numbers at work in non-agricultural sectors 1991 to 1996
	% Change in numbers at work in agriculture 1991 to 1996

Principal Components

The principal components analysis results in eight distinct components that represent underlying structural dimensions in the data set. Taken together these eight components represent a high percentage, almost 70%, of the total variation in the original data set.

In order to establish what each component represents it is necessary to examine the correlations (loadings) of the variables onto each component. High positive or negative loadings for particular variables on a component define the key characteristics of that component. Each of the eight components are summarised below. (Table A.5 in the Annex gives a detailed account of how each variable correlates onto each component).

Table 2.2: Summary Description of Key Components

Component No and Title	% of Total Variance in Data Set	Description	
		Strong Positive Correlations	Strong Negative Correlations
1. Non-Agricultural Employment	12.5	• % of employment outside of farming • high population density • strong demographic structure	• % at work in agriculture • % of males involved in large scale farming
2. Labour Force Participation	12	• labour force participation (male and female) • % of adult population at work • young age structure • high education attainment • high social class	• % of females involved in home duties

Table 2.2: Summary Description of Key Components *(continued)*

Component No and Title	% of Total Variance in Data Set	Description	
		Strong Positive Correlations	Strong Negative Correlations
3. Demographic Viability	9.2	• young population • vitality ratio • % of males who are married • % of households with a couple and children	• % of people aged 65 and over
4. Strength of Agriculture Sector	9	• economic return from agricultural production1 • young age structure	• farm holders aged 65 and over • households with children • low % of unemployed people • low % of males in part-time employment
5. Socio-economic Profile	8.4	• % at work in high level professional employment • % of population with post-graduate education • % of population in the highest social class • net in-migration of persons of working age	• unemployment rate • % of population with low levels of education
6. Population and Employment Dynamics	7.3	• % change in population • net in-migration • % change in employment • % change in non-agricultural employment	
7. Rural Diversification	6	• % of people self employed outside of 6% agriculture • % of people (especially females) employed part-time • % of work in "other industries" including personal and recreational services (likely to be tourism-related)	• % of people employed in manufacturing
8. Agricultural Employment Change	4.2	• % change in agricultural employment (increase or relatively small decline) • % change in total employment • % of males and females employed part-time • economic return from agriculture[a] • unemployment rate	

a. The economic return from agricultural production is measured by European Size Unit (ESU). ESUs are derived from standard gross margin (SGM) estimates for each farm, based on the type of livestock and crops on the farm

2.4 Spatial Characteristics of Components

2.4.1 Overview

The previous section described the eight components identifiable in our data set. This section examines the spatial characteristics of each component or how rural DEDs perform on each component. Each DED is assigned a score against each component. A DED obtains a high score on a component if it possesses "equivalent" values for variables that characterise that component. For example, Table 2.2 noted that Component 1 – Non-agricultural Employment reflects positive correlations with the percentage of people employed outside of agriculture and negative correlations with the percentage of males included in large scale farming. Hence a DED receives a high score for Component 1 if a high percentage of people are engaged in non-agricultural employment and if a low percentage of males are involved in large scale farming, conversely a DED with a low percentage of people engaged in non-agricultural employment and a high percentage of males involved in large scale farming would receive a low score on Component 1.

The distribution of DED scores against each component is shown in each map key (the divisions between shading categories was selected using an algorithm that searches for "natural breaks" in scores). These are best interpreted in a qualitative sense as representing a scale from "very high" to "very low".

2.4.2 Component 1 - Dominance of Non-agricultural Employment

Map 2.1 illustrates that high scoring DEDs on Component 1 – Dominance of Non-agricultural Employment are mainly concentrated around the larger urban centres, the impact of Dublin is particularly obvious. The lower scoring DEDs tend to proliferate in more remote areas with some exceptions. High scores are also evident in west Limerick and north Kerry. These may be associated with large industrial units along the Shannon Estuary and the importance of tourism in places such as Ballybunion in north Kerry. Localised incidences of high scores on this component are evident in western coastal areas, signifying the local importance of non-agricultural employment.

2.4.3 Component 2 - Labour Force Participation

Map 2.2 illustrates a somewhat similar spatial pattern for Component 2 – Labour Force Participation to the previous component, ie a pattern of high scoring that is highly urban-focussed. In addition there are a number of relatively remote areas with high scores such as west Connemara, south Kerry and also north Monaghan. The lowest scores in terms of labour force participation are found in coastal areas of the west (which contrasts with the distribution for the first component); extensive parts of Co. Roscommon, extending into neighbouring counties Mayo, Leitrim and Longford; parts of north Tipperary, Laois and Offaly; and moving south-eastwards into counties Carlow and Wexford.

2.4.4 Component 3 - Demographic Viability

Map 2.3 shows that high scoring DEDs on Component 3 – Demographic Viability are mainly in the eastern half of the country and around the main urban centres. There is a distinct lack of high scoring DEDs throughout most of the northwest and in the southwest (outside of the Cork city zone of influence). North Monaghan, which scored highly on the labour force participation component, also scores highly here, in contrast to northwest Mayo which scores poorly for both components 2 and 3.

2.4.5 Component 4 - Strength of Agriculture Sector

Map 2.4 illustrates how rural DEDs perform on Component 4 – Strength of Agriculture Sector. There is a distinctive divide between the north-west and south-east in the distribution of component scores. There is a high concentration of low scoring DEDs on this component throughout the west and northwest. This contrasts with the geographic pattern of Component 1 in Map 2.1. This is because different scores for different DEDs on Component 4 describe differences within the agricultural sector rather than differences between agriculture and other sectors as Component 1 does.

2.4.6 Component 5 - Socio-economic Profile

Map 2.5 shows the distribution of DED scores on Component 5 and it provides an interesting pattern. There is as expected a clustering of high scoring DEDs around some of the larger urban centres (eg Sligo, Kilkenny, Tralee, Castlebar and Mullingar) and the cities. However, several concentrations of high scoring DEDs on this component are also apparent in more rural locations, for example west Kerry and parts of Co. Clare. The overall pattern seems to be suggesting that north-east, eastern and south-eastern districts (with the exception of the Dublin area) are performing poorly on this dimension compared to the west and northwest. This pattern may be emerging because of the more mixed sectoral employment profile of the latter areas, involving both highly skilled and manual workers.

2.4.7 Component 6 - Population and Employment Dynamics

Map 2.6 shows that the high scoring DEDs on Component 6 Population and Employment Dynamics, ie those that experienced strong growth in both population and employment, are at some distance from large urban centres but are within the commuter catchment of these centres. These are areas of relatively new growth driven mainly by in-migration (since fertility levels have been declining throughout the state). Employment growth in these areas has been boosted by increased levels of female participation in the labour force. Other high-growth areas include some more remote parts of counties Kerry, Clare and Galway, which again might be regarded as experiencing new growth, most likely due to the growth of tourism, but perhaps also reflecting new residential preferences. The trend shown on the map should not be taken as evidence of high growth of employment located in all of the high scoring districts but rather relatively high growth in the number of employed people living in the DEDs.

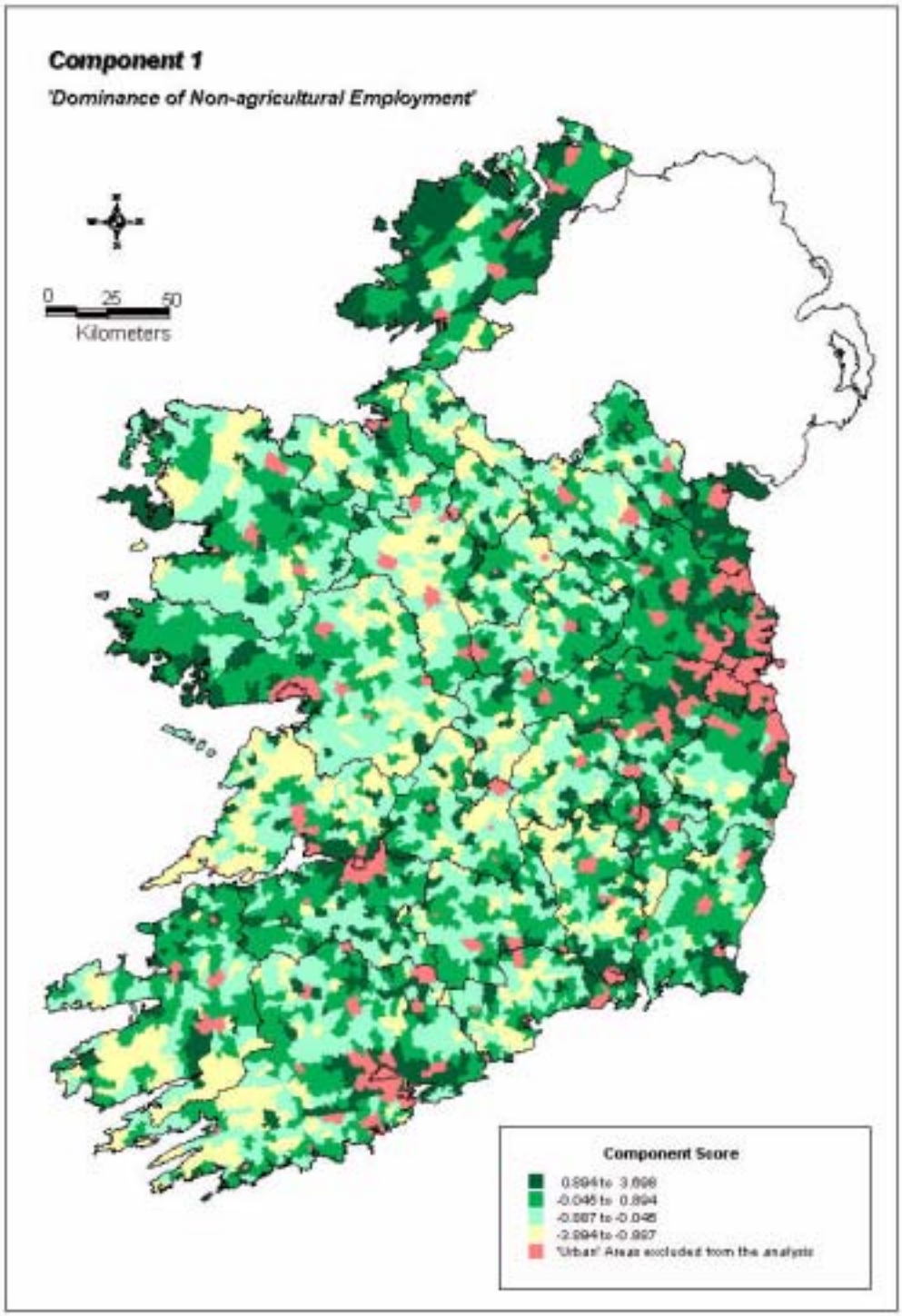
2.4.8 Component 7 - Rural Diversification

Map 2.7 indicates that DEDs scoring highly on this component are mostly located in remote rural areas - some in very peripheral locations. However these locations are also some of the more popular tourism destinations. These are areas where agricultural production is likely to be unprofitable, while manufacturing employment alternatives are in short supply (strong negative loading on the manufacturing variable). Nevertheless an adjustment appears to have taken place where tourism and recreational service have been capitalised upon and converted into employment and demographic stability (weak positive correlations on population change and net migration variables). Of course a location in some of these remote and scenic landscapes may be a feasible option for professional people, given modern telecommunications facilities, and the specialised nature of services provided.

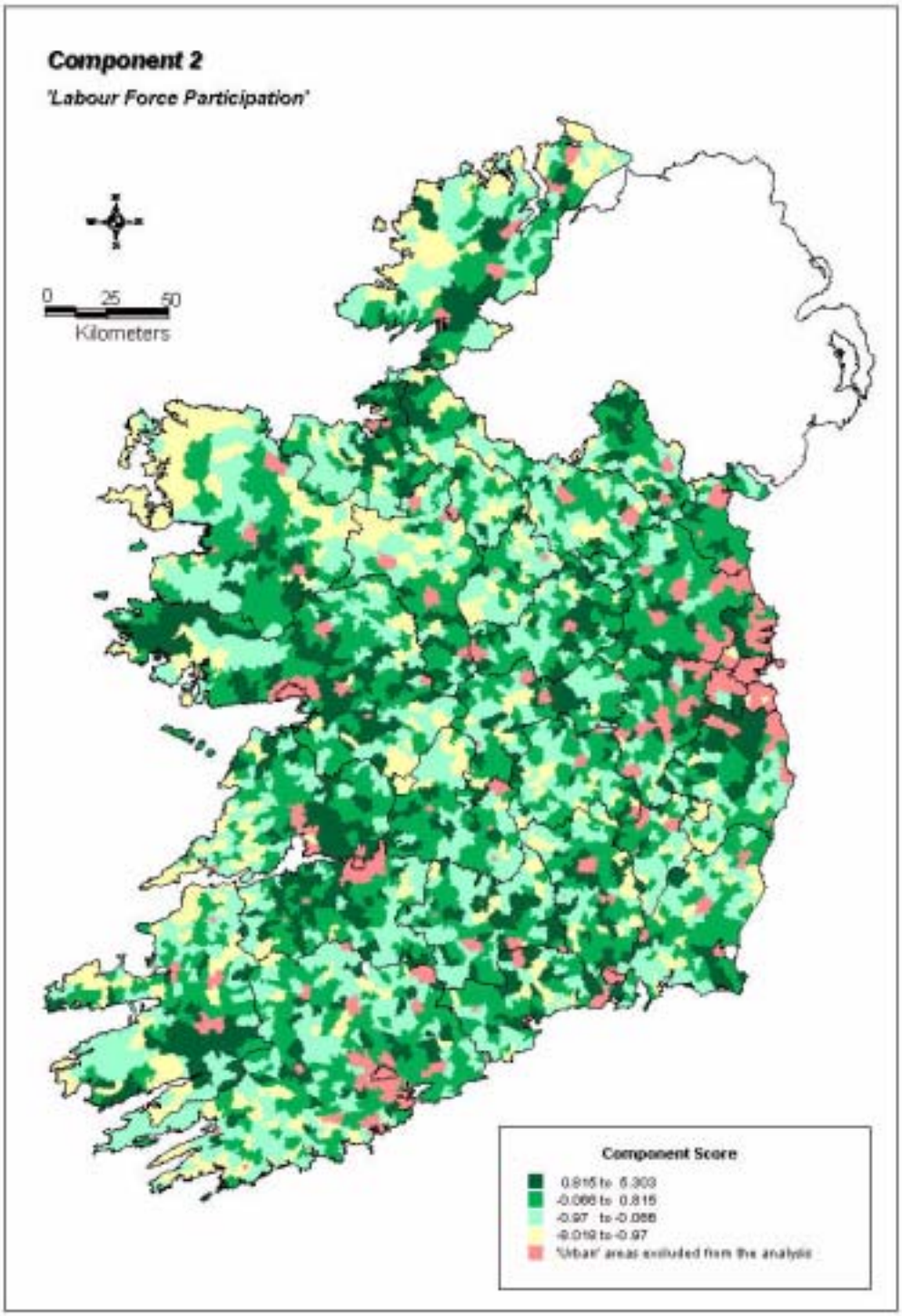
2.4.9 Component 8 - Agricultural Employment Change

Map 2.8 shows that high scoring DEDs on Component 8 proliferate in the east, south-east and in the south-west, typically where the agricultural sector is structurally more robust. In some western coastal areas (north Mayo, west Galway, west and south Kerry as well parts of south Donegal and the Inishowen peninsula) the relatively high scores may be associated with the presence of other employment opportunities, sometimes on a part-time basis, as for instance in fishing or rural tourism which may help to reduce the decline in the numbers at work in “agriculture”.

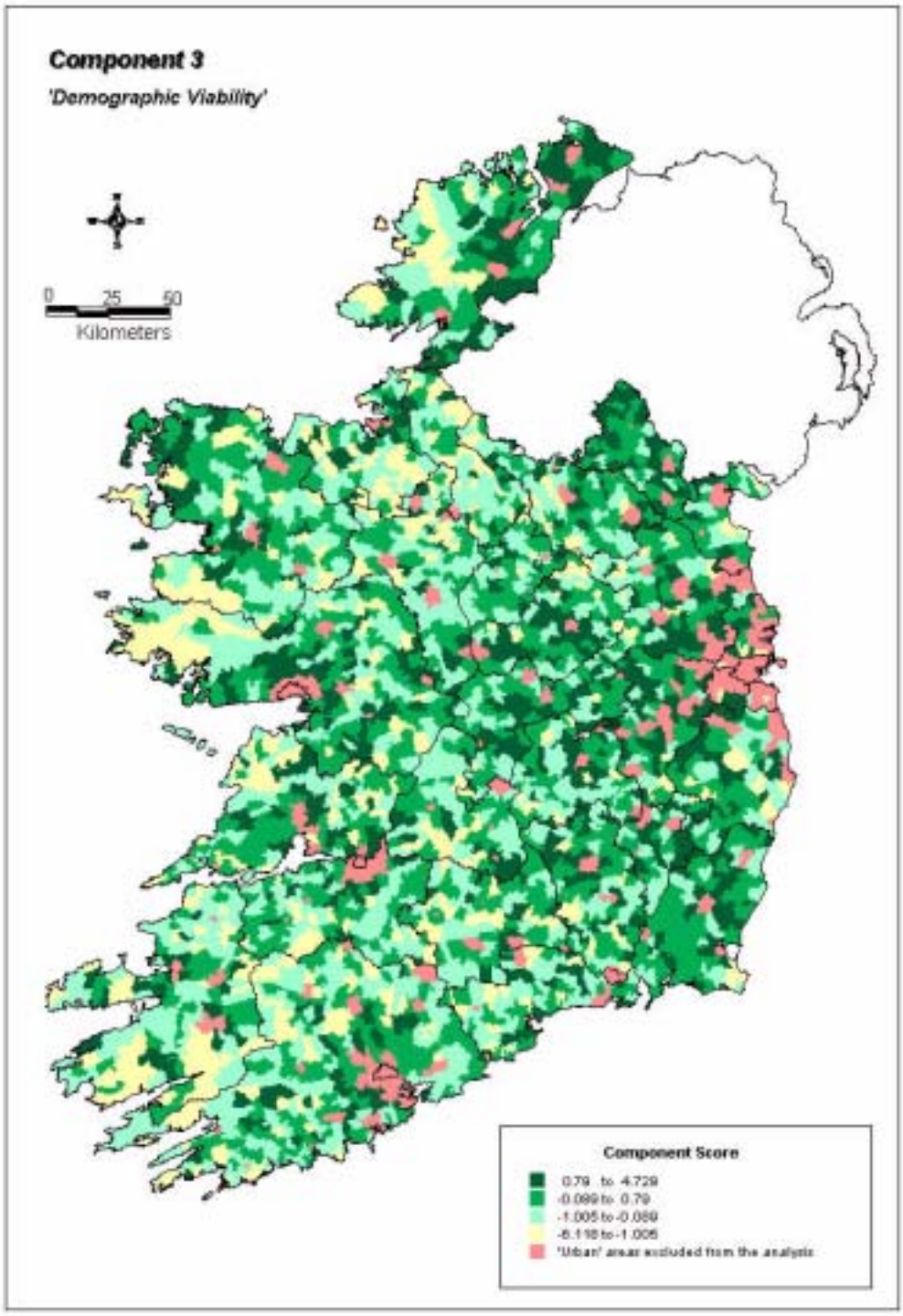
MAP 2.1


Component 1
'Dominance of Non-agricultural Employment'
0 25 50
Kilometers
Component Score
0.894 to 3.668
-0.045 to 0.894
-0.987 to -0.045
-2.994 to -0.987
'Urban' Areas excluded from the analysis

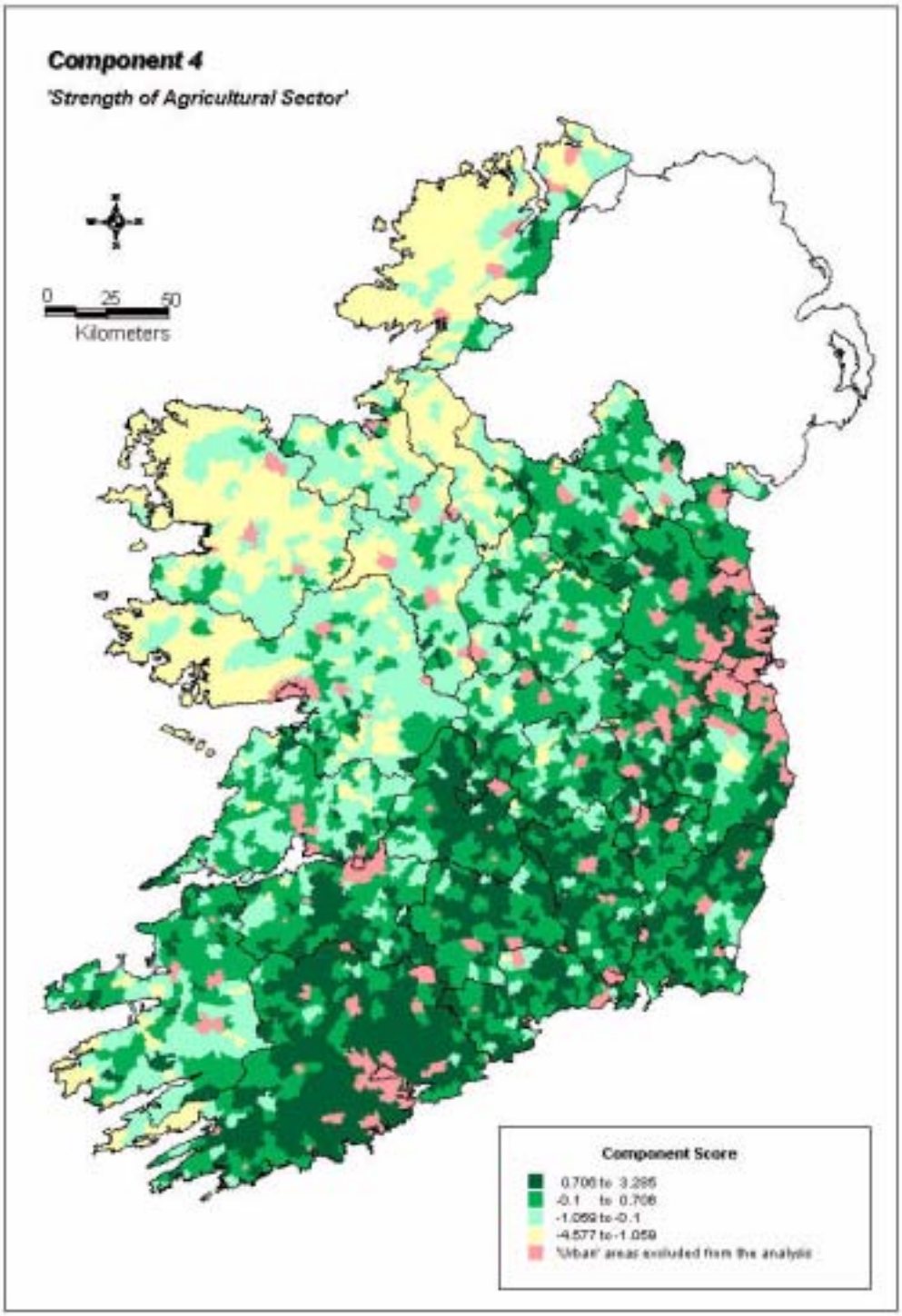
MAP 2.2


Component 2
'Labour Force Participation'
0 25 50
Kilometers
Component Score
0.815 to 6.303
-0.066 to 0.815
-0.97 to -0.066
-6.019 to -0.97
'Urban' areas excluded from the analysis

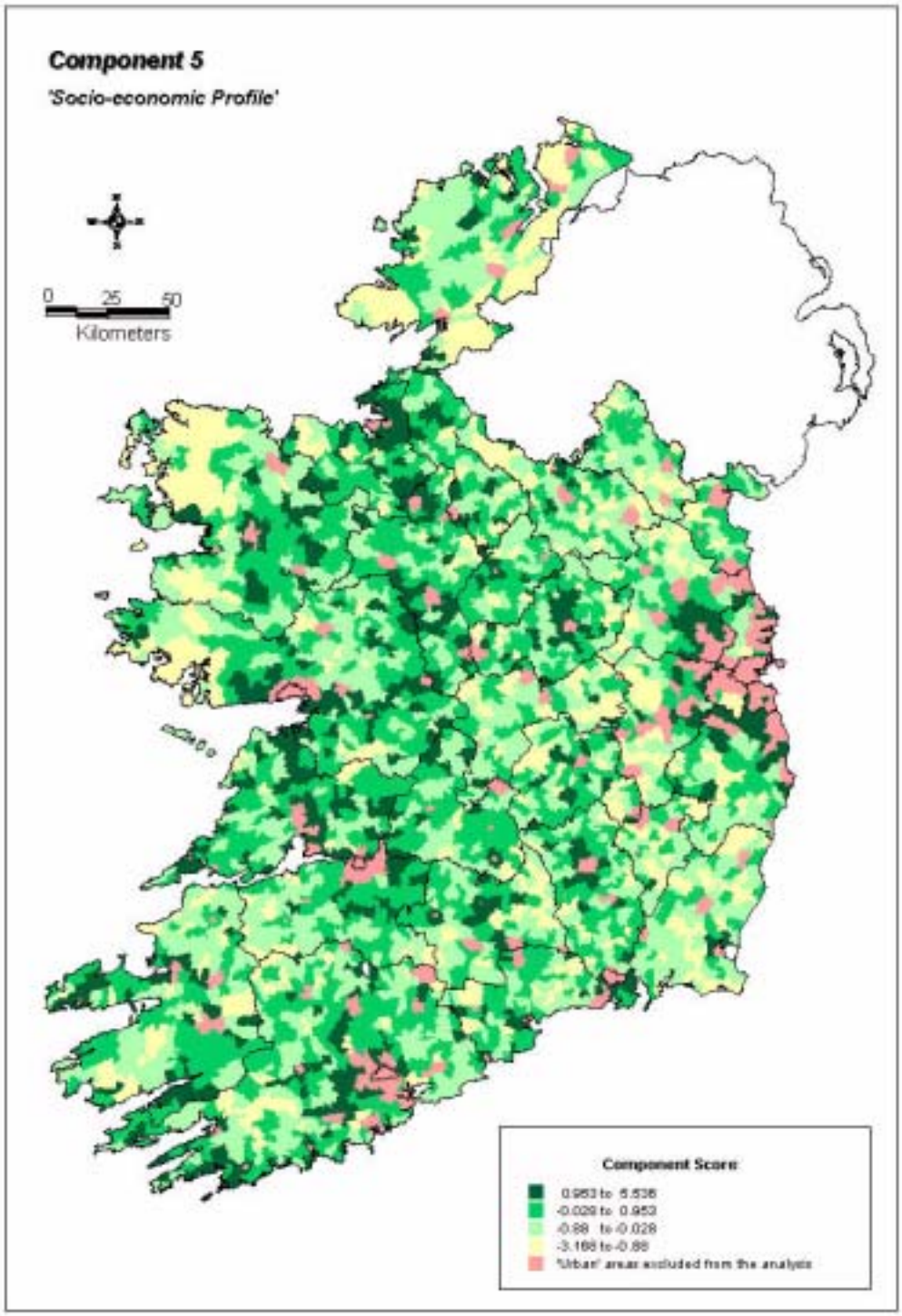
MAP 2.3


Component 3
'Demographic Viability'
0
25
50
Kilometers
Component Score
0.79 to 4.729
-0.089 to 0.79
-1.005 to -0.089
-6.118 to -1.005
'Urban' areas excluded from the analysis

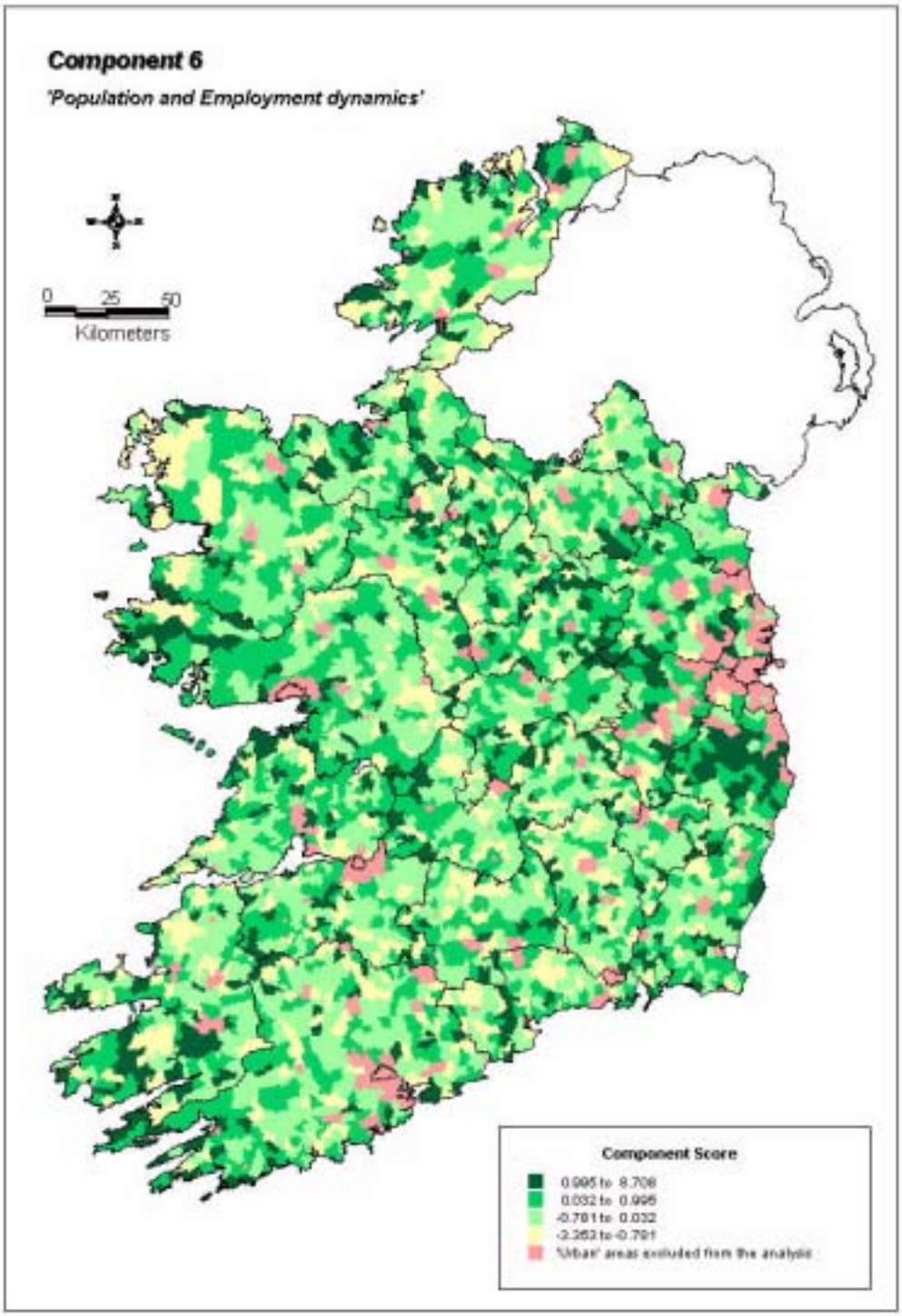
MAP 2.4


Component 4
'Strength of Agricultural Sector'
0
25
50
Kilometers
Component Score
0.706 to 3.285
-0.1 to 0.706
-1.059 to -0.1
-4.577 to -1.059
'Urban' areas excluded from the analysis

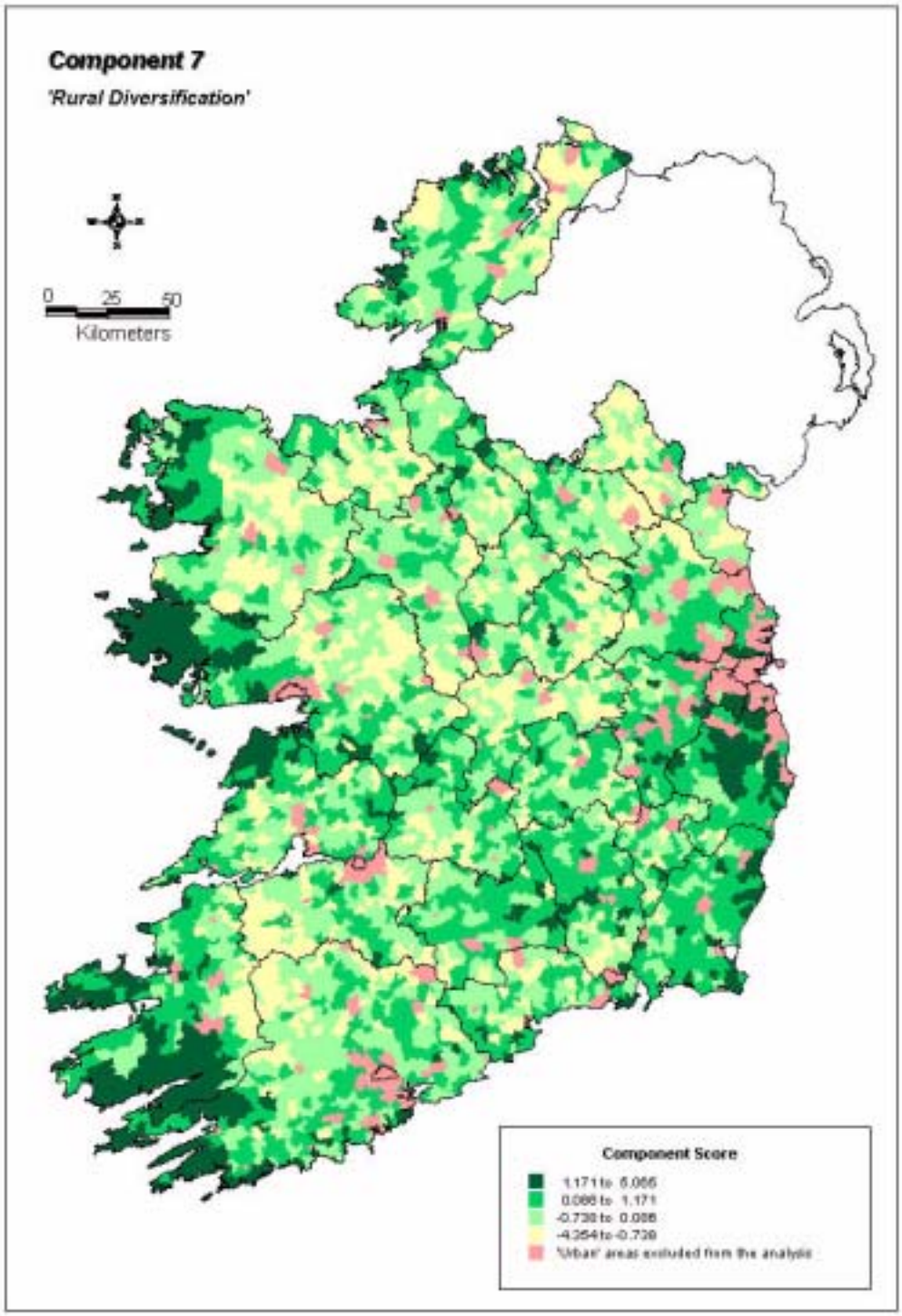
MAP 2.5


Component 5
'Socio-economic Profile'
0
25
50
Kilometers
Component Score
0.953 to 5.536
-0.029 to 0.953
-0.88 to -0.029
-3.166 to -0.88
'Urban' areas excluded from the analysis

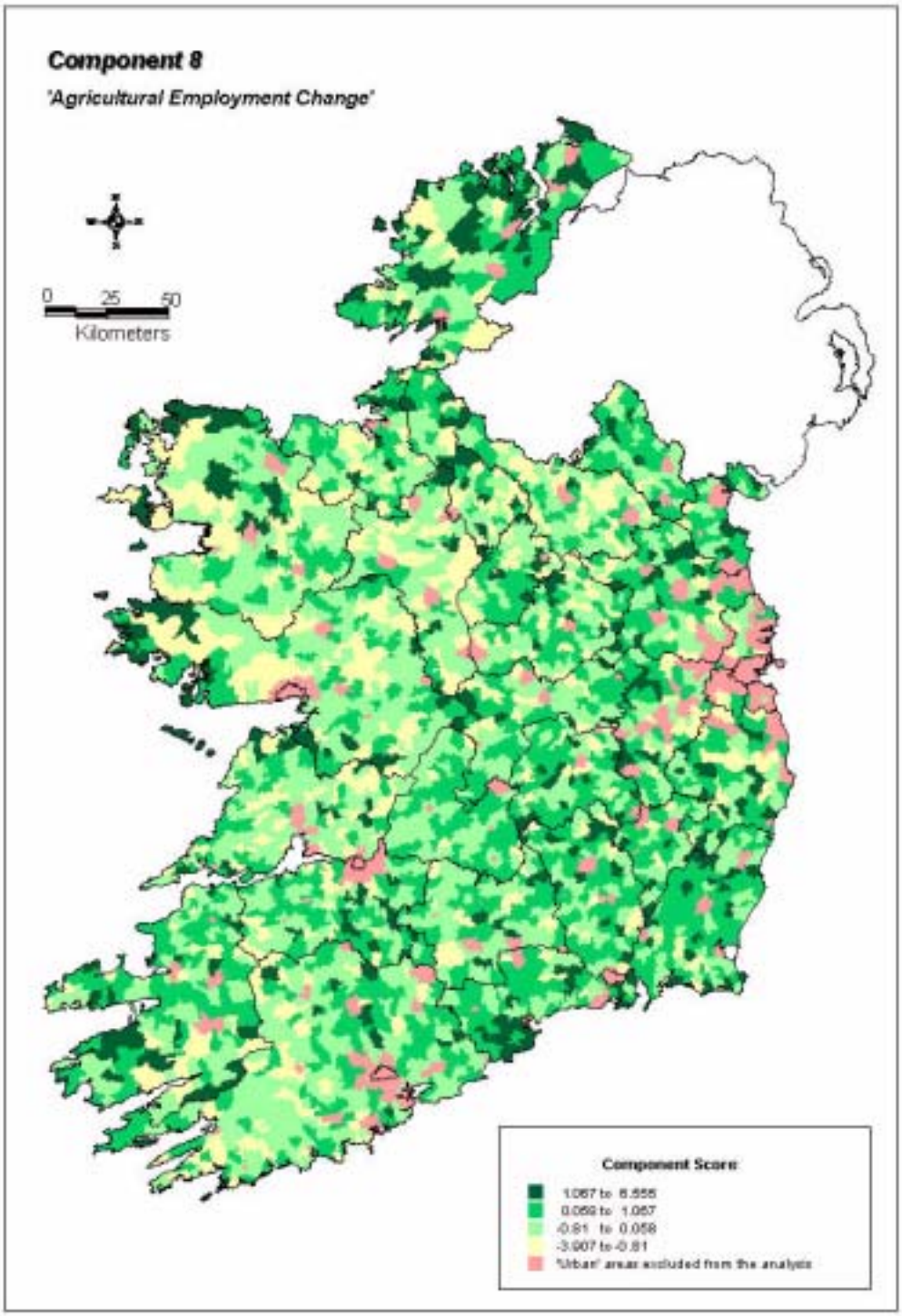
MAP 2.6


Component 6
'Population and Employment dynamics'
0
25
50
Kilometers
Component Score
0.995 to 8.708
0.032 to 0.995
-0.781 to 0.032
-2.563 to -0.781
'Urban' areas excluded from the analysis

MAP 2.7


Component 7
'Rural Diversification'
0
25
50
Kilometers
Component Score
1.171 to 5.065
0.086 to 1.171
-0.739 to 0.086
-4.264 to -0.739
'Urban' areas excluded from the analysis

MAP 2.8


Component 8
'Agricultural Employment Change'
0
25
50
Kilometers
Component Score
1.067 to 6.555
0.059 to 1.067
-0.81 to 0.059
-3.907 to -0.81
'Urban' areas excluded from the analysis

2.5 A Rural Area Typology

2.5.1 Overview

This Section presents the results of the final stage in our analysis, namely to develop an overall rural typology, a core purpose of this report. Stage 2 of our analysis, as discussed in the previous section, "scored" or examined each rural DED's performance across the eight components in our data set. To develop an overall typology of rural areas we need to categorise each DED into an "Area Type" that reflects its performance across each of these eight components. The following sections outline our typology of rural Ireland.

2.5.2 Classification of Area Types

In Section 2.4 we "scored" each rural DED according to its performance on each of the eight components in our data set. The next task is to categorise DEDs into groups or "Area Types" according to how they perform on each of the eight components. We use a technique called Cluster Analysis to categorise DEDs into Area Types, the DEDs in each Area Type are those that are most similar to each other on the basis of their performance across each of the eight components.

Our analysis identifies six distinct rural Area Types. Table 2.3 shows the population and number of DEDs in each Area Type (urban DEDs constitute an additional category of Area Types 7).

Table 2.3: Population and Number of DEDs in each Area Type

Area Type	No. of DEDs	% of all DEDs	Population	% Total Population
1. Peri-urban areas	443	12.9	408,876	11.3
2. Very strong areas	628	18.3	375,493	10.4
3. Strong agricultural areas adjusting to restrictions on agricultural output	612	17.9	204,039	5.6
4. Structurally weak areas	644	18.8	239,535	6.6
5. Marginal areas	201	5.9	107,026	3.0
6. Highly diversified areas	188	5.5	91,378	2.5
7. Urban DEDs	705	20.6	2,199,740	60.7
Total	3421	100.0	3,626,087	100

Having identified distinct Area Types the next task is to describe the typical socio-economic features of each Area Type. Table 2.4 illustrates how each Area Type relates to each of the eight components discussed in Section 2.4.

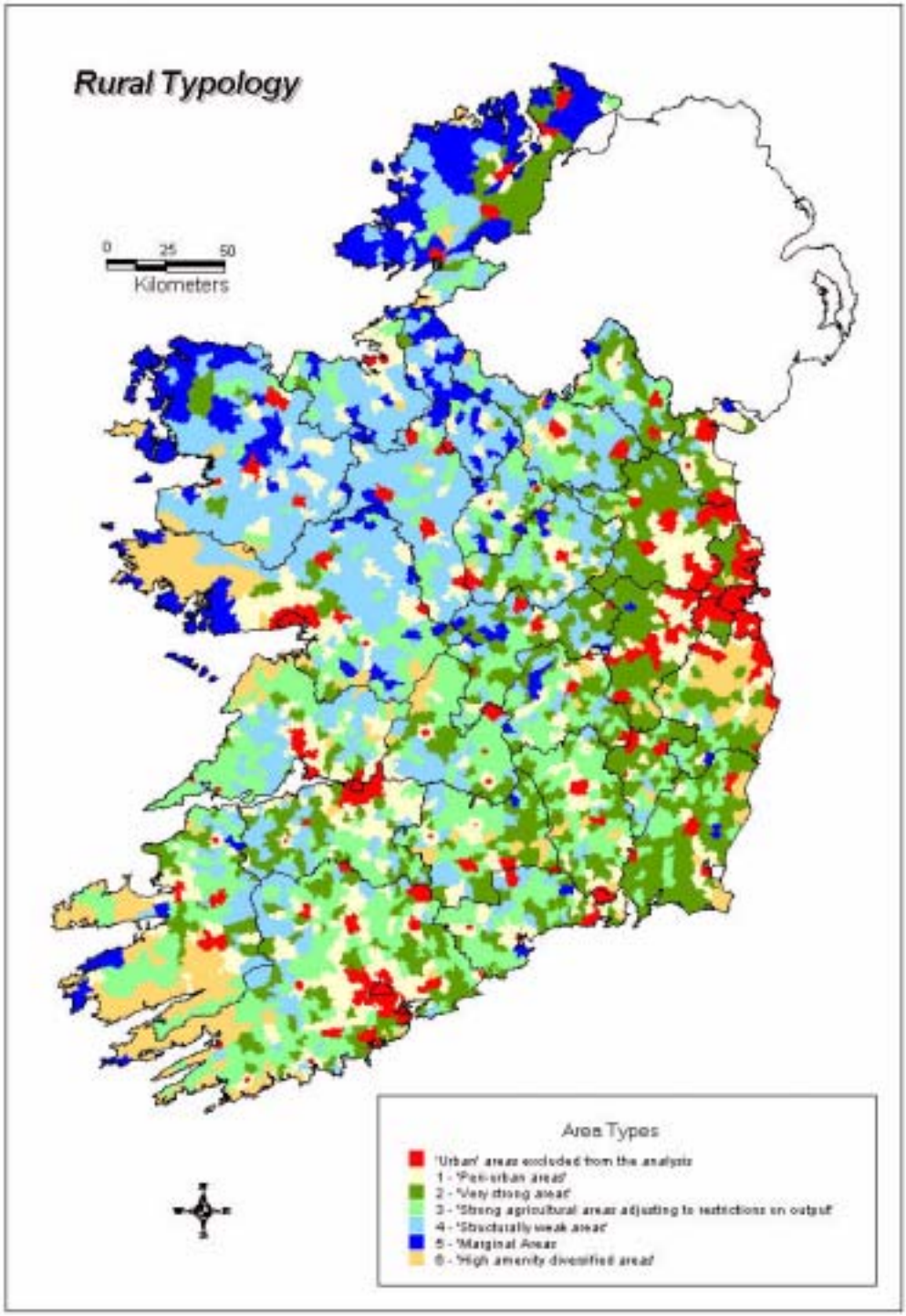
Table 2.4: Socio-economic Characteristics (Component Scores) of Area Types

Rural Area Type	Component							
	1.	2.	3.	4.	5.	6.	7.	8.
1. Peri-urban areas	0.96	0.14	0.18	0.11	1.14	-0.17	-0.05	-0.01
2. Very strong areas	0.40	0.17	0.45	0.52	-0.67	0.36	-0.08	0.28
3. Strong agricultural areas adjusting to restrictions on agricultural output	-0.85	-0.3	0.05	0.53	0.11	-0.63	0.23	0.13
4. Structurally weak areas	-0.29	0.11	-0.42	-0.47	-0.145	0.10	-0.72	-0.71
5. Marginal areas	0.14	-0.53	0.17	-1.72	-0.34	-0.14	0.12	1.32
6. Highly diversified areas	0.02	0.27	-0.82	-0.26	0.02	1.04	1.99	-0.31

The figures in the table represent the "typical" features of each Area Type. For example, Area Type 1 peri-urban areas scores strongly relative to other Area Types on Component 1 Non-agricultural Employment and on Component 5 Socio-economic profile, and scores relatively weakly on Component 8 Agricultural Employment. In short what matters is the relative absolute value of an Area's score on each component and the "sign" of the score, eg a relatively high positive score for an Area on a component indicates strong presence of this component in that Area.

Map 2.9 presents our rural typology and the following sections describe each Area Type in detail.

MAP 2.9


Rural Typology
0
25
50
Kilometers
Area Types
'Urban' areas excluded from the analysis
1 - 'Peri-urban areas'
2 - 'Very strong areas'
3 - 'Strong agricultural areas adjusting to restrictions on output'
4 - 'Structurally weak areas'
5 - 'Marginal Areas'
6 - 'High amenity diversified areas'

2.5.3 Area Type 1: Peri-urban Areas

The districts that constitute Area Type 1 have relatively high average scores on Component 1 (dominance of non-agricultural employment), Component 5 (socio-economic profile) and Component 3 (demographic viability). These are DEDs characterised by high population densities, an advanced level of transition to a higher socio-economic profile (higher proportions with advanced levels of education, larger shares of the workforce in professional services and commerce functions) and low reliance on agricultural employment. This area type has an average population density of just over 40 persons per sq. km. and contains 11.3% of the total population.

As Map 2.9 illustrates, Area Type 1 DEDs are generally found in close proximity to urban centres and are particularly evident around the larger towns and the cities. Indeed the distribution of the DEDs that make up this Area Type provide a good indication of the extent of the urban fields surrounding the larger centres. They may be described as the "peri-urban areas". It is noticeable that there are isolated districts belonging to this Area Type in what are otherwise very rural areas (eg., parts of east Galway and east Mayo), signifying the importance of small centres such as villages in these rural areas.

2.5.4 Area Types 2 and 3: Very Strong and Strong Agricultural Areas

These two Area Types may be considered together since they broadly represent those parts of the country where agriculture is relatively strong. Table 2.4 shows that both have similarly high average scores on Component 4 (strength of agricultural sector). Not surprising too is the fact that, in terms of their respective component profiles, they are closer to each other than to the other Area Types (see Table A.7 in the Annex).

The main differences between Area Type 2 and Area Type 3 are that the transition to non-agricultural activities is less advanced in Area Type 3 with smaller shares of the workforce employed in manufacturing (13.9% compared to 21.7% in Area Type 2) and it has below average scores on the labour force participation rate component. Also there has been a very low level of increase in employment (0.6%) and the demographic structure exhibits a greater tendency towards ageing, with higher net out-migration which has contributed a decline in population of 2.7% between 1991-96.

Map 2.9 shows that Area Type 2 is very prominent throughout the rural parts of the Mid-East and much of the Southeast. As well as possessing a strong agricultural base (characterised by large farms, high levels of economic return and greater employment stability), DEDs that constitute this Area Type also exhibit an above average level of transition to non-agricultural employment. This is evidenced by their high relative scores on Components 1 and 2 - dominance of non-agricultural employment and labour force participation (see Table 2.4). The rate of population increase in Area Type 2 is higher than in the peri-urban areas and is reflected in a more youthful population (Table A.6) The rate of increase in the number of persons at work is significantly larger than in the peri-urban areas (15.5% compared to 12.7%). This suggests that some parts of this Area Type are possibly experiencing the demographic and labour force effects associated with the increase in long distance commuting.

Area Type 3, however, differs markedly from Area Type 1 (peri-urban areas) in one important respect reflected in the average score for the Area Type on Component 5 (socio-economic profile). The relatively low average score on this Component suggests that there are higher percentages of the population with relatively low levels of education, lower female participation rates, higher levels of employment in manufacturing and/or higher levels of unemployment. The significance of these attributes is confirmed by the data in Table A.6 in the Annex. Taking account of the location of the districts in this category (northwest Kildare - east Offaly peatlands, south Kildare - north Carlow, north Meath - central Louth, much of Wexford) suggests that this Area Type consists of districts where previously there was a strong rural industrial base linked to natural resources, but it has been in decline since the 1970s. The relatively lower education levels could be associated with above average concentrations of unskilled and semi-skilled manual workers, the strength of agriculture and the predominantly male-oriented industrial tradition.

Thus, Area Type 2 which contains about 10% of the population, represents a complex zone prominent in east Leinster, where the agriculture based rural economy remains strong but the socio-economic profile is not as strong as that of Area Type 1. This Area Type may be described as “very strong areas”.

Area Type 3, consisting of DEDs throughout much of Leinster and Munster, contains 5.6% of the total population distributed at a density of under 15 persons per sq. km., the lowest for all of the area types. It is very highly dependent on agriculture with almost 40% of the total at work in that sector. In this area the agriculture production structure consists of large farms with a strong orientation towards dairying and a relatively large number of younger farmers.

In summary, Area Type 3 represents those strong agricultural areas which were relatively stable until the early 1990s, but have been slower to make the transition to non-agricultural activities. In summary, it represents "strong agriculture areas adjusting to restrictions on agriculture output".

2.5.5 Area Types 4 and 5: Structurally Weak and Marginal Areas

These two Area Types represent the rural areas that are economically and demographically most disadvantaged. Area Type 4, consisting of "structurally weak areas", is the most extensive Area Type consisting of almost one quarter of the rural territory and containing one-sixth of the rural population. It is concentrated mostly in the northwest but also extends into parts of the north Midlands and inland parts of the Southwest and Midwest (see Map 2.9).

The defining attributes of Area Type 4 are a strong reliance on a very weak farm structure (older farmers on small farms producing very low levels of output, high level of decline in number of farmers, though they still account for over 31% of the workforce), low levels of employment in manufacturing or services and a below average level of self-employment outside agriculture. These economic attributes have contributed to a very weak demographic profile based on an ageing population with relatively fewer households with young children. Area Type 4 also differs from the other rural areas types by having the lowest proportion of its workforce self-employed outside agriculture and the lowest incidence of females in part-time work. The eastern edge of the distribution of districts in this group tends to merge with the western edges of Area Types 2 and 3 in the north midlands, giving rise to what may be described as a transition corridor throughout parts of Westmeath, Longford, east Cavan and south Monaghan.

Area Type 5 consists of very "marginal areas" located mainly in peripheral parts of the northwest and west. Here the agriculture structures are weakest, and labour force participation rates are also among the lowest (perhaps reflecting the age profile, and greater proportions of adults classified as either retired or in home duties). More significantly, perhaps are the low employment rates and conversely the highest unemployment levels for all of the Area Types. However, the position in regard to overall demographic viability is more favourable than in Area type Four districts, which may in part be associated with a relatively high incidence of part-time occupations linked to fishing and rural diversification.

2.5.6 Area Type 6: Highly Diversified Areas

This Area Type, comprising only 9% of the rural territory and containing just over 91,000 persons (6.4% of the rural population), is defined by attributes that markedly distinguish it from the other rural area types. The locations of the constituent districts provide a strong clue as to its character. It consists mostly of districts in the scenic high amenity landscapes of the southwest, Connemara, the Burren, the Wicklow uplands, coastal resorts in the southeast and some inland lakeshore areas such as around Lough Derg on the Shannon.

These areas tend to have higher levels of self-employment outside agriculture (22.4% of the workforce) and higher levels of part-time work especially for women, though the share of employment in manufacturing is very small (only 11% of the workforce in contrast to approximately 20% in most other areas). The demographic structure is typical of areas experiencing some net in-migration of persons aged over 25. This trend has resulted in this Area Type experiencing the highest rate of population growth among all of the Area types including the urban areas. The total population grew by almost twice the rate for the whole country. While in absolute terms the total gain for districts in this Area Type was only 4,643 persons, it can be contrasted with the declines of 5,753 in Area Type 3 and 4,608 in Area Type 4.

Another distinctive attribute of this rural population is a disproportionately high share with postgraduate level qualifications - over twice the average for Area Types 2,3,4 and 5. These characteristics are suggestive of a very high amenity areas where there is a considerable amount of diversification underway. While it may be reasonable to assume that for the majority the occupational profiles that have been identified refer to activities that take place within the area there may be instances in the Wicklow uplands where the attributes arise from choice of residential location.

In summary, this Area Type consists of “highly diversified areas”.

2.5.7 Rural Typology and Gaeltacht Areas

The final map in this Chapter, Map 2.10, repeats the overall rural typology map (Map 2.9), but this time with the boundaries of the Gaeltacht Area DEDs marked. Because of the DED basis of the analysis, the maps show all DEDs with Gaeltacht areas within them, but also some non-Gaeltacht areas where these cut across DEDs.

It will be recalled that the Terms of Reference requested that the study allude specifically to the Gaeltacht. The map shows that in terms of the study typology most Gaeltacht areas are rural, as would be expected. However, it shows that these areas include a high degree of diversity within the rural typology. Of the main Gaeltacht areas:

- Meath Gaeltacht fits mostly into Area Type 2 very strong areas;
- Waterford and Cork Gaeltachts are a combination of Area Type 2 very strong areas, Area Type 3 strong agricultural areas and Area Type 4 structurally weak areas;
- Kerry Gaeltacht involves a mixture of Area Type 3 strong agricultural areas, Area Type 5 marginal areas and Area Type 6 highly diversified areas;
- Galway Gaeltacht constitutes a combination of Area Type 4 and 5 structurally weak and marginal areas, and Area Type 6 highly diversified areas (a small number of areas are also urban or peri-urban);
- Donegal and Mayo Gaeltachts fit mostly within Area Type 4 and 5 weak and marginal areas.

2.5.8 The Role of Urban Centres and Transport Routes

The relative importance of small settlements is particularly striking in parts of Area Type 4 where the overall urban structure is weak. It is evident that there is a localised positive impact around those small settlements that are located on or adjacent to the National roads. The spatial impact of small settlements throughout most of Area Type 5 appears to be extremely limited.

In Area Types 2 and 3 the urban impact on the countryside appears to be related to the presence of larger towns which induce socio-economic changes throughout both the countryside and the smaller centres. The smaller centres and the rural areas that are located along the National routes appear to benefit from increased accessibility. This is reflected in the corridor of Area Type 1 and to a lesser extent Area Type 2 along the N7 almost to Roscrea, along the N20 from Cork city to Mallow, along the N18 from Limerick to Ennis and also along the N4 from Tubercurry to Sligo.

2.6 Conclusions

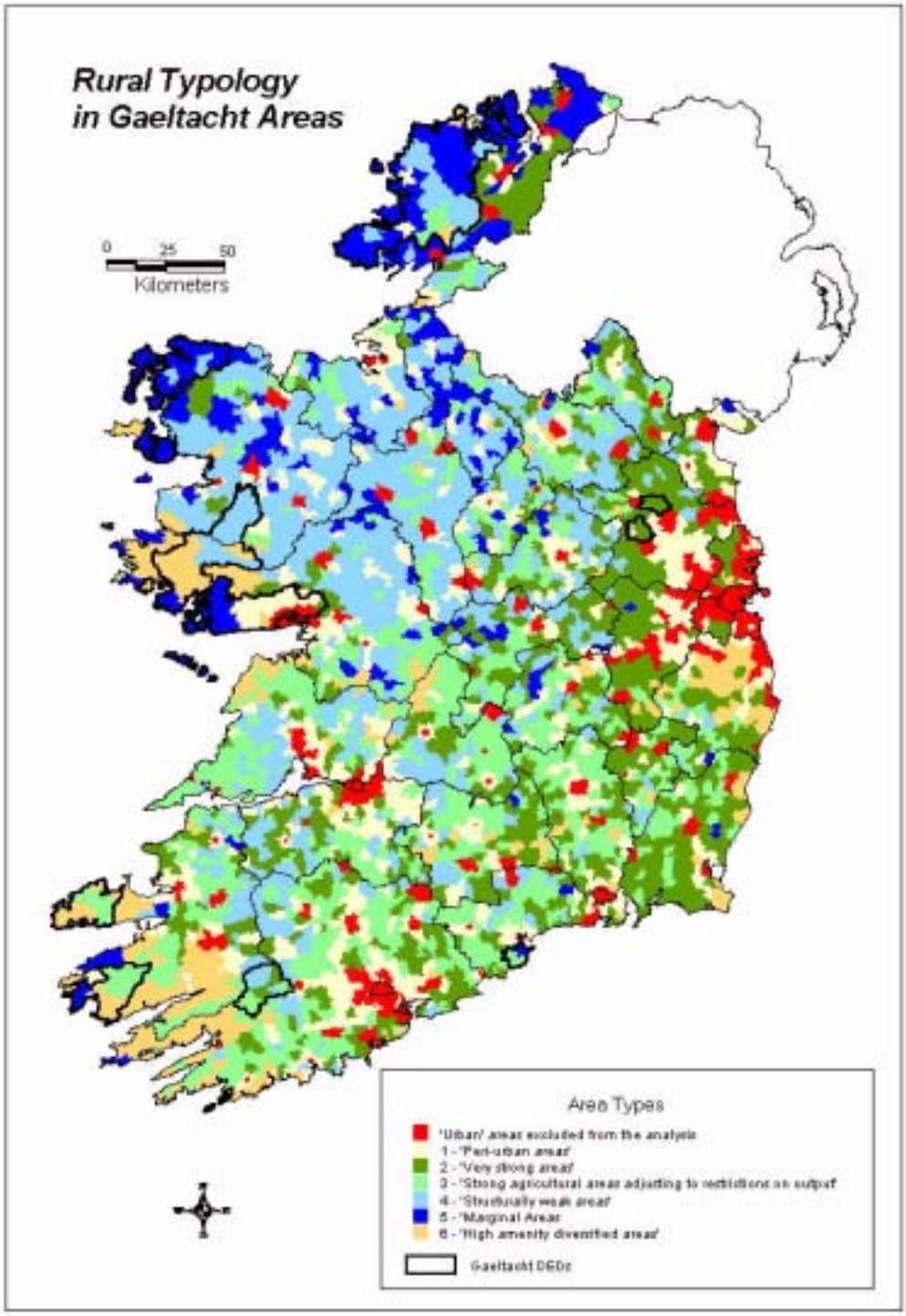
Our analysis revealed the existence of eight distinct components/dimensions of variation in the socio-economic profile of rural Ireland. Categorising rural DEDs according to their performance on these eight components we developed a rural typology with six rural Area Types, plus a separate Area Type containing all of the urban DEDs. There are some differences that merit attention between this typology and those produced by others.

The studies by Cawley (1983) and Haase (1995) have used a multivariate approach to identify one dimension of rural variation, namely rural disadvantage. They have identified the distinctions between weak and strong rural areas but essentially only along one axis of differentiation. By contrast, Horner (1993) adopted an approach based on lifestyle characteristics which lead to the identification of six major regions, some of which consisted of several sub-regions. A broad distinction, based on data for the late 1970s and early 1980s, was drawn between strongly urbanised areas and rural and small town Ireland. The boundary lines suggested between the rural regions were more strongly influenced by underlying contrasts in agriculture production than is the case here. The micro level data upon which this typology is based allows for a clearer identification of the extent of urban influences. It has also identified some major structural weaknesses in areas that were previously regarded as part of strong rural Ireland. It has also permitted greater elucidation of the rural areas where tourism, recreational activities and the presence of high amenities have lead to net in-migration are very significant growth in population and employment.

The analysis upon which the typology developed here is based confirms that the socio-economic profile of rural Ireland is multidimensional. The final typology map (Map 2.9) is the outcome of a combining the distributions of the scores on each of the dimensions/components. As such each Area Type represents a particular combination of component scores with the distinctions between Areas reflecting differences in the relative importance of the components. It follows that there is some diversity between DEDs in the same Area Type. A second feature of the typology map is that the Area type boundaries do not conveniently follow administrative boundaries. The spatial framework presented here should, therefore, be used to guide the articulation of the spatial dimension of county and regional strategies as well as national development plans.

The typology presented here is of course not without limitations. It is entirely based on a selection of variables compiled from the Small Area Statistics published by the Central Statistics Office. While this dataset has introduced a level of spatial detail that has never been analysed comprehensively before it is limited in its coverage (eg., no direct data on enterprises, no data on environmental variables, etc) and most importantly the data relate to 1996 and change over the period 1991-1996. There will clearly be a need to update this analysis as soon as possible using the results of the 2001 Census of Population. The next analysis will have the opportunity to also include data for Northern Ireland from its 2001 Census, this was not possible for this analysis as comparable data was not available.

MAP 2.10


Rural Typology
in Gaeltacht Areas
0
25
50
Kilometers
Area Types
'Urban' areas excluded from the analysis
1 - 'Peri-urban areas'
2 - 'Very strong areas'
3 - 'Strong agricultural areas adjusting to restrictions on output'
4 - 'Structurally weak areas'
5 - 'Marginal Areas'
6 - 'High amenity diversified areas'
Gaeltacht DEDs

3 Outlook for Rural Areas

3.1 Introduction

The purpose of this Chapter is to:

- establish the labour-force position of rural areas, based on the continuation of current trends for the years 2010, 2015 and 2020;
- identify the impact of continued reform of the CAP on the rural area identified above;
- quantify in general terms the amount of off-farm employment required.

3.2 Projections of Workforce for Rural Areas

3.2.1 The Model

Labour force projections have been undertaken for the six rural area types as developed in Chapter 2, ie

Rural Area Type	Description of Area
1.	Peri-urban
2.	Very strong
3.	Strong adjusting
4.	Structurally weak
5.	Marginal
6.	Highly Diversified

Baseline populations and workforces were specified for 1996. Projections have been made to the year 2021, in five year cycles, with results for 2000, 2010, 2015 and 2020 obtained by interpolation.

The model that has been used for these projections is a modified version of the regional projection model that has been developed by Jonathan Blackwell and Associates as part of the National Spatial Strategy.

Results from the runs reported on here are consistent with the national totals from the baseline projections at national regional and level, ie the rural and urban totals when added equal the national totals derived from regional projections[5].

5. There are small differences in some results, for technical reasons.

3.2.2 Assumptions

Full details of assumptions used in the model as originally developed are contained in the NSS demographic report. Some key assumptions with regard to this variant are as follows:

Mortality:

This is assumed uniform throughout the State and follows the projected path set out in the 1999 CSO Projections.

Fertility:

Fertility is not area-differentiated as, with the exception of Dublin, no information is available on the differentials between the Area Types specified in the projection process. At national level fertility follows the CSO F1 assumption (TFR at 2.0 from 2001 onwards).

Migration:

Internal migration is set to zero and all movement between rural typology areas is subsumed into shifting shares of external migration. Since no information is available on inter-area movement, this does not represent a loss of accuracy in the projection process.

Total international emigration and immigration are set to the CSO M1 assumption.

The share of out-migration assigned to each Area Type is assumed to be proportional to the population aged 15 to 40 (the age groups at risk from movement)

One set of projections (Projection (i)) uses natural increase of the population and migration is therefore set to zero.

In the remaining three, in-migration is adjusted to provide three sets of results:

a. the absolute population level in each Area Type remains constant;
b. the share of State population in each Area Type remains constant;
c. the growth rate of the population in the Area Type between 1991 and 1996 is continued.

The balance of population growth necessary to satisfy the national growth constraint is assigned to urban areas outside Dublin in each case.

Participation Rates:

Participation rates are now poorly related to marital status. For this reason, the CSO methodology of projecting participation rates was not followed. Instead, the ESRI target rates for males and females by five year age cohorts for 2011 were assumed to apply in 2010, and a steady movement towards these rates was assumed, from a base in 2000, using participation rates available at State level from the QNHS for this date. ESRI participation rates are based on implicit assumptions regarding educational participation rates.

Beyond 2011, we have continued the upward growth in certain rates, capping others where appropriate.

Results are set out in Table 3.1.

Table 3.1: Total Projected Labour Force

1. Natural Increase (Projection (i))				
Area1	**2000**	**2010**	**2015**	**2020**
1	185,533	210,650	212,256	211,152
2	171,506	196,062	198,883	198,658
3	88,127	100,738	101,991	101,013
4	107,935	120,246	120,592	119,338
5	45,130	51,679	52,174	51,883
6	41,062	44,935	45,102	44,785
Total	639,292	724,310	730,998	726,829

2. Static population (Projection (ii))				
Area1	**2000**	**2010**	**2015**	**2020**
1	180,654	191,718	187,270	180,292
2	165,852	174,998	171,407	164,977
3	86,699	94,601	93,711	90,721
4	106,537	114,078	112,190	108,787
5	44,276	48,223	47,570	46,176
6	40,591	42,673	41,959	40,820
Total	624,609	666,291	654,108	631,773

3. Static Shares (Projection (iii))				
Area1	**2000**	**2010**	**2015**	**2020**
1	191,994	229,254	234,434	236,886
2	176,393	209,404	214,464	216,484
3	92,294	113,207	117,006	118,501
4	113,336	136,318	140,034	142,096
5	47,231	57,884	59,652	60,623
6	42,795	50,234	51,503	52,242
Total	664,043	796,301	817,093	826,832

4. 1991-1996 growth rate of population (Projection (iv))				
Area1[a]	2000	2010	2015	2020

Table 3.1: Total Projected Labour Force *(continued)*

1	185,270	204,763	201,597	197,049
2	170,213	188,460	187,058	183,853
3	84,727	87,373	82,542	75,492
4	105,268	108,282	102,462	95,036
5	44,765	48,275	46,181	43,332
6	48,173	45,773	39,144	32,123
Total	638,417	682,926	658,984	626,886

a. See Section 3.2.1 for description of rural area types.

3.3 Agricultural Labour Force Projections

3.3.1 Recent Trends

Data on employment in agriculture, forestry and fishing (principal economic status) relative to all other work, shows that the proportion in agriculture has fallen from 19% of the total at work in 1980 to 8.5% in 1999. Total decline over the period was about 38%, equivalent to an annual average rate of 1.7%.

Table 3.2: Total at Work

	Agriculture		%	Total
	('000)	%	('000)	('000)
1980	219	18.9	947	1,156
1981	196	17.1	950	1,146
1982	193	16.8	953	1,146
1983	189	16.8	935	1,124
1984	181	16.4	922	1,103
1985	171	15.8	908	1,079
1986	168	15.5	912	1,081
1987	164	15.1	926	1,090
1988	165	15.2	925	1,090
1989	162	15.0	925	1,088
1990	169	14.8	964	1,134
1991	155	13.7	979	1,134
1992	154	13.4	991	1,145
1993	144	12.5	1,008	1,152
1994	142	12.0	1,046	1,188
1995	143	11.4	1,105	1,248
1996	138	10.6	1,159	1,297
1997	134	10.0	1,204	1,338
1998	135	9.0	1,360	1,495
1999	135	8.5	1,456	1,591

Sources: Labour Force Survey, and Quarterly National Household Survey, CSO

3.3.2 Pull and Push Factors

In general two sets of factors impact on the agricultural labour force; so-called "pull" and "push" factors. The pull factors include availability of job opportunities in the non-farm sector while push factors derive from changes in relative incomes in farming and in capital/labour cost ratios.

The relationship between the strength of these pull and push factors and the pace of change in the size of the agricultural workforce is not at all clear. Nor do strong pull and push factors often coincide. On the 'push' side, the trend in agricultural incomes relative to incomes available in other sectors is probably the principal determinant of change in the farm labour force. The rate of decline of the farm labour force slowed down during the years 1975-1978, but it gathered speed again in 1980 and 1981 when farm incomes fell sharply. The pattern was more erratic for the remainder of the 1980s. Except for 1985, when both farm incomes and employment fell markedly, the 1980s saw a smaller rate of employment contraction than the two preceding decades. In the early nineties, the decline in the farm labour force was large, as was the decline in farm incomes. However, in the mid to late 1990s there were conflicting trends in the relativity between farm incomes and farm employment.

The effects of the pull factor are even more difficult to discern. In the late 1980s, job opportunities outside farming became progressively scarcer both on domestic and foreign labour markets. However, even when new jobs outside agriculture are relatively abundant, they may be inconveniently located for the farming community. In addition, with a rapidly rising labour force, competition for available jobs grow increasingly stiff. It is probable that at that time the persistent weakness of the labour market was forcing some family farm members to remain on farms longer than they would wish. Future trends in farm employment may thus be dictated as much by employment prospects outside agriculture as by the effects of income factors 'pushing' people off the land.

The critical decision to enter the agricultural labour force is made in the 15-19 and 20-24 age groups when the income situation, income prospects and availability of alternative employment would be the dominant influences. The movement into or out of farming reduces as one ascends the age ladder. While some changes can occur at the upper end of the age spectrum, as in the 1971-1981 decade, it is likely that most of the changes in the rate of decline in the farm labour force over the next decade will occur because of developments in the rate of entry. It is probable that participation rates in post-primary education have now stabilised. As a result, the crucial determinant of the rate of entry into farming will hinge on the perceived attractions of farming as a career. Since labour mobility through the sector lessens with age, the evolution of the farm labour force in the future will be particularly sensitive to changes in the rate of entry to the sector.

3.3.3 Outlook

On the evidence of past trends and with realistic expectations of the future, it is likely that the numbers at work in agriculture will decline by some 15-20% by the year 2010 as compared with 1999. In 1999, the Labour Force Survey showed that those listing agriculture as their principal occupation numbered 135,000. A reduction in the range projected would see the farm labour force contract to between 108,000 and 115,000 by the year 2010. However, the agricultural workforce could fall even more sharply if the economy continues to boom and prospects in the farm sector remain discouraging.

The crucial influencing factors affecting employment in agriculture are largely exogenous to the sector and they are largely negative in character. First, to the extent that farm income levels are a determinant of employment levels in agriculture, the prospects are poor. Incomes in farming in general continue to lag behind incomes in other sectors as shown above and the position may get even worse in the short-term. The state of expectations with respect to longer-term trends in farming also plays a part in influencing the decisions of potential entrants to the sector. Where such expectations are anything but optimistic in terms of relative incomes, then it can hardly fill such people with any enthusiasm for farming.

Second, to the extent that aggregate economic growth bounds ahead, many if not most among the younger age groups will be seeking jobs off the land. Higher participation rates in third level education have widened the career choices available to young people from farming backgrounds. Furthermore, the increasing availability of jobs outside agriculture and the buoyant state of the economy are offering increased opportunities for young people outside farming.

Third, a pro-active early retirement strategy would work to increase per capita incomes in farming, but would tend to depress, rather than increase, agricultural employment.

Meanwhile, in the years ahead, part-time farming will continue to increase. The decision to engage in part-time farming is normally taken early. It usually emerges as younger members of farm households progress to jobs off the farm while later gradually assuming managerial responsibility for their farm holdings. It occurs less frequently where older full-time farmers switch to an off-farm occupation.

While employment in agriculture will contract, we will not witness a mass exodus from farming. The fall in the size of the agricultural workforce from year to year is not caused primarily – or even significantly – by farmers actually leaving to take up positions elsewhere. Instead, the decline in the farm labour force is due principally to the combined forces of retirement and a reduced rate of entry, and the reduction in the farm labour force will inevitably continue to be modulated by the ebbs and flows in the relative fortunes of the farming and non-agricultural economies. Perhaps it is the perception that all the "buzz" is in the rest of the economy, with rising employment and steadily increasing incomes, while the agricultural sector itself is highly regulated with restricted expansion opportunities and relatively low incomes, that is primarily responsible for the distinct lack of optimism in the sector at present.

3.4 Projections of Agricultural Employment

Table 2.3 in Chapter 2 shows the number of people living in each Area Type and based on the percentages at work in agriculture in 1996 as outlined in Table 2.6, the following were the estimated numbers working in agriculture in that year by rural Area Type:

Area Type:	1	2	3	4	5	6	Total
No:	21,187	30,228	28,147	27,091	7,322	7,078	121,053

Based on the trend from 1988 to 1996 in the numbers working in agriculture for representative areas for each Area Type the 1996 were updated to 2000 as a basis for projections to 2010, 2015 and 2020. The variation in the annual average percentage decline in the numbers working in agriculture from 1986 to 1996 ranged from 1.25% in Area Types 1 and 2 to 2.6% in Area Type 4.

Two scenarios are presented with respect to the projections for the respective years. Scenario I assumes a continuation of the trends over the past 14 years (1986 – 2000) while Scenario II is based on an increase in the rate of decline of 20% to take account of further reform of the CAP arising from pressures from enlargement of the Union and further liberalisation of world agricultural trade.

Table 3.3: Agricultural Projected Employment

Area Type1[a]	1	2	3	4	5	6	Total
Base 2000	20,107	28,686	26,281	24,246	6,617	6,529	112,466
Scenario I							
2010	17,641	25,168	22,140	18,440	5,137	5,335	93,861
2015	16,524	23,574	20,321	16,082	4,526	4,822	85,849
2020	15,477	22,081	18,651	14,414	3,988	4,359	78,970
Scenario II							
2010	17,182	24,512	21,386	17,442	4,880	5,121	90,523
2015	15,883	22,659	19,282	14,794	4,190	4,535	81,343
2020	14,682	20,946	17,403	12,547	3,598	4,016	73,192

a. See Section 3.2.1 for description

In Scenario I the numbers working in agriculture are projected to fall in the range of just over 23% in Area Type 2 to slightly over 40% for Area Type 4. In Scenario II the corresponding range would be from 27% to just over 48%, respectively. While further reform of the CAP will undoubtedly limit the opportunities for increased growth and income in agriculture, an equally important factor influencing the level of employment in the sector will be the employment opportunities in the non-farm economy (the pull factor). It is likely that these two forces will have a similar and negative influence on the farm labour force.

3.5 Required Non-agricultural Employment

Table 3.4 sets out the required increases in non-agricultural jobs, after making the assumption of 5 per cent unemployment, the remaining agricultural jobs having also been removed from the figures in Table 3.2 – using Scenario I. Table 3.5 provides the same calculations for Scenario II. There is no significant difference in the results obtained.

Table 3.4: Required Growth in the Non-agricultural Employment – Scenario I

(i) Natural Increase								
Rural Area:	2000	2010	2015	2020	2000-2010	2010-2015	2015-2020	2000-2020
Area Type 1	157,154	183,359	185,945	185,891	26,205	2,586	- 54	28,737
Area Type 2	135,679	162,349	166,544	167,748	26,670	4,195	1,204	32,069
Area Type 3	58,754	74,668	77,586	78,244	15,915	2,918	658	19,490
Area Type 4	79,504	96,715	99,285	99,678	17,211	2,570	393	20,173
Area Type 5	36,588	44,215	45,266	45,500	7,627	1,051	235	8,913
Area Type 6	32,806	37,620	38,266	38,405	4,813	646	139	5,599
Total	500,485	598,926	612,891	615,466	98,441	13,965	2,575	114,981
(ii) Static Population								
Rural Area:	2000	2010	2015	2020	2000-2010	2010-2015	2015-2020	2000-2020
Area Type 1	152,520	165,373	162,209	156,574	12,853	- 3,165	- 5,634	4,054
Area Type 2	130,308	142,338	140,442	135,751	12,031	- 1,897	- 4,691	5,443
Area Type 3	57,397	68,838	69,720	68,466	11,441	882	- 1,254	11,069
Area Type 4	78,176	90,856	91,303	89,655	12,680	447	- 1,648	11,479
Area Type 5	35,776	40,932	40,892	40,079	5,156	- 40	- 813	4,303
Area Type 6	32,359	35,471	35,280	34,638	3,112	- 190	- 642	2,279
Total	486,536	543,809	539,846	525,163	57,273	- 3,963	- 14,683	38,627

Table 3.4: Required Growth in the Non-agricultural Employment – Scenario I *(continued)*

(iii) Static Shares								
Rural Area:	**2000**	**2010**	**2015**	**2020**	**2000-2010**	**2010-2015**	**2015-2020**	**2000-2020**
Area Type 1	163,293	201,033	207,014	210,339	37,740	5,982	3,324	47,046
Area Type 2	140,321	175,024	181,346	184,683	34,702	6,322	3,337	44,361
Area Type 3	62,712	86,514	91,851	94,857	23,802	5,337	3,006	32,145
Area Type 4	84,635	111,984	117,754	121,298	27,349	5,770	3,543	36,662
Area Type 5	38,584	50,109	52,370	53,803	11,526	2,260	1,433	15,219
Area Type 6	34,453	42,654	44,347	45,489	8,201	1,693	1,142	11,036
Total	523,998	667,318	694,682	710,468	143,320	27,364	15,786	186,470

(iv) 1991-1996 Growth Rate of Population								
Rural Area:	**2000**	**2010**	**2015**	**2020**	**2000-2010**	**2010-2015**	**2015-2020**	**2000-2020**
Area Type 1	156,905	177,766	175,820	172,493	20,861	- 1,947	- 3,326	15,588
Area Type 2	134,451	155,127	155,310	153,683	20,676	183	- 1,627	19,232
Area Type 3	55,524	61,971	59,110	53,999	6,447	- 2,862	- 5,111	- 1,525
Area Type 4	76,971	85,350	82,061	76,591	8,379	- 3,289	- 5,469	- 380
Area Type 5	36,240	40,981	39,573	37,377	4,741	- 1,408	- 2,196	1,137
Area Type 6	39,562	38,416	32,606	26,376	- 1,146	- 5,810	- 6,230	- 13,186
Total	499,654	559,611	544,478	520,520	59,958	- 15,133	- 23,958	20,866

Table 3.5: Required Growth in the Non-agricultural Employment Scenario II

(i) Natural Increase								
Rural Area:	**2000**	**2010**	**2015**	**2020**	**2000-2010**	**2010-2015**	**2015-2020**	**2000-2020**
Area Type 1	157,154	183,795	186,554	186,647	26,641	2,759	92	29,492
Area Type 2	135,679	162,972	167,413	168,826	27,294	4,441	1,413	33,147
Area Type 3	58,754	75,385	78,573	79,430	16,631	3,188	856	20,676
Area Type 4	79,504	97,663	100,509	101,451	18,159	2,845	943	21,947
Area Type 5	36,588	44,459	45,585	45,871	7,872	1,126	286	9,283
Area Type 6	32,806	37,823	38,538	38,731	5,017	715	193	5,925
Total	500,485	602,097	617,172	620,955	101,612	15,075	3,783	120,470

(ii) Static Population								
Rural Area:	**2000**	**2010**	**2015**	**2020**	**2000-2010**	**2010-2015**	**2015-2020**	**2000-2020**
Area Type 1	152,520	165,809	162,818	157,330	13,289	- 2,992	- 5,488	4,810
Area Type 2	130,308	142,962	141,311	136,829	12,654	- 1,651	- 4,482	6,521
Area Type 3	57,397	69,555	70,708	69,652	12,157	1,153	- 1,055	12,255
Area Type 4	78,176	91,804	92,526	91,428	13,628	722	- 1,098	13,252
Area Type 5	35,776	41,176	41,211	40,449	5,400	35	- 762	4,673
Area Type 6	32,359	35,674	35,553	34,964	3,315	- 121	- 589	2,605
Total	486,536	546,980	544,126	530,652	60,444	- 2,853	- 13,475	44,116

Table 3.5: Required Growth in the Non-agricultural Employment Scenario II *(continued)*

(iii) Static Shares								
Rural Area	2000	2010	2015	2020	2000-2010	2010-2015	2015-2020	2000-2020
Area Type 1	163,293	201,469	207,623	211,094	38,176	6,155	3,470	47,801
Area Type 2	140,321	175,647	182,215	185,761	35,326	6,568	3,546	45,440
Area Type 3	62,712	87,230	92,838	96,043	24,518	5,608	3,205	33,331
Area Type 4	84,635	112,932	118,978	123,071	28,297	6,046	4,093	38,436
Area Type 5	38,584	50,353	52,689	54,174	11,770	2,335	1,485	15,590
Area Type 6	34,453	42,857	44,619	45,815	8,405	1,762	1,195	11,362
Total	523,998	670,489	698,963	715,958	146,491	28,474	16,995	191,959

(iv) 1991-1996 Growth Rate of Population								
Rural Area	2000	2010	2015	2020	2000-2010	2010-2015	2015-2020	2000-2020
Area Type 1	156,905	178,202	176,428	173,249	21,297	- 1,774	- 3,180	16,344
Area Type 2	134,451	155,750	156,179	154,762	21,299	429	- 1,418	20,311
Area Type 3	55,524	62,688	60,097	55,185	7,163	- 2,591	- 4,912	- 339
Area Type 4	76,971	86,298	83,284	78,365	9,327	- 3,014	- 4,919	1,394
Area Type 5	36,240	41,225	39,892	37,747	4,985	- 1,333	- 2,144	1,507
Area Type 6	39,562	38,619	32,879	26,702	- 943	- 5,741	- 6,177	- 12,861
Total	499,654	562,782	548,759	526,009	63,129	- 14,024	- 22,750	26,355

3.6 Conclusions

The most significant conclusions to arise from Tables 3.4 and 3.5 are:

- the requirement to replace agricultural jobs is most critical in the first decade when growth of the labour force will be strongest (mainly through natural increase and migration rather than participation rates) and the decline of agricultural employment will be the greatest. Requirements are modest thereafter and indeed negative under some scenarios, since the decline in agriculture does not keep pace with the decline in the workforce as a whole;
- if the population of rural areas continue on a similar growth (or decline) path to that experienced in the early 1990s, then the need for additional employment is relatively modest throughout;
- however, if rural areas are to maintain their share of the State population (an unlikely scenario), then requirements are bigger and, predictably, more onerous relatively on the weaker rural areas.

4 Urban-Rural Relationships

4.1 Introduction

This chapter addresses study objectives five and six as outlined in the Terms of Reference, it examines:

- the relationship between the economic performance of rural areas and the proximity of rural areas to a city and also the overall remoteness of rural areas;
- The relationship between the economic performance of small, medium and large rural areas and proximity to a city and overall remoteness from urban areas.

4.2 Methodology

Chapter 2 illustrates that there are spatial patterns in the socio-economic characteristics of rural areas. The aim of this chapter is to systematically establish the extent to which economic performance differs according to the location of rural areas. We view location in a specific way, in terms of proximity to a city, and in a general way, in terms of overall remoteness from urban areas. [6]

We use the compound annual growth rate of employment as a summary indicator of economic performance. Because this indicator measures the employment of people residing in an area (rather than employment located in an area) it should adequately capture improvements in employment performance.[7] For instance, it captures situations where the number of people living in a rural area but working in an urban area increases. It also captures instances where the number of people both living and working in a rural area increases.

Our analysis involves two stages.

Stage 1 Proximity to a City and Rural Performance

A number of policy reports have noted that the pattern of employment growth in Ireland over recent years has tended to be concentrated around the country's main urban centres[8]. This suggests that proximity to a city may have affected the economic performance of rural areas.

6. We use the same definition of a rural area as used in Chapter 2, ie a rural area is any DED that: is not an urban DED as defined by the CSO (ie a DED that can be aggregated to form an urban district or a borough); has a population density of less than 150 people per square kilometre; does not contain a town with a population of 1,500 or over.
7. The Rural Enterprise Report, ie Task No 11 of Stage 2 of the NSS, deals with location of employment activity.
8. See for example NESC's report "Population Distribution and Economic Development" and Forfás' report "Enterprise 2010".

To examine this we divide rural areas into two groups, areas that are "close" (defined as 30 kilometres or less) to a principal city (ie Dublin, Cork, Limerick, Galway and Waterford) and areas that are not[9]. We use statistical tests (independent t-tests) to establish if the average performance of rural areas in the former group is significantly better than that of the latter group. We also test if this relationship holds for small, medium and large rural DEDs.[10]

Stage 2 Remoteness from Urban Areas and Rural Performance

To examine the relationship between economic performance and location Stage 1 used two broad groups, rural areas that are "close" to a city and areas that are not, and used a somewhat arbitrary cut-off point of 30 kilometres to distinguish between these two groups. In Stage 2 we use a more rigorous approach.

We compute a remoteness score, for each of the 2,716 rural areas, which relates each rural area to each urban town with a population of 5,000 or over in 1991. Our remoteness score jointly considers two factors, distance of rural areas from urban areas and the population size of urban areas, to produce a single score for each rural area. [11]

This enables us to test if the economic performance of a rural area is related to the "social or economic mass" of urban areas (as measured by population) and the distance of a rural area from urban areas.

We test if there is a relationship between the economic performance of rural areas and their "remoteness" in general terms. We also allocate rural areas into six broad groups according to their remoteness scores and map rural areas falling into each group. We apply statistical tests (analysis of variance or ANOVA tests) to examine if the average performance of areas in each group is significantly different to each other. Finally, we test if this is also the case for small, medium and large rural areas. Section 4.4 presents our findings.

9. The distance measure used is the straight-line distance from the centre of a rural area to the centre of a city.
10. Rural DEDs were categorised as being small, medium and large based on their population and population density.
11. Remoteness scores were commuted the equation below.

$R_i = \sum_{j=1}^{n} \left(\frac{1}{d_{ij}} * population_j\right)$ where $i = 1,..2,716$ Where $\frac{1}{d_{ij}}$ is the straight-line distance from the centre of rural area i to the centre of urban area j. The scores were calculated with the above formula but we squared the distance, ie $(d_{ij})^2$, thereby giving higher weighting to larger distances.

4.3 Proximity to a City and Rural Performance

4.3.1 Overview

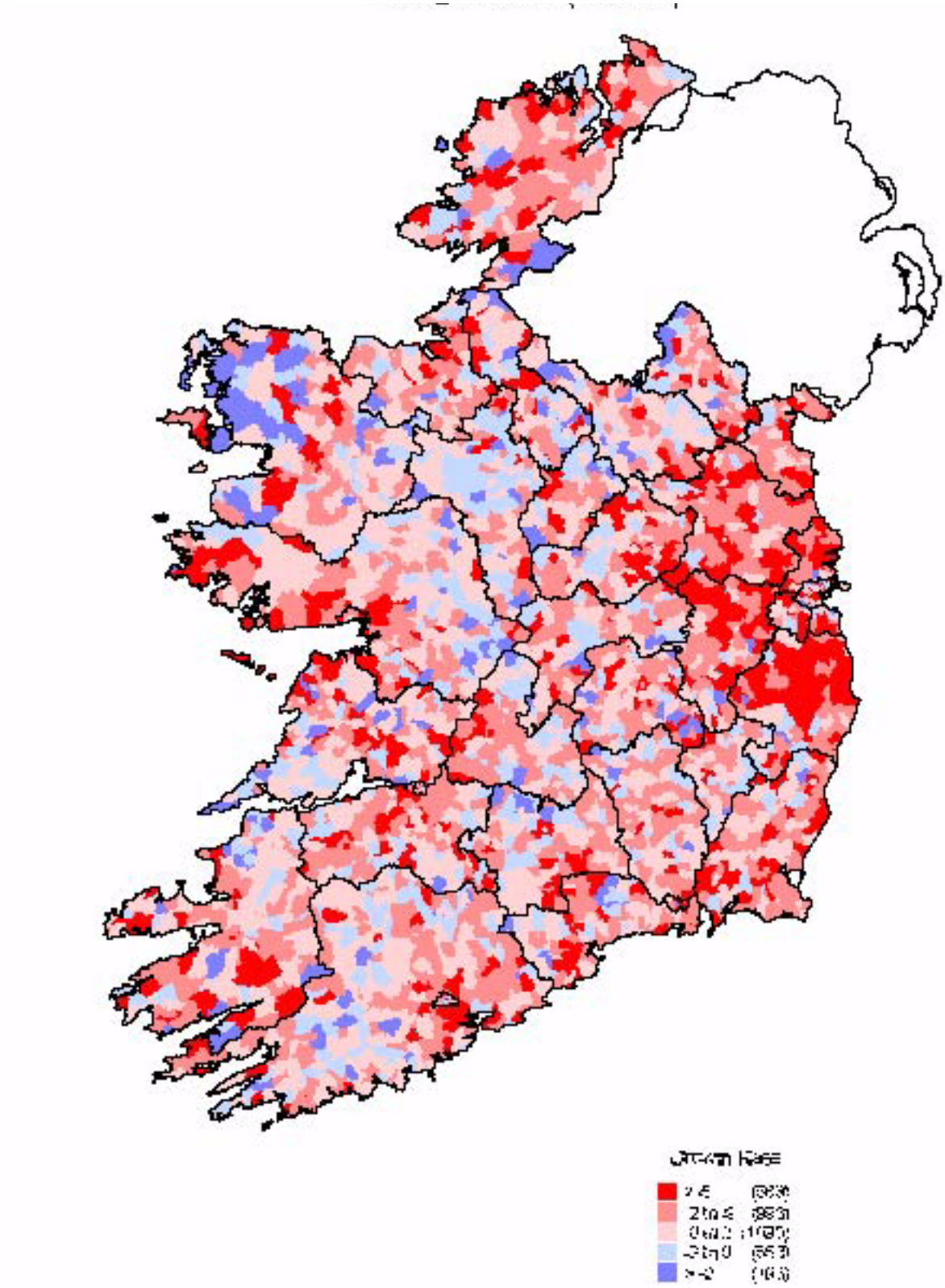
Map 4.1 presents the annual compound employment growth rate for each rural DED over the 1991-96 period. This map exhibits similar patterns to Map 2.6 which shows the distribution of Component 6 – Population and Employment Dynamics.

It shows that rural areas on average grew by 1.7% per annum over the period. The performance of rural areas varied, with nearly 600 rural areas experiencing a fall in employment. These rural areas (the blue areas on the map) are spread relatively well across the country with the exception of the Greater Dublin Area.

The employment performance of Gaeltacht areas varied. Most DEDs in the Gaeltacht areas of counties Galway, Meath and Waterford experienced positive employment growth while employment growth rates in Cork, Donegal, Kerry and Mayo were more mixed, with some DEDs recording falls.

The map also highlights that for the country as a whole over 1,200 rural areas achieved employment growth in excess of 2% per annum. Nearly 400 areas achieved annual compound growth in excess of 4%. These areas (the dark red areas) are clustered around the principal cities. This suggests a positive relationship between the employment performance of rural areas and proximity to a city.

MAP 4.11



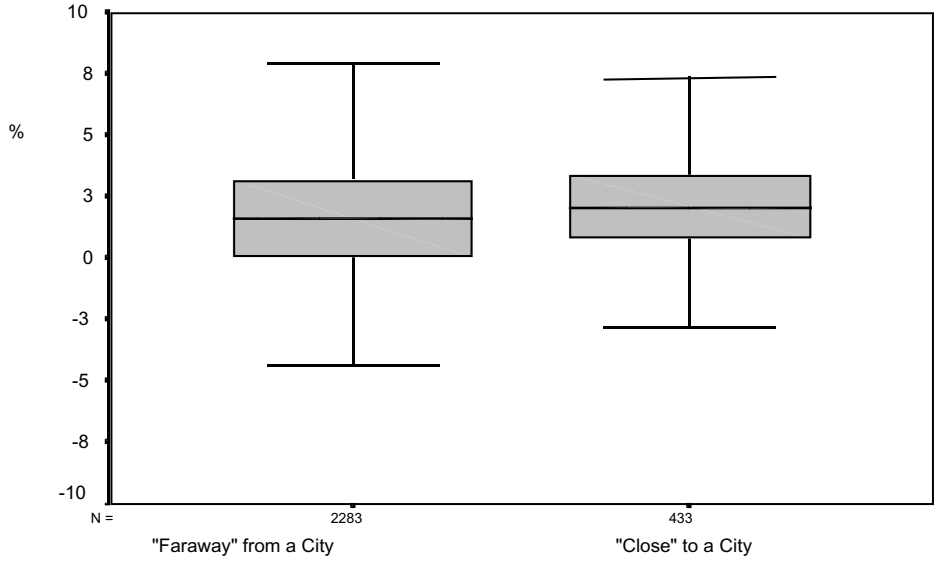
This section presents our results in relation to:

- proximity to a city and the performance of rural areas;
- proximity to a city and the performance of small, medium and large rural areas.

4.3.2 Proximity to a City and Rural Performance

Figure 4.1 presents the information conveyed in Map 4.1 in a way that enables us to systematically compare the employment performance of rural areas that are located "close" (defined as 30 kilometres or less) to a city to areas that are "far away" (defined as 30 kilometres or less) from a city.

Figure 4.1: Average Annual Employment Growth Rate of Rural Areas According to Proximity to a City (1991-96)



Source: Central Statistics Office (CSO), Census of Population

The above Figure shows that over 430 rural areas are located "close" to one of Ireland's five cities. These areas typically experienced higher employment growth rates than other rural areas (comparing the dark line at the centre of each box shows an average growth rate of 1.6% compared to 2.1%). This difference in average employment growth rates (0.5 percentage points per annum) is significant, confirming our expectations that rural areas "close" to a city performed better than other rural areas.[12]

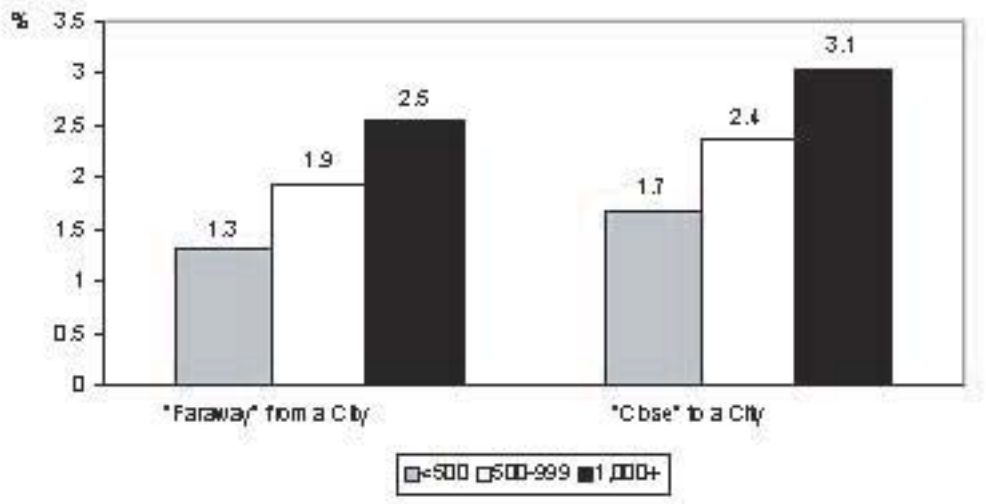
12. An independent T-test suggests that the difference in the mean performance of the two groups is significant at the 1% confidence level.

There was also less variation in the performance of rural areas that are located "close" to a city compared to areas that are not. This is reflected by the fact that the "spread" of employment growth rates for rural areas in the former group was less that that of the latter group (the bottom and top lines for each of the above boxes indicate the 25th and 75th percentile while the vertical lines indicate the minimum and maximum values).

4.3.3 Proximity to a City and Performance of Rural Areas of Different Population Size

The Terms of Reference requested that we consider urban-rural relationships for areas of different population size. To examine if the relationship between proximity to a city and performance holds for small, medium and large rural areas Figure 4.2 plots the average employment growth rates for rural areas according to their proximity to a city and also according to their different population size and population density in 1991.

Figure 4.2: Average Employment Growth Rates of Rural Areas by Proximity to Cities and Population 1991-96



Source: Central Statistics Office (CSO), Census of Population

The above Figure illustrates two important points.

First, "population size matters" for DEDs located "close" to a city and for "far away" areas. Small rural areas performed worse, in terms of employment growth, than medium sized areas (1.3% versus 1.9% and 1.7% versus 2.4%) and worse than urban centres in rural areas (1.3% versus 2.5% and 1.7% versus 3.1%). Moreover, these differences appear to be significant and this is particularly true in the case of rural areas located "far away" from a city.[13]

Second, for a rural DED of any given population "proximity to a city matters". Rural areas located "close" to a city performed better on average than rural areas that are not and this holds true for small, medium and large areas (with respective growth rates of 1.7% versus 1.3%, 3.1% versus 2.5%, and 2.4% versus 2%). These differences appear to be significant.

4.4 Remoteness from Urban Areas and Rural Performance

4.4.1 Overview

In this section we extend our analysis and use a more rigorous approach to differentiate between rural areas in terms of their location. We develop a weighted remoteness score that relates each rural area to all towns with a population of 5,000 or over in 1991. We use similar techniques to the previous section but apply them to the wider concept of "remoteness" and present results in relation to:

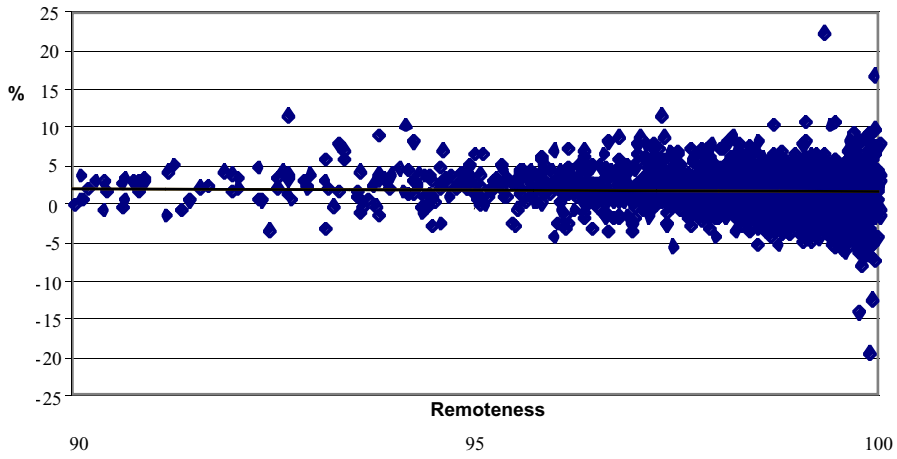
- the general "remoteness" of rural areas and their economic performance;
- the "degree of remoteness" of rural areas and their economic performance;
- the "degree of remoteness" of rural areas and the economic performance of small, medium and large rural areas.

4.4.2 Remoteness and Rural Performance

Figure 4.3 plots the relationship between the employment performance of each rural area and its "remoteness score" (a high index score indicates relatively high remoteness and a low score indicates relatively low remoteness).

13. An ANOVA test suggests that the difference in the mean performance of these population groups is significant at the 1% confidence level. Post hoc tests suggest that for rural areas "far away" from a city there are significant differences in the average performance of rural areas across each population group. For rural areas "close" to a city there are significant differences between the average performance of areas with a population of less than 500 versus those with a population of 500-999 and 1,000 plus, but the latter two groups are not significantly different to each other. This is consistent with our finding that there is less variation in the performance of rural areas that are "close" to a city compared to rural areas that are relatively further away.

Figure 4.3: Relationship between Employment Performance and Remoteness of Rural Areas 1991-96



1 For illustrative purposes the remoteness scores are presented in terms of a standardised index and the Figure excludes places with a remoteness score of less than 90, this does not affect the results.

Source: Central Statistics Office (CSO), Census of Population

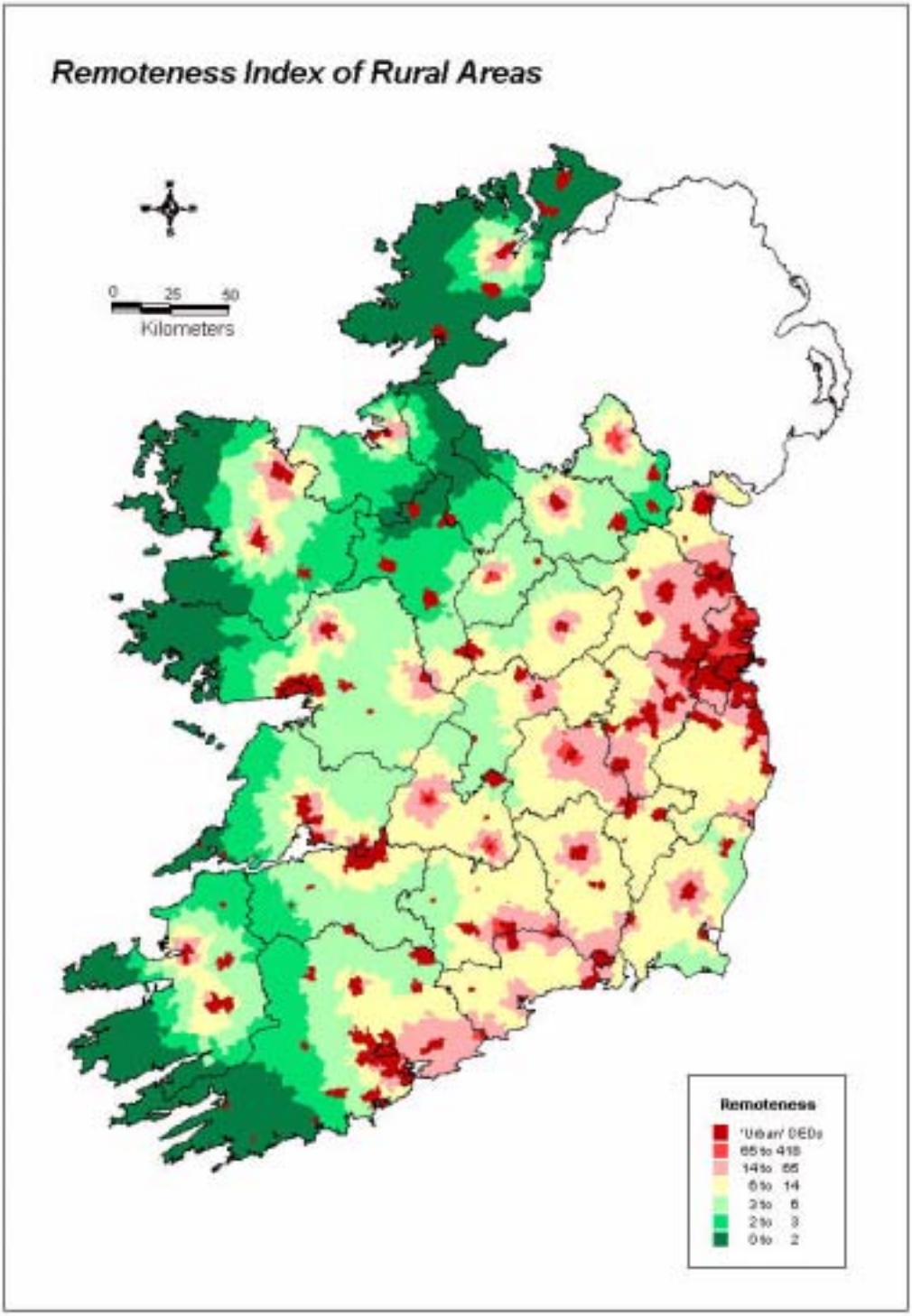
We expected to observe a negative relationship between the employment performance of rural areas and their remoteness score. However, this relationship does not emerge in general terms from Figure 4.3. There are a number of potential reasons for this and we examine this relationship in more detail in the following section.

4.4.3 Degree of Remoteness and Rural Performance

To investigate in more detail the relationship between the remoteness of rural areas and their economic performance we allocate rural areas into six broad groups according to their remoteness scores. Group 1 contains the most remote areas, group 2 contains the next most remote areas and so on (the actual number of areas in each group was determined by a "natural break" selection operation in MapInfo which groups areas with "similar" remoteness scores).

Map 4.2 illustrates the resulting areas.

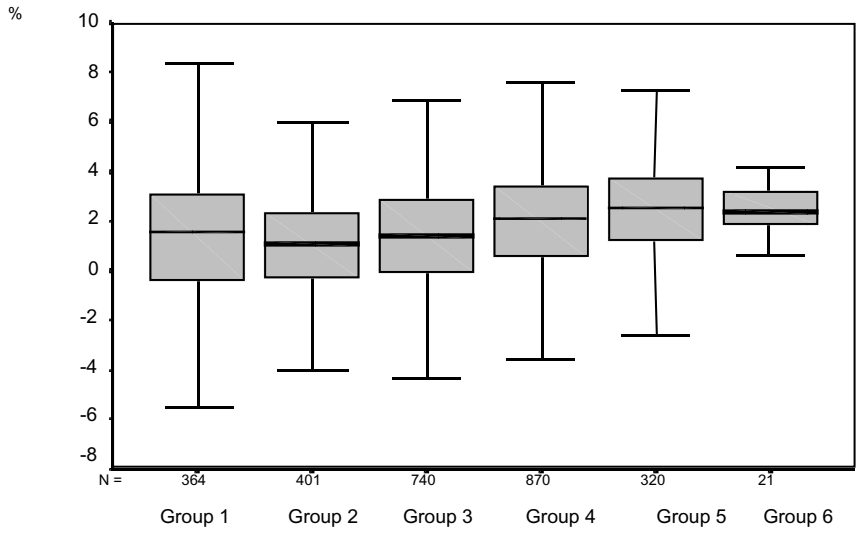
MAP 4.12


Remoteness Index of Rural Areas
0
25
50
Kilometers
Remoteness
65 to 418
14 to 65
6 to 14
3 to 6
2 to 3
0 to 2

Interestingly Gaeltacht areas fall into a number of remoteness groups. Gaeltacht areas in counties Donegal, Mayo and Kerry are in the most remote group in terms of distance from urban areas of a substantial size. The next most remote Gaeltacht areas are in county Cork (remoteness groups 2 and 3) and in Waterford (groups 3-4). Gaeltacht areas in Galway cover a number of groups.

Figure 4.4 shows the employment performance of rural areas in each broad group as identified in Map 4.2, ie group 1 relates to the dark green areas, group 2 relates to the light green areas and so.

Figure 4.4: Average Employment Growth Rates (1991-96) by Remoteness Category



Source: Central Statistics Office (CSO), Census of Population

The above Figure suggests that "remoteness matters". It shows that on average "less remote" rural areas experienced higher employment growth rates than "more remote" areas (as indicated by the black line in each of the above boxes). For example, rural areas in groups 1-3 on average experienced annual employment growth rates of 1-1.3% whereas rural areas in groups 4-6 experienced rates of 2-2.5%.

Statistical tests suggest that the difference in the performance of these groups is significant. Specifically, the employment performance of rural areas in groups 1, 2 and 3 (the green areas) are significantly lower than those experienced by less remote rural areas (specifically group 4 and 5, ie the yellow and light red areas).[14]

14. An ANOVA analysis suggests that the differences in the average performance of the groups are significant at the 1% confidence level. A post hoc test suggests that the mean performance of the first three groups is significantly different to the fourth and fifth group.

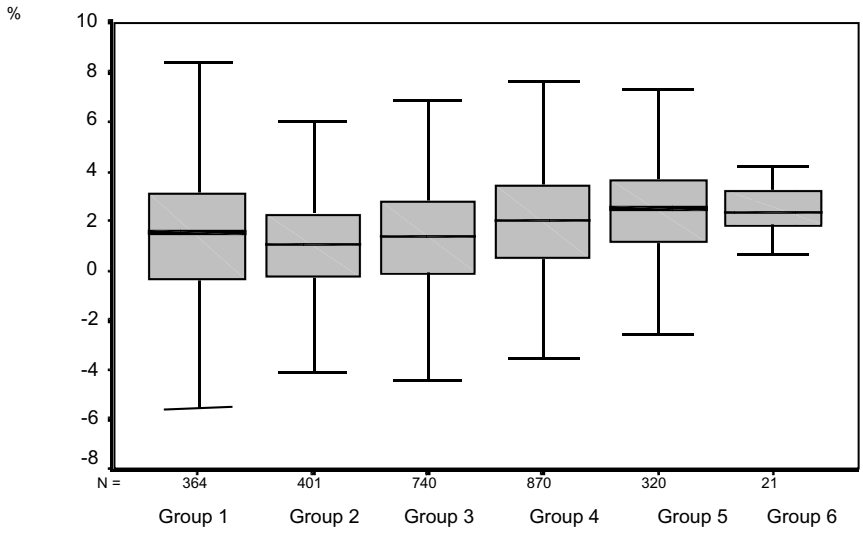
Interestingly, rural areas in the most remote group (ie the dark green areas) on average performed better or at least as good as those in the 2nd and 3rd most remote groups (ie the light green areas). This may be due to a number of factors. It may be due to an anomaly in the numbers arising from the fact that we are dealing with growth rates rather than absolute changes or it may be due to some unique feature of these areas, eg tourism. However, the difference in the performances of group 1 with group 2 and 3 is not significant. It should also be pointed out that group 1 experienced the largest amount of variation in employment performance.

Relating these finding to Map 4.2 it suggests that the employment performance of the "green areas" was significantly lower than that of other "non-green" areas. It also suggests that there is certain "degree of remoteness" that significantly effects the average employment performance of some rural areas (ie those with a remoteness index value of over 98.6 in Figure 4.3).

4.4.4 Degree of Remoteness and Performance of Rural Areas of Different Population Size

The Terms of Reference requested that we consider urban-rural relationships for areas of different population size. To facilitate this, Figure 4.5 plots the average employment growth rates for rural DEDs according to their broad degree of remoteness and according to their population size in 1991. Rural DEDs in the “small” population category also have relatively low population densities, DEDs in the “medium” population category also have medium population densities and DEDs in the “large” category have high population densities.

Figure 4.5: Average Employment Growth Rates by Remoteness Category and Population Size (1991-96)



Source: Central Statistics Office (CSO), Census of Population

Figure 4.5 highlights two important points.

First, for rural areas in each remoteness group "size matters". Looking at each group individually Figure 4.5 shows that small rural areas (the grey boxes) grew less rapidly than medium areas (the black and white boxes) and less rapidly than large rural areas (the black boxes). This is true of each group.

However, this relationship is not as clear-cut for rural areas of different size. For instance, small rural areas in groups 2, 3 and 5 on average grew significantly less rapidly than urban centres in groups 2, 3 and 5 but they did not performance significantly worst than medium sized areas in these groups. Furthermore, the average employment performance of medium and large rural areas was not significantly different to each other.

Second, for a rural area of any given size "remoteness maters". Figure 4.5 shows that the performance of a rural area of any given size typically varies according to its degree of remoteness (ie its remoteness group). Remoteness seems to be particularly important for smaller rural areas. In fact the performance of an average rural area with a population of less than 500 and with a relatively high degree of remoteness (ie groups 1-3) was significantly worse than that of a similarly sized rural areas with a lower degree of remoteness (groups 4-5). Differences in the economic performance of groups 1-6 are less of a factor for medium and large rural areas.

These findings suggest that both the size of a rural area and its "degree of remoteness" influence economic performance, but that this is a complex relationship.

4.5 Conclusions

The principal findings of this chapter as regards the economic performance of rural areas and their location:

- employment in rural areas grew at an average rate 1.7% each year over the 1991-96 period. However, the overall performance of rural areas varied, with one in five rural areas experiencing a fall in employment;
- using a simple measure of location, ie rural areas located "close" (ie within 30 kilometres) to a city and areas that are "far away" (defined as more than 30 kilometres) from a city, we find that:

  - rural areas that are "far away" from a city recorded significantly lower employment growth rates than rural areas that are "close" to a city (a difference of 0.5 percentage points per annum). The former group also experienced more variation in employment performance;

- "size matters". Small rural areas performed significantly worse, regardless of whether they were “close to/far away from” a city, than medium sized areas and indeed large rural areas. For areas located more than 30 kilometres from a city, medium rural areas performed on average significantly worse than large rural areas, but this was not the case for rural areas located "close" to a city;

- for a rural area of any given size "proximity to a city matters". Rural areas located "close" to a city typically performed significantly better than other rural areas and this holds true for small, medium and large areas;

- using a more robust measure of location, ie a remoteness score that relates each rural area to each town with a population of 5,000 or over, takes into account the distance of a rural area from each urban area and the population of each urban area, we find:

  - the average employment growth rate of the three most remote groups (areas covered by one of the three shades of green in Map 4.2) was significantly lower than that of less remote groups (a difference of about one percentage point per annum);

  - interestingly, rural areas in the most remote group (the dark green areas in Map 4.2) on average performed better or at least as good as those in the 2nd and 3rd most remote groups (the light shades of green in Map 4.2). This may be due to a number of factors, such as an anomaly in the numbers arising from the fact that we are dealing with growth rates rather than absolute changes or it may be due to some unique feature of these areas, eg tourism. However, these differences in average performance are not significant and it should also be pointed out that group 1 experienced the largest amount of variation in employment performance;

  - “size matters for the performance of rural areas” with different degrees of remoteness, but the relationship between size and performance is not as clear-cut as in the case of our simple classification of rural areas as being "close to/far away from” a city. While small rural areas typically grew less rapidly than medium and large rural areas, for groups 1-6, the differences in performance were not always significant. Only for groups 2, 3 and 5 (areas covered by the two shades of light green and the light red shade in Map 4.2) did small rural areas grow significantly less rapidly than large rural areas. However, the average performance of small rural areas was not significantly different to that of medium sized areas, and this holds across groups 1-6;

  - "remoteness" appears to be more important for small rural areas than for large rural areas. Small rural areas in groups 1-3 (the green areas in Map 4.2) grew significantly less rapidly on average than small rural areas in other groups, but the difference in the performance of medium and large rural areas was not significant for any group.

5 Chapter Role of Infrastructure

5.1 Introduction

Study Objective no. 7, as outlined in the Terms of Reference, is: "to identify any deficiencies in the provision of physical infrastructure including transportation and communications which act as barriers to economic activity."

Casual observation shows that rural areas have weaker infrastructure - transport, energy, telecommunications etc. To some extent this is a tautology, as urban areas by definition have major concentrations of infrastructure.

The focus of this study is on transport, and specifically on road transport. While alternate forms of transport such as rail and air deserve consideration within the context of the national transport policy environment, these modes do not impact to the same degree on the everyday lives of people in rural communities as does road transport, and in particular, both car and bus transport. In this context, we use road access as a proxy for wider infrastructural access.

Recent research has indicated access to transport to be one of the most important factors determining the social and economic sustainability of rural areas (O'Shea, 1996. Cawley, 1999). Rural Partnerships and Community Groups have consistently highlighted the lack of transport as one of the major barriers to economic and social development within their areas. This perceived infrastructural deficit in rural areas is seen as the most basic element of the restricted ability of rural areas to access essential services, participate in employment and to take part in social activities (ADM, 2000).

5.2 Issues in Rural Transport

5.2.1 Overview

A survey of the generic Irish rural literature displays virtual unanimity as to the existence of a rural transport deficit; there is also consensus regarding two ancillary issues:

1. inadequate transport in rural areas negatively affects rural economies, but perhaps more importantly there are severe social and quality-of-life impacts which differentiate the rural transport deficit from any broader urban-centred transport deficit;
2. this negative impact is most pronounced among certain strata of society, ie older people, people with disabilities, and those who are particularly impoverished.

Notwithstanding this degree of unanimity among researchers on the issue, quantitative evidence is less readily available. This means that measuring the extent of the problem is not a straightforward task.

To distinguish levels of infrastructure that serve mainly urban centres from levels of infrastructure in rural areas, it is necessary to pitch the analysis at a high level of spatial disaggregation; this has deleterious effects on the quality of data. Often, therefore, the analysis will not be at the ideal spatial unit, but may in fact constitute spatially aggregated areas such as counties or regions, which encompass both rural areas and dense population clusters.

5.2.2 Rural Transport from a Community Viewpoint

In response to the prominence of transport issues in the strategic plans of Partnership Companies, Community Groups and others at a local level, and the work being undertaken by these bodies to improve the level of transport provision in rural areas, ADM commissioned a Rural Transport Study in September 1999. This study, which was completed in July 2000, represents a comprehensive attempt to quantify the rural transport deficit in an Irish context.

The report encompassed a wide-ranging consultation process with service providers, community groups, Government departments and agencies, and individuals involved in the provision of transport in rural areas. Relevant international experience was also examined. The core quantitative aspect involved examining and collating the large number of local studies into rural transport that have been undertaken around the country, many of which were carried out by ADM sponsored groups. About 70% of Partnership Companies and 50% of Community Groups have undertaken research. The aim was to derive tentative conclusions of national relevance by surveying these local studies. While acknowledging the limitations of the method and the data, the report suggests the following statements are broadly reflective of reality:

- over one third of the population either has no access or serious difficulty with regard to transport;
- social reasons for travel are not given enough emphasis when determining the significance of the need for a service, given that the highest percentage of those surveyed cited this as their reason for travel;
- 24% of those questioned favoured a daily service;
- distance from public transport pickup points was cited in most cases as a major problem, particularly for older people/mobility impaired.

The study concluded that “significant loss of opportunities results from this (rural transport) deficit - economic, social, quality of life etc and it is very evident from the studies examined that inadequate transport is a major contributing factor to the risk of marginalisation and social exclusion.”

A recent report on the social economy in the Gaeltacht provides evidence of the difficulty of community-building in the presence of transport shortcomings. In a household survey of Gaeltacht areas in Kerry, Donegal and Galway, 26% of respondents cited "better roads" or "public transport" as the additional services needed to improve quality of life. The same survey found that 37% of households rated shortcomings in the area of transport as the greatest difficulty facing older people (NUI, Galway, 1998).

The difficulty of measuring transport infrastructure in the rural context is a constant constraint on research in the area. The ADM report accepted that the concept of "adequate transport provision" is analytically troublesome, and highly subjective. The adequacy of transport in a rural area depends on, amongst other things, the demographics of the area, the actual needs of inhabitants, the centralisation or otherwise of services, the distances to be travelled and the type of vehicles available.

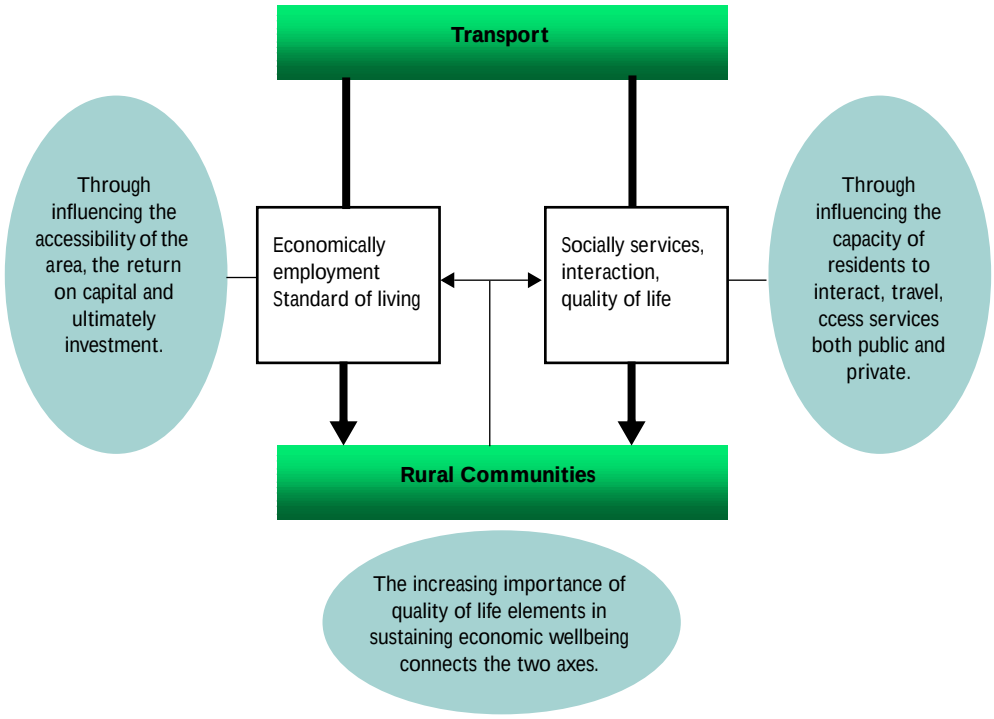
This complexity in defining adequacy, or more fundamentally of quantifying levels of service, is demonstrated by the complex scoring system which has been applied by the Rural Transport Fund in Northern Ireland to determine the need for the provision of additional services. The ADM report states that: "no definitive index or mechanism has yet been developed to measure the extent of accessibility to services etc and hence, no benchmark has been set as to what is acceptable in terms of adequacy of transport in a modern Ireland."

5.2.3 The Interaction between Transport and the Rural Community

Transport impacts on the rural population via two axes (Figure 5.1): there are direct economic impacts, which will influence levels of investment and competitiveness in an area; there are also social impacts, which will influence the general quality of life in an area.

In addition, the general sustainability of rural communities is highly dependent on the relationship between transport and "quality of life." If a rural area is not an attractive place to live it will suffer economically in the long run, in an era of increasingly mobile capital, both human and physical (Figure 5.1). This last point is of particular resonance given that "quality of life" issues are one area where rural economies may compensate if there are disadvantages created by the absence of agglomeration economies in the rural environment.

Figure 5.1: Transport and the Rural Community: Axes of Impact



5.3 Rurality and Public Transport

5.3.1 Travel to Work Patterns at NUTS III Level

The most up-to-data regional data available on travel patterns comes from the Quarterly National Household Survey (QNHS). A special module on travel to work was included in the QNHS in the first quarter of 2000. Questions were only asked of people in employment, there was no information gathered on journeys for other purposes, for eg schools, shopping, leisure etc Nonetheless, some clear patterns emerge from the survey. The survey facilitates analysis at NUTS III level.

The 8 NUTS III regions were ranked on an index of rurality based on the population in each region residing in aggregate rural areas. A score of 100 on the index indicates the entire population of the region resides in areas outside clusters of 1,500 or more. Unsurprisingly the Dublin region scores lowest on this index (2.5), whilst the West region scores highest (69.7). By highlighting a number of indicative variables from the survey, it is possible to deduce certain relationships between rurality and patterns of transport use across NUTS III regions.

Table 5.1: Rurality and Transport to Work, NUTS III Regions, (Ranking in Parentheses)

Region	Rurality Index	Non-availability of public transport1	% Travelling < 1 mile to work	% Travelling to work as a car passenger	% Using Public Transport to travel to work2
West	69.7 (1)	49.5 (3)	15.1 (6)	10.4 (3)	2.0 (6)
Border	68.0 (2)	48.5 (4)	21.7 (2)	11.9 (1)	2.4 (5)
Midland	65.5 (3)	59.4 (1)	20 (3)	11.2 (2)	1.8 (8)
South-East	58.6 (4)	55 (2)	22.8 (1)	9.1 (7)	1.9 (7)
Mid-West	57.9 (5)	33.9 (6)	15.8 (5)	10 (5)	3.2 (3)
Mid-East	48.5 (6)	32.2 (7)	12.4 (7)	10.1 (4)	6.4 (2)
South-West	46.3 (7)	43.1 (5)	17.6 (4)	9.4 (6)	3.1 (4)
Dublin	2.5 (8)	5.4 (8)	9.3 (8)	5.1 (8)	20.1 (1)

1 % of private transport users citing non-availability as the reason why they do not use public transport to get to work
2 % of people travelling to work by bus, train or DART

Source: Quarterly National Household Survey, September 2000

According to the survey, the Midland region emerges as the region with the greatest public transport deficit, with 59% of private transport users citing a lack of availability of public transport. Although both the Border and West regions are positioned above the Midland on the rurality index, approximately 10% more people in the Midland region than in the Border and West regions point to the non-availability of public transport. This may reflect the relative proximity of some parts of the Midland to the Dublin region, and the greater demand for transport in these areas generated by the potential for commuting.

Similarly, in the South-East, 55% of respondents felt there was no public transport alternative, compared to 49.5% and 48.5% in the two most rural regions (West and Border). Only 5.4% of respondents in the Dublin region suggested there was a lack of public transport, with the Mid-East (32.2%) and the Mid-West (33.9%) seeing themselves as relatively well served by public transport. From this, it appears that economic self-sufficiency within a region (ie a region that is not sustained through commuting) can be important in determining the public transport deficit.

The most compelling statistics from the survey are those relating to public transport use. The Dublin region stands-out as the only region where there is substantive usage of public transport, with 20.1% of people using public transport to travel to work. Of the rest of the country, the Mid-East is some way ahead (6.4%). The Midland, the South-East and the West regions register the lowest public transport usage, all approximately 2%.

5.3.2 Rurality and the Supply of Road Infrastructure at County Level

When the length of road per km2 is used as an indicator of transport infrastructure supply, one discovers a negative relationship between the degree of rurality of a given county and its transport infrastructure supply (Figure 5.2). Following from this is the conclusion that the most rural areas of the country have a less well-developed transport infrastructure (Table 5.2).

Considering the location of the Gaeltacht areas, a diverse picture emerges. Mayo and Donegal are amongst the top five most rural counties, whereas Cork and Waterford are among the five least rural counties. Kerry, Meath and Galway fall in between. Of the major Gaeltacht counties, Kerry has the best endowment of national road infrastructure per km2, (8th out of 27), followed by Mayo and Galway (15th and 17th respectively). Donegal and Cork fare worst, appearing 24th and 25th on the list respectively.

Table 5.2: Rurality and Road Infrastructure, classified by county

County	Index of Rurality	National Primary Roads/ 100km2	M'way/D'way/ 100km2	Total National Roads/ 100km2	Total National Roads/100 Residents	Nat Primary Roads/100 Residents
Leitrim	93.9	3.557	0.00	3.557	0.23	0.23
Cavan	83.1	3.388	0.00	6.530	0.24	0.12
Roscommon	81.6	3.960	0.09	9.742	0.48	0.19
Mayo	78.7	2.404	0.00	7.191	0.36	0.12
Donegal	78.2	3.095	0.09	6.256	0.23	0.12
Longford	76.8	3.955	0.00	8.995	0.33	0.14
Monaghan	71.9	5.739	0.00	8.135	0.21	0.14
Laois	70.9	4.856	0.81	9.472	0.31	0.16
Kilkenny	70.8	7.063	0.00	10.339	0.28	0.19
Kerry	68.8	1.972	0.00	8.915	0.34	0.08
Wexford	68	6.340	0.02	6.980	0.16	0.14
Sligo	66.8	4.975	0.45	7.575	0.25	0.16
Tipperary N.R.	66.7	3.222	0.00	8.140	0.29	0.11
Meath	66.1	5.201	0.12	8.481	0.18	0.11
Clare	64.7	1.579	0.41	6.791	0.25	0.06
Offaly	63.4	0.900	0.00	6.911	0.23	0.03
Galway	61	2.496	0.04	6.998	0.23	0.08
Tipperary S.R.	59.6	5.278	0.00	7.011	0.21	0.16
Westmeath	57.6	5.248	0.66	9.826	0.29	0.15
Carlow	53.9	2.609	0.00	8.592	0.19	0.06

Table 5.2: Rurality and Road Infrastructure, classified by county *(continued)*

Limerick	51	4.950	0.04	6.887	0.11	0.08
Wicklow	41.6	2.628	1.08	4.702	0.09	0.05
Waterford	39.9	3.668	0.00	5.590	0.11	0.07
Cork	39.6	2.949	0.54	6.386	0.11	0.05
Kildare	39.4	6.631	3.00	8.144	0.10	0.08
Louth	36.5	8.959	0.97	15.245	0.13	0.08
Dublin	2.5	11.811	10.40	14.161	0.01	0.01
State	41.9					

Source: NRA

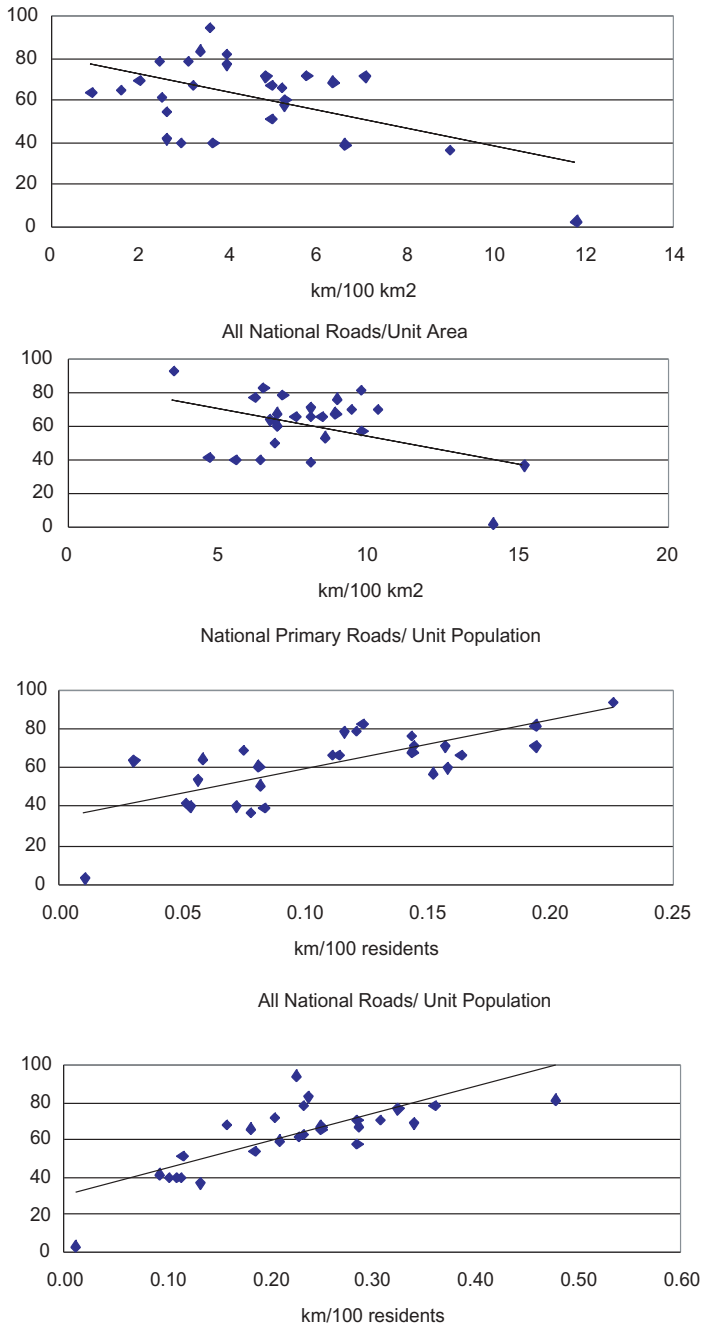
However, as Figure 5.2 indicates, when the length of road per capita is used as an indicator for transport infrastructure, a strong positive relationship[15] is suggested between a county's degree of rurality and its stock of transport infrastructure.

This suggests that, although rural areas may be unequally serviced with respect to transport infrastructure, this inequality is related to rurality only insofar as low population density is an intrinsic characteristic of rurality; in addition, Table 5.2 suggests that, on average, persons living in rural areas have in fact more transport infrastructure to go around than their counterparts living in urban areas. Certainly, current levels of congestion on transport infrastructure in urban areas is consistent with this notion.

These two scenarios together suggest that the country's road network is relatively evenly distributed in population terms. It is possible to construe that residents of rural areas are in fact to some extent compensated for their peripherality, given the higher levels of road per capita in rural counties (Table 5.2). However, where precisely you live within a largely rural area appears as crucial in determining whether you have above- or below-average level of access to transport infrastructure. If you live in a relatively dense population cluster, for example a town above 1,500, but within a largely rural area, it is likely that you have a relatively high level of access to road infrastructure; living some distance from the population cluster itself would seem to substantially reduce your level of accessibility.

15. The strength of the relationship is indicated by the correlations given in Figure 5.2.

Figure 5.2: Supply of National Roads by County[16]



1. The strength of the correlation in each case, ie the extent to which the two ranges of data move together, is given as follows: national primary roads per unit area and rurality (-0.53); all national roads per unit area and rurality (-0.43); national primary roads per unit population and rurality (0.72); all national roads per unit population and rurality (0.77).

Source: NRA

16.Rurality index plotted on Y axis in each case

Whether you live in an urban area or not is more important than the relative rurality of the broader region in determining your accessibility to road infrastructure. Mayo is a good example of a highly rural county (it is the fourth highest-ranking county on the rurality-index) within which there are a number of population clusters which are relatively well served in terms of the transport network (see Box 5.1).

Box 5.1: Local Bus Services in County Mayo

A detailed exploratory analysis of local bus services in County Mayo was carried out. There are a total of 82 settlements served by Bus Éireann in County Mayo. These settlements are located on the national primary roads in Mayo, the N26, the N5 and the N17; the national secondary roads, the N59, the N84, the N58, the N60, and also the regional roads, the R314, the R313, the R315, the R310, the R335, the R330, the R345. The analysis indicated that the local bus service in the county is heavily concentrated along a central spine defined by the national primary road N26, the national secondary road N58, and the regional roads R315 and R310 which all connect Ballina and Castlebar, and the national primary road N5 connecting Castlebar and Westport (which also serves as a partial connection between Castlebar and Ballina), with various less well serviced spurs off this central spine.

There were 25 towns listed for Mayo in the last census. These towns fall into two categories: those with legally defined boundaries and towns without legally defined boundaries, but with boundaries defined for census purposes[17]. Of the 82 settlements served by the local bus network, 24 are listed census towns. Ballindine is the only census town which is not on the Bus Éireann local network. It is however, on the Bus Éireann Expressway network. The remaining 58 settlements do not have sufficient critical physical mass, according to the census definition, to constitute a town.

The 24 census towns together had a population of 36,514 in 1996. Leaving aside any consideration yet of the quality or frequency of the service, this implies that approximately 33% of the population of Mayo can access the Bus Éireann network directly, without the need for ancillary support such as private cars, taxi/hackneys, bicycles etc This 33% of the population is by definition the most spatially concentrated segment of the population. In addition to this, there are additional 58 settlements which are served by the local bus network. Given that most local bus services are 'stop on request', any estimate of the immediate population catchment of the local bus service should include those living along or close-by the road used. Thus, a conservative estimate would place over 50% of the population of Mayo completely dependent on their own resources to access the Bus Éireann local service. Given that those who most need to use the public transport are those who do not have their own private transport, it is incisive to examine the extent to which private transport is required in order to access public transport.

In the case of Mayo, each of the 82 settlements was examined to deduce the quality of service provided in each case. A weighting mechanism was devised, with the maximum weight applying if there was a departure each weekday from a particular settlement on particular route, and minimum weight applying if the service was only weekly. A similar but more nuanced scoring system was applied to Northern Ireland's 300 settlements of population 10,000 or less, in order to assess the adequacy of existent transport provision there (ADM, 2000)

A clear correlation emerges between the settlement size and service. The three largest population centres in the county, Ballina, Castlebar and Westport enjoyed the best service respectively. The next four highest-scoring settlements were located on roads connecting Ballina and Castlebar, (Foxford, Straide, Ballyvary, and Turlough). After this, proximity to one of the three largest settlements, or substantial indigenous population, emerged as important. The next six ranked settlements scored evenly: Knockmore (close to Ballina), Newport (census town), Mulrany (close to Westport), Achill Sound (census town), Keel (census town) and Dooagh. The remainder of the 82 settlements are much poorly served: 23 have a bus service that operates only once a week, and another 5 have a bus service that operates on only 2 or 3 days a week.

It is worth noting that the four highest scoring settlements under this analysis are all also points of access on the national rail network. There are six such points of access in Mayo.

5.4 Road Infrastructure and Rural Performance

5.4.1 Introduction

The following sections examine the relationship between the economic performance of rural areas at DED level and transport infrastructure. The initial stage in the analysis was to map the economic performance of rural DEDs and the national road network. Building on this, a more nuanced statistical analysis was carried out at DED level to deduce whether there is a relationship between proximity to national roads and economic performance.

5.4.2 National Road Network and DED Employment Growth

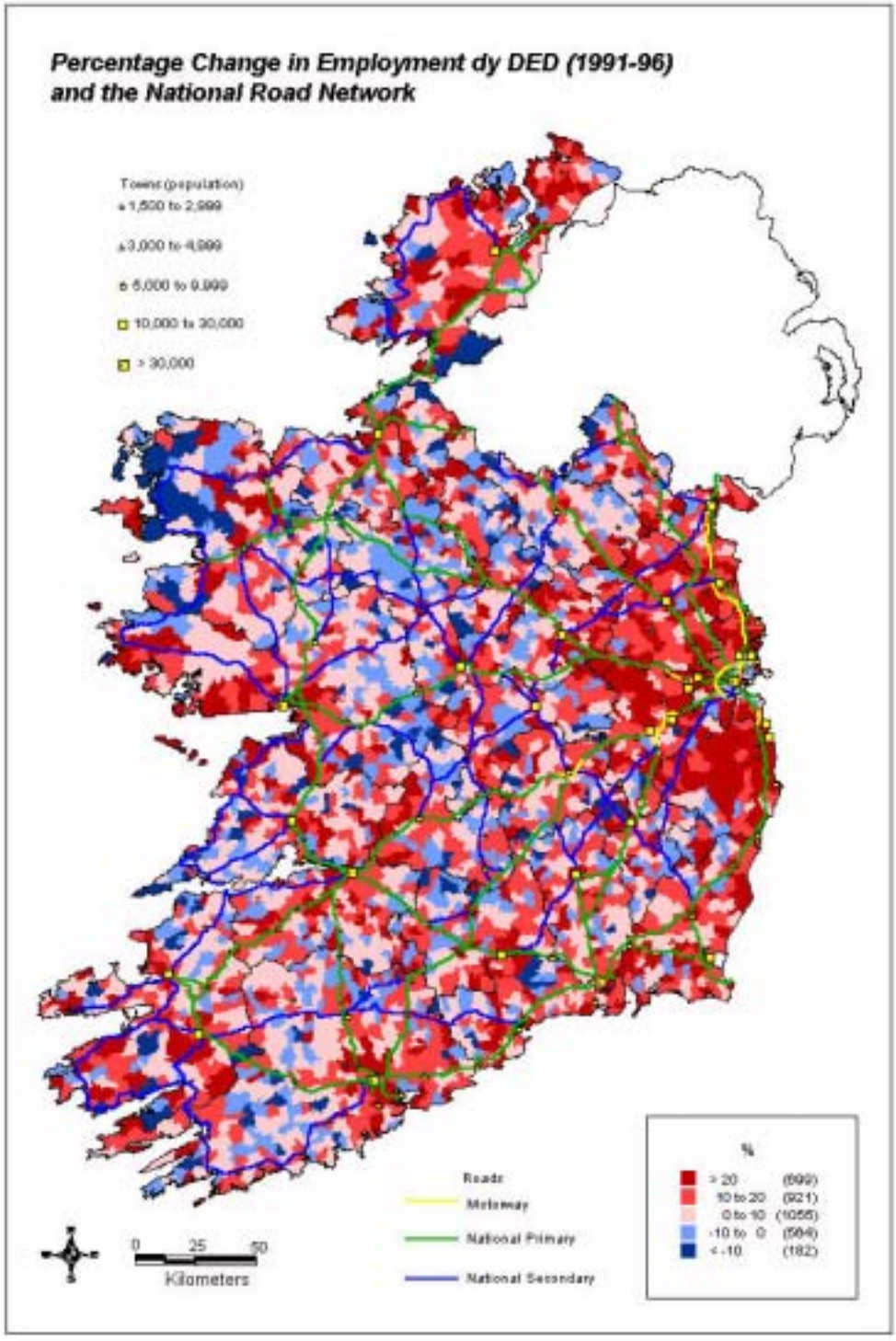
The mapping exercise involved superimposing the national road network (differentiating motorway, national primary, and national secondary standard) on a map of Ireland illustrating employment growth at DED level during the last intercensal period (1991-1996). The results are presented in Map 5.1.

DEDs are grouped into five categories according to their employment growth rate. DEDs with positive employment growth rates are indicated by differing shades of red, and similarly DEDs experiencing a fall in employment are indicated by two different shades of blue.

The most obvious pattern discernible from the map is the large concentration of well performing DEDs (those with positive employment growth) extending in a semi-circular fashion out from Dublin. This pattern mirrors the radial nature of the national road network which is centred on Dublin. Strong growth (>10%, dark red) is also seen to extend out along national routes around the larger towns and cities (Cork, Limerick, Galway, Athlone, Drogheda, Dundalk), which generally represent the convergence of a number of national routes. It can be deduced from Map 5.1 that most growth over the period was urban generated; there is also evidence that the spatial spread of this growth was facilitated by national roads feeding out from the urban centres.

17. This latter group is defined as a cluster of fifty or more occupied dwellings not having a legally defined boundary, in which within a distance of 800 metres there is a nucleus of either thirty occupied houses on both sides of the road or twenty occupied houses on one side of the road.

MAP 5.1


Percentage Change in Employment dy DED (1991-96)
and the National Road Network
Towns (population)
1,500 to 2,999
3,000 to 4,999
5,000 to 9,999
10,000 to 30,000
> 30,000
Roads
Motorway
National Primary
National Secondary
%
> 20 (699)
10 to 20 (921)
0 to 10 (1055)
-10 to 0 (564)
< -10 (182)
0 25 50
Kilometers

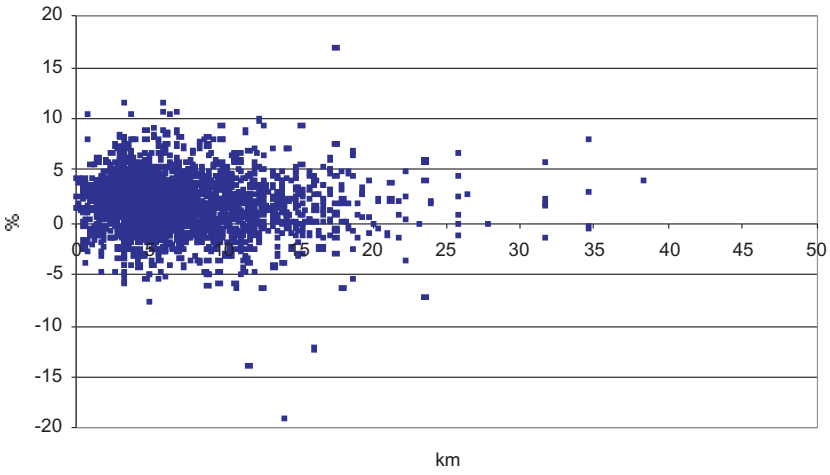
Focussing on those DEDs with the weakest employment performance (those with a 10% decrease in employment, dark blue), the most prominent concentrations are in areas of West Mayo, East Galway and West Clare that are at some remove from the nearest National Primary road. Generally speaking, the route of the national primary network is defined by DEDs experiencing positive employment growth. There are exceptions to this, however: there are notable pockets of poorly performing DEDs along the N5 in Mayo, the N26 in Mayo and Roscommon, the N6 in Galway and Roscommon, the N22 in Cork and Kerry, and the N8 in Tipperary South and Kilkenny. Similarly, there are large areas of the country characterised by well performing DEDs which are not served by a national primary or national secondary road at all, such as the Inishowen Peninsula, Connemara, East Clare and Wicklow.

5.4.3 Rural Area Performance and Proximity to the National Road Network

Figure 5.3 plots the relationship between the employment performance of each rural area and its distance from the national road network. The distance variable is the straight-line distance (kms) from the centre of each rural DED to the nearest national primary or national secondary road. The employment variable is the employment growth rate between 1991 and 1996 in each DED. The definition of 'rural area' is identical to that adopted in the preceding analyses in Chapters 2 and 4.

A clear representation of the assumed positive relationship between distance to nearest national road and employment performance is not evident from Figure 5.3. Most rural DEDs are positioned between the 0% and 5% growth bands on the graph and this positioning does not alter radically as the distance from the national road network increases. The relationship is examined in greater detail below.

Figure 5.3: Relationship between Employment Performance (1991-96) and Distance from National Road Network of Rural Areas

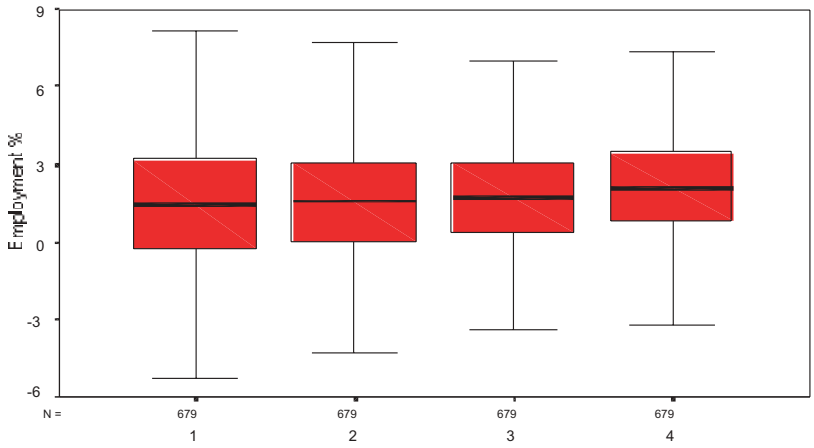


Source: Central Statistics Office (CSO), Census of Population, GAMMA

In order to distinguish the precise relationship between the economic performance of rural areas and the distance from the national road network, we divided the rural areas into quartiles based on their distance from the nearest national road. The first quartile represents the 25% of rural areas furthest away from a national road, and the fourth quartile contains the 25% of DEDs nearest a national road.

Figure 5.4 shows the employment performance of rural areas in each quartile.

Figure 5.4: Average Employment Growth Rates (1991-96) by Quartiles of Distance from National Road Network



Source: CSO, Census of Population, GAMMA

The above Figure suggests that there is some improvement in the economic performance of rural areas as they become more closely integrated with the national road network. It shows that on average rural areas closer to national roads experienced higher employment growth rates than rural areas further away from national roads (as indicated by the black line in each of the above boxes).

This pattern is most notable in the case of the fourth quartile (ie rural areas closest to the national road network). The average employment growth rate for rural areas in this quartile was 2%, compared to 1.7% and 1.6% for rural areas in the third and second quartiles respectively. Rural areas in the first quartile, representing areas furthest from the national road network, are seen to lag somewhat with an average growth rate of 1.4%.

Statistical tests suggest that the difference in the performance of these groups is significant. Specifically, the employment performance of rural areas in the fourth (those closest to the national road network) is significantly better than that of rural areas in the first and second quartiles (those furthest from the national road network).[18]

Caution must be exercised in interpreting these results, as the direction of causality is difficult establish. For example, as evidenced form Map 5.1, the national road network directly connects the large urban centres in the country. Rural areas that are closer to national roads will generally also be closer to urban centres, or will be positioned along economic corridors connecting urban centres.

Drawing on the conclusions of the previous chapter, spillovers from urban areas may account for the higher employment growth rates in rural areas closer to national roads. Additionally, as well as proximity to urban areas being important, it is also likely that the direction of a rural area relative to surrounding urban centres is important; in other words, rural areas will benefit from a location in the direction of national primary and national secondary roads leading out of an urban centre, as it appears that economic spillover is channelled out from the urban centres along these routes.

18. An ANOVA analysis suggests that the differences in the average performance of the groups are significant at the 1% confidence level. A post hoc test suggests that the mean performance of the first and second quartile is significantly different to the fourth quartile.

5.5 Conclusions

The principal findings of this chapter as regards rural transport are as follows:

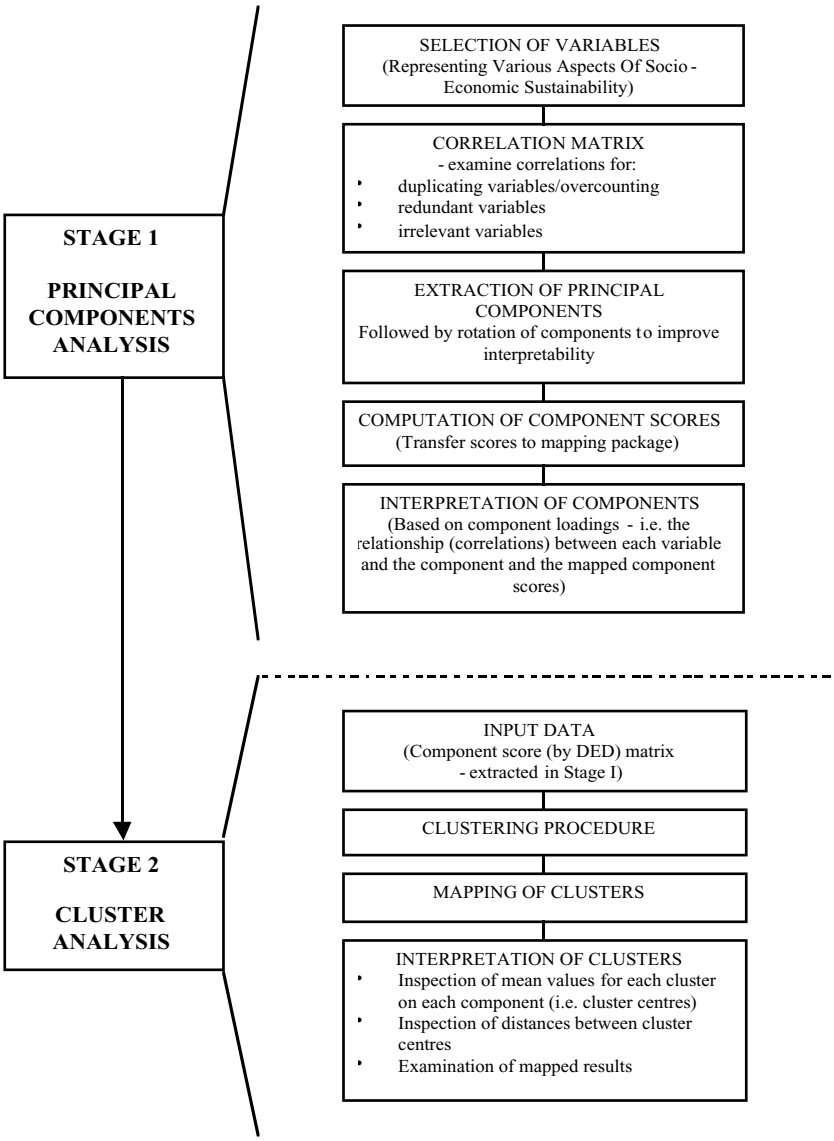
- contemporary researchers have consistently pointed out the negative social and economic impacts of this deficit on rural communities. Studies undertaken by various Community and Local Groups have supported this. In many rural areas, there exists only a skeleton public transport service. In many cases, the service is so infrequent that it can make no substantive impact on the everyday lives of people; in addition, many 'local' services operate in so centralised a fashion that private means of transport is required to access it. In all cases, it is the most vulnerable in society, such as older people, who are most affected;
- areas (counties) that are otherwise predominantly rural in character may have a relatively high level of transport infrastructure by virtue of its location with respect to Dublin. The closer the positioning of an area to Dublin, the greater the spatial intensity of the road infrastructure. However, there is also evidence that the demand for transport infrastructure increases as you move towards Dublin, because of the increased population densities and also because of the increased commuting potential. Overall, the national road network is relatively evenly distributed in population density terms, but less so in purely spatial terms;
- the analysis also reveals that where precisely you live within a largely rural area is crucial in determining whether you have above- or below-average level of access to transport infrastructure. For example, whether you live in a dense population cluster or not has a greater effect than the relative rurality of the area in which you live, in determining your accessibility to road infrastructure;
- there is evidence that rural areas closer to national roads on average perform better than rural areas further away from national roads. However, rural areas that are closer to national roads will generally also be closer to urban centres. It appears that economic spillover from urban centres is channelled out to rural areas along the route of major roads;
- the emerging emphasis in the transport arena on the importance of small urban centres in otherwise rural areas, is reflected in the rural area typology developed in Chapter 2. The first area type, described as peri-urban zones, is classified by high population densities, advanced levels of education, and low levels of reliance on agricultural employment. DEDs falling into this category are generally found in close proximity to urban areas. However, there are a number of such peri-urban zones located in otherwise very rural areas, such as East Galway and East Mayo. This is interpreted as signifying the importance of small centres such as villages in what are otherwise weak rural areas.

A Development of a Rural Typology – Technical Note

A.1 Overview of Methodology

Figure A.1 outlines in detail the steps involved in the development of a rural typology. The subsequent sections give a detailed description of each step.

Figure A.1: Outline of the Statistical Analysis



A.2 Step 1 – Correlated Variables

Before applying the Principal Components Analysis (PCA) technique, it is important to carry out some preliminaries with regard to determining a final selection of variables to be included in the analysis. It is possible that if the initial selection is biased towards one or more dimensions in the data set, for example, a large volume of demographic variables relative to other variable types, it is likely to produce a biased set of principal components. The set of variables were also inspected with a view to removing 'redundant' variables. These might be duplicating variables (ie different variables effectively measuring the same characteristic), variables that are mirror images of one another (ie highly inter-correlated variables on the same dimension but with opposite signs, eg percentage males/females) or variables with little or no correlation with other variables in the set. It is also prudent to avoid so-called 'closed number sets', ie sequences of variables that add up to 100%, such as age categories or employment status, which results in over-counting and ultimately a biased result.

Table A.1 presents the initial 90 variables examined. The inter-correlations of the final 30 "key" variables are presented in Table A.2.

Table A.1: Initial Selection of 90 Variables for the Statistical Analysis

Category	Variable Description	Variable Name
Demographic Structure	Population Density 1996	POP_DENS
	Persons aged 0-14 yrs as a % of the total population - 1996	%AGE_0_14
	Persons aged 25-44 yrs as % of the total population - 1996	%AGE_25_44
	Persons aged 65+ yrs as a % of total population - 1996	%AGE_65PL
	Persons aged 65+ and living alone as a % of total population - 1996	%_65PL_LIV_AL
	Females aged 15-44 yrs as a % of the total population - 1996	%_F_AGE_15_44
	% of total males aged 25-44 years who are married - 1996	%M25-44MAR96
	% of total males aged 45-54 years who are single - 1996	%M45-54SING96
	Gender Ratio age group 25 to 44 yrs - 1996	GEND_RATIO
	Elderly Dependency Ratio - 1996	E_DEP
	Youth Dependency Ratio - 1996	Y_DEP
	Vitality Ratio (20-39 year olds to persons aged 60+) - 1996	VITALITYRATIO96
	General Fertility Rate - 1996	GEN_FERT_R
	One-person households as % of all permanent private households	%1PERS_HSLD
	Couple only households as % of all permanent private households	%CPLEONLY_HSLD
	Couple+kids households as % of all permanent private households	%CPLEKIDS_HSLD
	Two pers. unrelated households as % of all permanent private households	%2PLNOTREL_HSLD
	Family Cycle Empty-nest as % of all Family Units	%FU_EMPTNEST
	Family Cycle Retired as % of all Family Units	%FU_RETIRED
	Family Cycle Pre-school as % of all Family Units	%FU_PRESCHL
	Family Cycle Early-school as % of all Family Units	%FU_EARSCHL
	Family Cycle Pre-adolescent as % of all Family Units	%FU_PREADOL
	Family Cycle Adolescent as % of all Family Units	%FU_ADOL

Table A.1: Initial Selection of 90 Variables for the Statistical Analysis *(continued)*

Category	Variable Description	Variable Name
Labour Force Characteristics	All persons labour force participation rate - 1996	LFPR_ALL
	Female labour force participation rate - 1996	F_LFPR
	Females aged 25-34 labour force participation rate - 1996	F_LFPR_25_34
	Females aged 35-44 labour force participation rate - 1996	F_LFPR_35_44
	Male labour force participation rate - 1996	M_LFPR
	Males aged 15-24 labour force participation rate - 1996	M_LFPR_15_24
	Males aged 55-64 labour force participation rate - 1996	M_LFPR_55_64
	% of females 15+ involved in 'home duties'	FHOMEDUT96
	Persons self-employed as % of all persons At Work (excluding agr.)	SEEXCLAG96
	Persons at work part-time as a % of total population 15+ at work - 1996	%ATWK_PT_
	Males at work part-time as a % of total males 15+ at work - 1996	%M_ATWK_PT
	Females at work part-time as a % of total females 15+ at work - 1996	%F_ATWK_PT
	Persons at work as a % of all persons 15+ - 1996	%ATWK_ALL
	Retired as a % of all persons 15+ - 1996	%RETIRED_ALL
	Females aged 25-34 at work as % of all females aged 25-34 - 1996	%F_25_34_ATWK
Unemployment and Economic Dependency	Economic dependency ratio - 1996	ECON_DEP
	Unemployment rate all persons - 1996	ALL_UNEMPLRATE
	Unemployment rate males - 1996	M_UNEMPLRATE
	Unemployment rate females - 1996	F_UNEMPLRATE
	Unemployment rate males aged 25-34 - 1996	M_URATE_25_34
	Unemployment rate males aged 35-44 - 1996	M_URATE_35_44
	Unemployment rate females aged 25-34 - 1996	F_URATE_25_34
	Unemployment rate females aged 35-44 - 1996	F_URATE_35_44
	Unemployment rate all persons aged 25-34 - 1996	ALL_URATE_25_34
	Unemployment rate all persons aged 35-44 - 1996	ALL_URATE_35_44
	Long-term unemployment rate all persons - 1996	LTUALL
	Long-term unemployment rate males - 1996	LTUM
	Long-term unemployment rate females - 1996	LTUF
	Long-term unemployed as a % of all unemployed - 1996	%LTUALL

Table A.1: Initial Selection of 90 Variables for the Statistical Analysis *(continued)*

Category	Variable Description	Variable Name
Education and Social Class profile, lone parent families, affluence	% Total Population in Social Class 1	%SOC_CL_1
	% Total Population in Social Class 2	%SOC_CL_2
	% Total Population in Social Class 3	%SOC_CL_3
	% Total Population in Social Class 4	%SOC_CL_4
	% Total Population in Social Class 5	%SOC_CL_5
	% Total Population in Social Class 6	%SOC_CL_6
	% Total Population in Social Class 7	%SOC_CL_7
	% Persons 15+ finished full-time education - primary or no formal educ.	%ED_NO_FORM
	% Persons 15+ finished full-time education - lower secondary	%ED_LOWSEC
	% Persons 15+ finished full-time education - post grad degree	%ED_POSTGR
	% Persons 15+ finished full-time education - sub degree to deg/prof qual.	%ED_SUBTOPQ
	% of total family units - lone parent families - 1996	%LOPARENTSFU96
	% of Households with 2 or more cars - 1991	%HSLD2+CAR91
	% of Households with 0 cars - 1991	%HSLD0CAR91
Sectoral Employment profile	At Work - Agriculture, forestry and fishing as % of all pers. at work - 1996	%ATWK_AG
	At Work - Mining, Quarrying & Turf Prod. as % of all pers. at work - 1996	%ATWK_MIN
	At Work - Manufacturing industries as a % of all persons at work - 1996	%ATWK_MAN
	At Work - Building and Construction as % of all persons at work - 1996	%ATWK_B_C
	At Work - Electricity, Gas & Water supply as % of all pers. at work - 1996	%ATWK_E_G
	At Work - Comm., ins, fin. & business ser. as % of all pers. at work - 1996	%ATWK_COM
	At Work - Transpt. comm. and storage as % of all pers. at work - 1996	%ATWK_TRANSP
	At Work - Public admin. and defence as % of all persons at work - 1996	%ATWK_PUBADM
	At Work - Professional services as % of all persons at work - 1996	%ATWK_PROF
	At Work - Other ind. or ind. not stated as a % of all pers. at work - 1996	%ATWK_OTH
Commuting	Average distance (miles) travelled to work school or college - 1996	AVE_DIST_TR
	% travelling 30+ miles to work, school, college - 1996	%TRAVEL30+MILES96
Employment performance measure	Total Net Shift 1991-1996	NETSHIFT9196
	Net Shift standardised by 100 persons at work in 1991	NSHIFTBY100ATWK91

Table A.1: Initial Selection of 90 Variables for the Statistical Analysis *(continued)*

Category	Variable Description	Variable Name
Structure/ performance of the farming sector	Males At Work Occupation Farming 30 acres or less as % all males at wk.	MATWK_FARM30
	Males At Work Occupation Farming 30 to 50 acres as % all males at wk.	MATWK_FARM30_50
	Males At Work Occupation Farming 50+ acres as % all males at wk.	MATWK_FARM_50+
	Males At Work Occupation Other Agri as % all males at wk.	OCCATWKMOT
	Average ESU (European Size Units) per farm 1991 (CofAg)	AVEESUPERFARM_91
	Percentage of farms of 0-8 ESU economic size 1991 (CofAg)	FARMS0_8ESU91_%
	Percentage of farm holders aged under 45 yrs 1991 (CofAg)	FARMHLDRUND45_91 %
	Percentage of farm holders aged over 65 yrs. 1991 (CofAg)	FARMHLDR65PL_91_%
	Commercialisation Index (Component 1 in PCA, Lafferty, 2000)	COMMERCCOMP_SL_9 1
	Average Annual Work Units per farm in DED 1991 (CofAg)	
	AVEAWUFARM_91_%	

Table A.2: Correlation Matrix of 30 “Key” Variables

	POP_DENS	%AGE_0_14	%AGE_65PL	%M25-44MAR96	VITALITYRATIO96	%CPLEKIDS_HSLD	LFPR_ALL	F_LFPR	FHOMEDUT96	SEEXCLAG96	%M_ATWK_PT	%F_ATWK_PT	%ATWK_ALL	ALL_UNEMPLRATE	%SOC_CL1_2	%ED_LOWSECorless	%ED_POSTGR	%ATWK_AG	%ATWK_MAN	%ATWK_COM	%ATWK_PROF	%ATWK_OTH	MATWK_FARM_50+	AVEESUPERFARM_91	FARMHLDR65PL_91_%	%POPCH9196	%CHCOHORT20_298696	%ATWKCH9196	%ATWKNONAGRCH9196	%ATWKAGCH9196
POP_DENS	1.00																													
%AGE_0_14	0.17	1.00																												
%AGE_65PL	-0.36	-0.51	1.00																											
%M25-44MAR96	0.26	0.52	-0.40	1.00																										
VITALITYRATIO96	0.39	0.40	-0.83	0.34	1.00																									
%CPLEKIDS_HSLD	0.32	0.47	-0.70	0.46	0.66	1.00																								
LFPR_ALL	0.08	0.17	-0.50	0.13	0.55	0.36	1.00																							
F_LFPR	0.22	0.10	-0.41	0.24	0.48	0.30	0.77	1.00																						
FHOMEDUT96	-0.26	-0.03	0.36	-0.20	-0.36	-0.26	-0.50	-0.78	1.00																					
SEEXCLAG96	0.12	0.01	-0.02	0.05	0.00	-0.06	-0.06	-0.01	-0.06	1.00																				
%M_ATWK_PT	-0.05	-0.08	0.21	-0.14	-0.20	-0.28	-0.23	-0.16	0.13	0.02	1.00																			
%F_ATWK_PT	0.12	0.10	-0.10	0.05	0.07	0.06	0.01	0.04	-0.07	0.13	0.18	1.00																		
%ATWK_ALL	0.00	0.12	-0.36	0.16	0.39	0.35	0.80	0.63	-0.44	-0.06	-0.41	-0.04	1.00																	
ALL_UNEMPLRATE	0.09	-0.02	0.06	-0.12	-0.05	-0.18	-0.24	-0.20	0.17	0.04	0.43	0.08	-0.77	1.00																
%SOC_CL1_2	0.04	0.06	-0.23	0.11	0.20	0.26	0.28	0.32	-0.32	0.21	-0.34	0.01	0.44	-0.42	1.00															
%ED_LOWSECorless	-0.33	-0.07	0.36	-0.25	-0.37	-0.32	-0.33	-0.50	0.51	-0.24	0.27	-0.07	-0.45	0.38	-0.55	1.00														
%ED_POSTGR	0.18	0.01	-0.15	0.10	0.18	0.09	0.14	0.26	-0.30	0.23	-0.08	0.08	0.16	-0.12	0.32	-0.47	1.00													
%ATWK_AG	-0.61	-0.18	0.42	-0.36	-0.45	-0.35	-0.17	-0.44	0.42	-0.13	-0.07	-0.17	-0.02	-0.16	-0.01	0.45	-0.27	1.00												
%ATWK_MAN	0.25	0.13	-0.24	0.19	0.25	0.28	0.13	0.15	-0.09	-0.21	-0.05	-0.08	0.03	0.08	-0.20	0.06	-0.08	-0.40	1.00											
%ATWK_COM	0.47	0.08	-0.30	0.26	0.32	0.28	0.12	0.25	-0.25	0.30	-0.04	0.14	0.06	0.04	0.12	-0.35	0.18	-0.57	0.02	1.00										
%ATWK_PROF	0.29	0.11	-0.16	0.24	0.14	0.18	0.08	0.38	-0.45	0.06	-0.03	0.11	0.09	-0.06	0.36	-0.48	0.34	-0.46	-0.11	0.19	1.00									
%ATWK_OTH	0.20	-0.08	-0.10	-0.04	0.14	-0.07	0.08	0.24	-0.26	0.27	0.12	0.18	-0.03	0.13	0.05	-0.32	0.28	-0.37	-0.17	0.14	0.04	1.00								
MATWK_FARM_50+	-0.53	-0.11	0.28	-0.25	-0.30	-0.19	-0.05	-0.24	0.27	-0.14	-0.25	-0.19	0.13	-0.28	0.28	0.24	-0.20	0.81	-0.33	-0.45	-0.31	-0.31	1.00							
AVEESUPERFARM_91	0.13	0.07	-0.34	0.07	0.33	0.35	0.19	0.14	-0.11	0.03	-0.33	-0.04	0.24	-0.19	0.42	-0.27	0.03	0.06	0.03	0.09	0.01	-0.02	0.24	1.00						
FARMHLDR65PL_91_%	-0.12	-0.12	0.31	-0.08	-0.24	-0.24	-0.12	-0.05	0.07	-0.03	0.29	0.05	-0.22	0.24	-0.26	0.18	0.00	-0.09	0.01	-0.06	0.02	0.06	-0.24	-0.46	1.00					
%POPCH9196	0.20	0.33	-0.28	0.26	0.33	0.22	0.20	0.26	-0.21	0.17	-0.05	0.08	0.14	-0.02	0.17	-0.32	0.25	-0.31	0.01	0.21	0.18	0.26	-0.22	0.07	-0.07	1.00				
%CHCOHORT20_298696	0.09	0.21	-0.21	0.28	0.28	0.16	0.18	0.23	-0.21	0.19	-0.05	0.10	0.19	-0.10	0.25	-0.35	0.30	-0.20	-0.07	0.14	0.23	0.21	-0.13	0.00	-0.03	0.43	1.00			
%ATWKCH9196	0.20	0.02	-0.28	0.14	0.33	0.16	0.29	0.34	-0.30	0.07	0.08	0.15	0.22	-0.06	0.10	-0.27	0.20	-0.34	0.10	0.19	0.13	0.28	-0.28	0.05	-0.04	0.49	0.28	1.00		
%ATWKNONAGRCH9196	-0.09	-0.06	-0.02	-0.05	0.06	-0.07	0.15	0.12	-0.09	-0.01	0.12	0.09	0.14	-0.07	0.02	-0.06	0.10	-0.02	-0.05	-0.05	-0.02	0.18	0.01	-0.03	0.02	0.35	0.17	0.72	1.00	
%ATWKAGCH9196	0.04	0.00	-0.09	0.02	0.11	0.06	0.12	0.08	-0.06	-0.01	0.00	0.02	0.07	0.01	0.03	0.01	0.00	0.06	0.05	-0.04	-0.05	-0.02	0.00	0.08	-0.08	0.09	0.04	0.39	0.01	1.00

A.3 Step 2 – Principal Components Analysis

Principal Components Analysis (PCA) serves two purposes. Firstly, it is a means by which underlying structural dimensions in a data set may be identified. It has the ability to reduce/transform a large data set, made up of many intercorrelated variables, to a smaller collection of key explanatory 'components' or dimensions (effectively representing groups of variables). The resultant components are uncorrelated. Secondly, PCA may be used to identify general patterns of spatial covariation (the "null hypothesis" being that each variable has a unique spatial variation). In other words, each of the dimensions (components) extracted from the data may be shown to have a distinct spatial configuration.

Very often the initial solution provided by a PCA is ambiguous and not easily interpretable, with variables loading highly on more than one factor. In order to simplify the component structure and so increase the interpretability of the components a rotated solution may be obtained without any loss of explanation or variance. The basic objective with rotation is to ensure that variables will have high loadings on some components and zero, or close to zero, loadings on the others (Davies, 1984). There are several ways in which this may be achieved.[19] In this analysis it is necessary to maintain the orthogonality between components so the choice of methodology will reflect this stipulation. One of the more widely used methods which accommodates the latter is the Varimax procedure, which is available in SPSS™. Table A.3 below illustrates how rotation of the components has resulted in a redistribution of the overall variance amongst the eight components, while the overall proportion of variance explained by the model remains unchanged.

Table A.3: Total variance explained (unrotated and rotated solutions)

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1. Dominance of non-agricultural employment	7.094	23.648	23.648	3.737	12.458	12.458
2. Labour Force Participation	3.548	11.826	35.474	3.598	11.992	24.450
3. Demographic Viability	2.591	8.635	44.109	2.765	9.216	33.666
4. Strength of Agricultural Sector	2.018	6.725	50.835	2.722	9.073	42.739
5. Socio-economic profile	1.784	5.946	56.780	2.513	8.376	51.115
6. Population & Employment Dynamics	1.422	4.738	61.519	2.209	7.362	58.477
7. Rural Diversification	1.126	3.752	65.271	1.814	6.046	64.523
8. Agricultural Employment Change	1.040	3.468	68.738	1.265	4.215	68.738

19. See Davies (1984) for a comprehensive discussion of the various methods available.

Table A.4 reports the communalities for each of the variables – ie the proportion of the variance for each variable accounted for by all of the components, ranging on a scale from 0 to 1. Most of the variables are well represented in the eight-component model as evidenced by the size of their communalities.

Table A.4: Communalities with 30 variables

Variable	Initial	Extraction
Population Density	1.000	.651
Persons aged 0-14 yrs as a % of the total population	1.000	.760
Persons aged 65+ yrs as a % of total population	1.000	.811
% of total males aged 25-44 years who are married	1.000	.625
Vitality Ratio (20-39 year olds to persons aged 60+) - 1996	1.000	.788
Couple+kids households as % of all permanent private households	1.000	.700
All persons labour force participation rate	1.000	.864
Female labour force participation rate	1.000	.852
% of females 15+ involved in 'home duties'	1.000	.699
Persons self-employed as % of all persons At Work (excluding agr)	1.000	.510
Males at work part-time as a % of total males 15+ at work	1.000	.553
Females at work part-time as a % of total females 15+ at work	1.000	.384
Persons at work as a % of all persons 15+	1.000	.876
Unemployment rate, all persons	1.000	.657
% Total Population in Social Class 1&2	1.000	.702
% Persons 15+ finished full-time education - no form to lower secondary	1.000	.756
% Persons 15+ finished full-time education - post grad degree	1.000	.429
At Work - Agriculture, forestry and fishing as % of all pers at work	1.000	.901
At Work - Manufacturing industries as a % of all persons at work	1.000	.648
At Work - Comm, ins, fin & business ser as % of all pers at work	1.000	.504
At Work - Professional services as % of all persons at work	1.000	.740
At Work - Other ind or ind not stated as a % of all pers at work	1.000	.638
Males At Work Occupation Farming 50+ acres as % all males at wk.	1.000	.818
Average ESU (European Size Units) per farm, 1991 (CofAg)	1.000	.642
Percentage of farm holders aged over 65 yrs, 1991 (CofAg)	1.000	.540
% Population Change 1991 to 1996	1.000	.615
% Change in size of 20-29 yr cohort between 1986 and 1996 (net migration)	1.000	.536
% Change in numbers at work 1991 to 1996	1.000	.932
% Change in numbers at work in non-agricultural sectors 1991 to 1996	1.000	.748
% Change in numbers at work in agriculture 1991 to 1996	1.000	.743

Table A.5 shows how each variable correlates onto each component.

Table A.5: Component Matrix (Rotated solution)

	Component							
	1	2	3	4	5	6	7	8
Population Density	.761		.124	.167	.138			
Persons aged 0-14 yrs as a % of the total population			.870					
Persons aged 65+ yrs as a % of total population	-.362	-.433	-.587	-.338	.105			-.121
% of total males aged 25-44 years who are married	.225		.688		.263		-.157	
Vitality Ratio (20-39 year olds to persons aged 60+) - 1996	.393	.488	.506	.307	-.119	.119		.103
Couple+kids households as % of all permanent private households	.295	.286	.612	.361			-.135	
All persons labour force participation rate		.898	.167	.122		.113		
Female labour force participation rate	.245	.840			.264	.100		
% of females 15+ involved in 'home duties'	-.302	-.665			-.388			
Persons self-employed as % of all persons At Work (excluding agr)	.132	-.150		.136	.178		.635	-.103
Males at work part-time as a % of total males 15+ at work		-.172		-.583	-.209		.215	.281
Females at work part-time as a % of total females 15+ at work			.182	-.212			.429	.337
Persons at work as a % of all persons 15+	-.199	.777	.112	.314	.244	.158	-.162	
Unemployment rate, all persons	.322	-.309		-.390	-.419	-.139	.261	.207
% Total Population in Social Class 1&2	-.156	.251		.470	.593		.191	
% Persons 15+ finished full-time education - no form to lower secondary	-.302	-.344		-.289	-.618	-.155	-.207	
% Persons 15+ finished full-time education - post grad degree	.190	.122			.513	.197	.263	
At Work - Agriculture, forestry and fishing as % of all pers at work	-.864	-.190	-.182	.164	-.193	-.122		
At Work - Manufacturing industries as a % of all persons at work	.477	.112	.139		-.273		-.550	
At Work - Comm, ins, fin & business ser as % of all pers at work	.616			.154	.156		.246	
At Work - Professional services as % of all persons at work	.283	.100	.130	-.155	.762			.143
At Work - Other ind or ind not stated as a % of all pers at work	.299	.195	-.173			.273	.624	
Males At Work Occupation Farming 50+ acres as % all males at wk.	-.803		-.126	.372				
Average ESU (European Size Units) per farm, 1991 (CofAg)		.106		.773				.144
Percentage of farm holders aged over 65 yrs, 1991 (CofAg)				-.722				

Table A.5: Component Matrix (Rotated solution) *(continued)*

	Component							
	1	2	3	4	5	6	7	8
% Population Change 1991 to 1996	.157		.375		.162	.616	.198	
% Change in size of 20-29 yr cohort between 1986 and 1996 (net migration)			.400		.341	.418	.261	
% Change in numbers at work 1991 to 1996	.243	.208				.797		.433
% Change in numbers at work in non-agricultural sectors 1991 to 1996		.117	-.103			.843		
% Change in numbers at work in agriculture 1991 to 1996				.176		.175		.816

A.4 Step 3 – Cluster Analysis

Cluster analysis allow DEDs to be grouped according to identifiable similarities in terms of their profile across all of the components identified in the PCA procedure. In effect, this provides a summary result of the spatial patterns driven by variation across all of the dimensions within the data.

Table A.6 provides a detailed profile of each Area Types identified by the cluster analysis procedure.

Table A.1: Profile of the Area Types

Variable	Area Type							
	1	2	3	4	5	6	Urban DEDs	State total
No. of DEDs	443	628	612	644	201	188	705	3421
% of DEDs	12.9	18.3	17.9	18.8	5.9	5.5	20.6	100.0
Area_sq_km	10089.9	13452.5	13886.9	15905.1	6212.1	5842.0	4340.5	69729.0
Population density	40.5	27.9	14.7	15.1	17.2	15.6	506.8	52.0
Total Population	408,876	375,493	204,039	239,535	107,026	91,378	2,199,740	3,626,087
% of Total Population	11.3	10.4	5.6	6.6	3.0	2.5	60.7	100.0
Population Change 1991- 1996	7,118	7,421	-5,753	-4,608	-451	4,643	91,998	100,368
% Population Change 1991- 1996	1.8	2.0	-2.7	-1.9	-0.4	5.4	4.4	2.8
Total At work	146,114	130,295	70,898	86,982	30,380	32,616	809,951	1,307,236
Change in number at work 1991- 1996	16,482	17,522	423	3,940	3,087	4,854	111,848	158,156
% Change in number at work 1991- 1996	12.7	15.5	0.6	4.7	11.3	17.5	16.0	13.8
% At work	47.7	46.9	46.2	47.6	38.0	46.0	47.8	47.2
% 0-14 yrs	25.1	26.1	24.9	23.6	25.3	22.4	22.9	23.7
% 15-24 yrs	16.3	16.8	14.8	15.1	15.3	14.6	18.5	17.5
% 25-44 yrs	26.1	26.8	25.2	25.1	24.1	26.1	29.4	28.0
% 45-64 yrs	20.4	19.4	20.3	20.1	19.8	21.9	18.9	19.4

Table A.1: Profile of the Area Types *(continued)*

Variable	Area Type							
	1	2	3	4	5	6	Urban DEDs	State total
% 65+ yrs	12.1	10.9	14.8	16.1	15.4	15.0	10.2	11.4
Elderly dependency ratio	193	174	246	266	261	240	152	176
Vitality ratio	1.6	1.8	1.3	1.2	1.2	1.3	2.3	1.9
Male labour force participation rate	69.9	73.3	70.8	70.6	67.4	69.9	70.6	70.7
Female labour force participation rate	37.7	35.3	31.4	34.1	32.4	36.5	44.0	40.7
% At work - Agriculture	14.5	23.2	39.7	31.1	24.1	21.7	1.6	10.2
% At work in mining, quarrying & turf production	0.6	1.1	0.6	1.0	1.0	0.4	0.2	0.4
% At work in manufacturing	19.4	21.7	13.9	20.5	20.8	11.4	19.1	19.1
% At work in building & construction	7.7	9.0	7.1	8.1	9.2	8.0	5.8	6.7
% At work in electricity & gas	1.0	0.8	0.8	0.8	0.9	0.6	0.9	0.9
% At work in commerce, ins., Fin. & business services	18.4	15.7	12.5	12.3	13.4	16.1	24.2	20.8
% At work in transport, communications & storage	5.0	4.3	3.4	3.9	3.7	4.6	7.0	6.0
% At work in public administration	5.3	4.1	3.4	3.8	4.3	3.6	7.0	6.0
% At work in professional services	19.4	12.2	12.9	12.4	14.9	13.5	20.8	18.5
% At work in other industries (or industries not stated)	8.7	8.0	5.7	6.0	7.7	20.0	13.3	11.4
Self employed (excl. Agric.) as % of Total At Work	16.9	15.1	16.3	12.9	14.1	22.4	11.8	13.1
Males at work part-time as % of Total Males At Work	7.8	8.6	7.6	8.7	18.0	11.4	7.1	7.9
Females at work part-time as % of Total Females At Work	25.3	24.6	23.7	19.9	29.0	27.2	25.7	25.3
Economic dependency	1.8	1.9	1.9	1.8	2.5	1.8	1.7	1.8
Unemployment rate	11.5	14.5	11.2	10.8	24.6	14.2	15.7	14.8
% of Total Population in Social Class 1+2	30.2	22.7	27.8	21.0	17.3	26.5	28.7	27.3
% of Total Population in Social Class 5+6	20.3	26.4	20.7	23.9	33.9	23.4	19.7	21.3
% Educated to low secondary or less	48.3	58.4	59.0	60.5	65.8	49.8	44.2	48.8
% Educated to post-graduate level	1.1	0.5	0.5	0.4	0.5	1.2	2.1	1.5

Table A.7 reports the distance between Area Types. This allows one to determine the closeness of each of the Area Types to one another. The larger the distance between Area Types the more unlike Area Types are from one another. This table highlights the distinctiveness of Area Type 1 and 6.

Table A.2: Distances between Area Types

Area Type	1	2	3	4	5	6
1		2.044	2.243	2.226	2.915	3.007
2	2.044		1.922	1.996	2.669	2.823
3	2.243	1.922		1.982	2.826	2.931
4	2.226	1.996	1.982		2.732	2.966
5	2.915	2.669	2.826	2.732		3.387
6	3.007	2.823	2.931	2.966	3.387	

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