

Regional Aspects of the Problem of Restructuring Use and Ownership of Agricultural Land in the Republic of Ireland*

J. P. O'CARROLL
University College, Cork

N. P. PASSCHIER, H. H. VAN DER WUSTEN
Municipal University of Amsterdam

I INTRODUCTION

This paper is an attempt to identify regional delineations which are relevant for the problem of restructuring the use and ownership of agricultural land in the Republic of Ireland. The social scientist's interest in regional classification arises from the fact that combinations of various dimensions of rural social structure are not randomly distributed spatially. The first aim is to identify regions which differ in regard to the structure of agriculture. Previous studies of farm structure have not used a systematic method for delineating regions.¹ It was decided that a strict procedure be adopted rather than an impressionistic one. Subjectivity is seen as applying only to the selection of variables used for classification and to the degree of homogeneity within regions.

The second aim is to relate the characteristics of each region to the problem of restructuring. The conformation of the elements, land,

1. See Macra na Feirme (1973) and Scully (1971).

*The authors wish to acknowledge the assistance of Mrs. K. Zonneveld-Zondag, who prepared the data while writing her thesis; Messrs. F. M. Dieleman and M. C. Deurloo, Department of Geography, Free University, Amsterdam, who kindly provided the computer programme used in this study; and the Departments of Geography and Geology, University College, Cork for preparing the maps. The comments of Professor D. Hannan and Dr. M. Ross of The Economic and Social Research Institute, Dublin, and particularly of the referee are also acknowledged.

demography and economy characteristic of each region is seen as the context in which a restructuring programme must be considered.²

This paper (a) describes the nature of the data used; (b) examines the pattern of the combination of the basic dimensions of agriculture (i.e., land, demography, and production enterprise), which underlie regional variations; (c) compares a number of regional classifications based on different data sets and from these identifies stable core areas of the regions; and (d) examines the research and policy implications of the study.

This approach differs from other classifications of rural areas in that it uses a rigorous procedure and is part of a larger research programme on the restructuring of agriculture.³ The regional classification will provide a basis for valid extrapolation of the findings of a number of community surveys on the problem of restructuring which were carried out in different parts of the country as part of the research programme. The broader implications of regional identification are discussed in the closing section.

II STRUCTURAL PROBLEMS, RESTRUCTURING AND THE DATA

The choice of data was based on the need to describe the regional structure of agriculture in such a way as to shed light on structural problems, and to allow, where possible, inferences to be drawn concerning a limited number of restructuring options. The family farm is the basic unit of organisation of Irish agriculture. It has been conceptualised by sociologists and economists as a system embracing land, economy and family.⁴ Land and labour originate in the corporate household. Strong feelings of attachment are generated in relation to family land, traditional enterprises and skills. The data also reflect the major structural problems of the system, i.e., late succession and inheritance, and the problem of viability on small farms

2. For a general discussion of contextual effects, see the Introduction to Dogan and Rokkan, *eds.* (1969, pp. 1-15). In the same volume many detailed examples of ecological analysis may be found. The ecological method has also been used in studies of social change and of political behaviour in this country. See, for example, Rumpf (1959). The treatment of the pattern of land league activities by Lee (1973, pp. 80-85) is another example.

3. Sociological aspects of the Problem of Restructuring Agriculture in the Republic of Ireland, J. P. O'Carroll (in progress). The study is in three parts: (i) An observational study of attitudes to land ownership and use; (ii) a survey of sociological aspects of restructuring in five communities and; (iii) a delineation of ecological aspects of the restructuring of land ownership and use. The research is funded by the Committee for the Administration of the Ford Foundation Grant for Social Science Research in Ireland.

4. Arensberg and Kimball (1940), Shanin (1971), Symes (1972), Johnson and Conway (1976).

with poor soil. The authoritarian patriarchal tendencies of the system and the traditional obligations of the stem family to siblings are associated with late succession and inheritance. As a result, land resources are not efficiently utilised by older farmers, who usually farm less intensively and adhere to traditional but less remunerative enterprises while denying access to farming to a younger generation who would be more likely to modernise.

The second major problem in the system arises from the fact that many farms are too small to support acceptable living standards and have, in recent years, shown little economic growth. (Johnson and Conway, 1976). Many farmers in such circumstances fail to marry, and others turn to non-farm sources to supplement farm income. Few, however, are able to gain access to extra land through either purchase or renting, because strong familism ensures that most land transfers are within the family. Furthermore, the absence of a tradition of long-term leasing limits interfamily transfers. The paradox of the problem is that there is a considerable minority of progressive farmers who lack access to land, while many old farmers produce very little, and lack successors. In the same way young farmers are excluded until late in life from control or ownership of land which is in the hands of their less productive parents.

While any restructuring policy is based on the primary rationale of efficient land use with a view to the highest possible national return, other values must be considered such as the commitment to the idea of the family farm, the idea that it should be viable, that the maximum number of such farms should exist, and that restructuring should cause minimum social disruption.

A restructuring programme in practice will employ a number of strategies such as encouraging earlier succession and inheritance, and transferring use or ownership of land from older inefficient farmers who can be persuaded to retire to young progressive farmers who are in need of land in order to achieve viable farm size. Also, in areas where land pressure is severe various schemes for supporting efficient part-time farming may be encouraged.

With these considerations in mind, fourteen variables measuring dimensions of the structure of farm production, land and demography are used as a basis for delineation of the regions. The unit analysis is the Rural District (see Census of Population 1971, Vol. 1), and the data are derived from the Agricultural Statistics 1970 and the Census of Population 1971.

The first eight variables measure the major dimensions of agricultural production. The traditional mix of enterprises contributes largely to the distinctive culture of each region but it is also reflected in regional variations in farm incomes, and viability. (Farm Management Survey 1972-75, AFT 1977.) For example, regions devoted predominantly to the production of young (store) cattle have low incomes in comparison with tillage and dairying

Table 1.: *The variables depicting the agricultural situation*

No.	Variables and definition	Sources
<i>Type of farm production</i>		
1.	TILLAGE: Acreage used for corn, root and green crops as a percentage of acreage under grassland and pasture.	Agr. Stat. 1970, Table 2.
2.	WHEAT and BARLEY: Acreage under wheat and barley as a percentage of total area.	Agr. Stat. 1970, Table 2.
3.	OATS: Acreage under oats as a percentage of total area.	Agr. Stat. 1970, Table 2.
4.	YOUNG CATTLE: Cattle under two years old in Livestock Unit Equivalents. (LUE) as a percentage of total number of cattle in LUE. ⁺	Agr. Stat. 1970, Table 3.
5.	SHEEP: All sheep in LUE as a percentage of total numbers of cattle and sheep in LUE.	Agr. Stat. 1970, Table 3 and 4.
6.	OLDER CATTLE: Other cattle two years old and over as a percentage of dry cattle under two years old in LUE.	Agr. Stat. 1970, Table 3.
7.	MILCH COWS: Milch cows as a percentage of total number of cattle in LUE.	Agr. Stat. 1970.
8.	PIGS: Total number of pigs per holding more than 5 acres (cf. variable 11).	Agr. Stat. 1970, Table 5 and unpublished records.
<i>Type of farm holdings</i>		
9.	LETTING: Total area let as a percentage of the total area forming holdings.	Unpublished records.
10.	VALUATION: Average rateable valuation/acre.	Population census Vol. 1, Table II.
11.	SMALL HOLDERS: Holdings 6–50 acres as a percentage of total number of holdings with more than 5 acres.	Unpublished records.
<i>Type of rural population</i>		
12.	YOUNG MEN: Males 15–29 years of age as a percentage of males over 50.	Population census '71, Vol. II, Table 13.
13.	OLD SINGLES: Percentage of Population over 49 years of age that is still unmarried.	Population census '71, Vol. II, Table 13.
14.	SEX RATIO: Single women aged 25–49 as a percentage of single men 30–54.	Population census '71, Vol. II, Table 13.

⁺ For definition of LUE see Farm Management Survey 1972–5, An Foras Talúntais, 1977.

areas. The implication of choice of enterprise for a restructuring programme is that, other things being equal, if a locality is engaged in low return enterprises its need for some form of restructuring will be greater. On the other hand, localities which have a higher return from the enterprise mix will find it much easier to generate the capital needed for modern farming.

The second block of variables, (Nos. 9-11) pertain to the land dimension. Letting of land is a transfer of use of land usually outside the family. It does not involve the capital cost of land purchase. Localities which have a tradition of letting land are assumed to be more likely to adopt some form of long term leasing than areas with no such tradition. Since one form of restructuring would involve providing progressive farmers on non-viable holdings with opportunities for leasing land from older farmers without successors who were willing to retire, the association between letting of land and the relevant demographic and other land structure characteristics are of interest. It may be found that there is no tradition of letting in such areas. The proportion of smallholders in each area (i.e., holdings of less than 50 acres) and the valuation of the land represent the relative viability of the locality. The 50-acre point was chosen because it has been identified as the boundary between growth and non-growth situations. (Johnson and Conway, 1976). Valuation is indicative of land quality.

The youthfulness of males in each district, the proportion of the population who were old and single, and the sex ratio of the single able-bodied population are indicative of the quality and availability of farm labour and management, the household structure, and the local marriage opportunities of the farm population, respectively. Localities with a low proportion of youth reflect late succession and inheritance. A high proportion of old single farmers indicate lack of successors, if not inheritors, and the potential availability of land for increasing farm size. It was not possible to get records of non-farm sources of income.

The population figures for the Rural Districts have been cleared of the urban population (i.e., those living in towns of over 1500 inhabitants). The whole of Co. Dublin was excluded because of the domination of the urban element, so the study is based on data from the remaining 155 Rural Districts.

III INITIAL ANALYSIS

The purpose of this section is to examine the pattern of the combinations of the basic dimensions of Irish agriculture, i.e., land, demography and choice of enterprise which underlie regional variations. Particular attention is paid to the role of demography, since this dimension has usually been

omitted from studies of this nature. The correlation matrix is first examined and other aspects of the structure are inferred from factor analysis and from selected partial correlations.

Correlations (Table 2) were generally low. Out of 91 coefficients only 5 were 0.60 or over, and only 48 were 0.20 or over. The intercorrelation pattern of each dimension is considered first followed by examination of the overall pattern of intercorrelation. Correlations among land variables are weak. **SMALLHOLDERS** is positively related to **LETTING** and negatively related to **VALUATION**. (See Table 1 for description of variables and their labels.) Regional intercorrelation in demographic structure is somewhat stronger. **YOUNG MEN** is positively associated with **SEX RATIO** (0.62) and negatively with **OLD SINGLES**. The correlation between **OLD SINGLES** and **SEX RATIO** is negative and unexpectedly weak (- 0.19) suggesting that failure to marry is due to social barriers rather than the lack of marriage partners.

In considering the regional structure of enterprise choice, tillage (variables 1 to 3) is examined separately from livestock (variables 4 to 8). Crop production (**TILLAGE**) is much more closely associated with the production of commercial cereals (**WHEAT AND BARLEY**) (0.85) than it is with **OATS** (0.26), which is usually regarded as the traditional tillage crop of subsistence farming areas. However, the fact that this association is positive rather than negative implies that oats production is dispersed throughout the country. **OATS** nevertheless, does show a closer correlation with small farm livestock enterprises such as **SHEEP** and **YOUNG CATTLE** (Table 2).

Livestock enterprises show much stronger regional differentiation, e.g., **MILCH COWS - OLDER CATTLE** (- 0.63), **YOUNG CATTLE - OLDER CATTLE** (- 0.45) and **MILCH COWS - YOUNG CATTLE** (- 0.38). The well known regional specialisation in the production of milk, store cattle and beef is represented by these figures.

The subsidiary enterprises **SHEEP** and **PIGS** are associated positively with **YOUNG CATTLE** and **MILCH COWS** respectively, but the correlations are low (0.25 and 0.30).

The principal associations between the three major dimensions are presented in Figure 1. Variables with few strong correlations are excluded, i.e., No. 3 (**OATS**), No. 9 (**LETTING**) and No. 11 (**OLD SINGLES**), and only coefficients ≥ 0.20 are included. If the correlations between variables were 0.60 or over, the variables were treated as a "block" of an integrated nature. Three variables describing aspects of the demographic and land structure dimensions emerge as a "block" i.e., **VALUATION**, **YOUNG MEN** and **SEX RATIO**. These are positively associated with commercial tillage variables (the second "block") and with **OLDER CATTLE**, and negatively with **SMALLHOLDERS**.

Table 2.: Correlation matrix of the 14 variables

	<i>Tillage</i>				<i>Drystock</i>		<i>Dairy and pigs</i>		<i>Land structure</i>			<i>Demography</i>		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1.00													
2	0.85	1.00												
3	0.46	0.26	1.00											
4	0.11	-0.04	0.28	1.00										
5	0.15	-0.01	0.21	0.25	1.00									
6	0.01	0.19	-0.14	-0.45	0.05	1.00								
7	-0.16	-0.23	-0.11	-0.38	-0.26	-0.63	1.00							
8	0.39	0.34	0.14	-0.10	-0.36	-0.24	0.30	1.00						
9	-0.04	0.05	0.12	0.16	0.01	0.16	-0.29	-0.25	1.00					
10	0.39	0.55	0.13	-0.27	-0.28	0.48	-0.29	0.29	0.17	1.00				
11	-0.48	-0.50	-0.00	0.21	0.17	-0.00	-0.12	-0.48	0.28	-0.24	1.00			
12	0.51	0.65	0.16	-0.39	-0.01	0.53	-0.24	0.19	0.02	0.72	-0.35	1.00		
13	-0.00	-0.08	0.17	0.24	0.06	-0.16	-0.06	0.03	-0.01	-0.23	-0.01	-0.33	1.00	
14	0.45	0.45	0.15	-0.42	0.08	0.34	-0.00	0.11	0.02	0.55	0.27	0.62	-0.19	1.00

For description of variables see Table 1 and text.

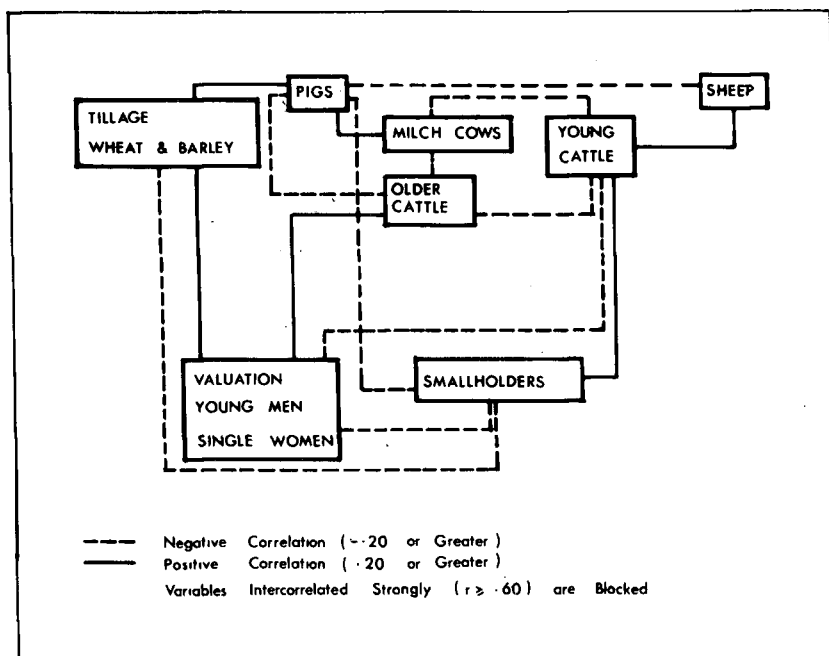


Figure 1.

The inspection of correlations therefore suggests four main types of farming situation in Ireland: (a) the traditional situation associated with the West, characterised by the emphasis on young cattle and sheep as livestock, oats as an important fodder crop, subsistence farming on very small holdings on poor quality land, and a striking demographic imbalance outside the towns; (b) the Southwestern context of intensive dairying where the circumstances of land and demography are somewhat (but not much) better; (c) the Eastern context of commercial cereal production; and (d) of commercial beef cattle production. Both the latter areas are connected with a better demographic situation.

The characteristics of the structure are further explored by factor analysis (Principle component, varimax rotations) which generally supports the interpretation derived from the correlation matrix (Table 3). However, it also further clarifies aspects of the structure not previously suspected. (See F. 5 in Table 3). The factors are Tillage (F.1), regional differentiation between beef and milk production (F.2), store cattle farming (F.3), subsidiary livestock enterprises, i.e., sheep and pigs (F.4). A new dimension emerges with the fifth factor characterised by renting of land in areas of small holdings (F.5). It is associated with traditional subsistence farming involving the production of young cattle and oats. The emergence of this factor, though it explains only 11 per cent of the variance, is important in the light of the

aims of this study, as it points to a dimension pertaining to the structure of land holding.

Table 3.: *Factor matrix (5 factors) principle components, varimax rotation*

<i>Variable Number *</i>	<i>F1</i>	<i>F2</i>	<i>F3</i>	<i>F4</i>	<i>F5</i>
1	-0.93	0.01	0.02	-0.07	-0.09
2	-0.85	0.23	-0.09	0.12	-0.07
3	-0.61	-0.24	0.16	-0.25	0.36
4 ^{Enter-}	-0.13	-0.11	0.77	-0.22	0.36
5 ^{prise}	-0.12	0.06	0.08	-0.91	-0.03
6	-0.00	0.88	-0.36	-0.03	-0.01
7	0.17	-0.83	-0.30	0.20	-0.27
8	-0.48	-0.31	0.05	0.58	-0.28
9	-0.02	0.19	-0.00	0.08	0.81
10 Land	-0.52	0.43	-0.40	0.40	0.18
11	0.51	-0.03	0.01	-0.30	0.60
12	-0.60	0.41	-0.55	0.07	-0.05
13 ^{Demog-}	-0.02	0.04	0.67	-0.00	-0.16
14 ^{raphy}	-0.51	0.13	-0.64	-0.11	-0.06
Explained variance:	24.3%	14.9%	14.7%	11.5%	10.7%

* For variable labels see Table 1.

The relationship of the land and demographic dimension to the various enterprises is an interesting aspect of the structure. The variables representing the demographic dimension are not extracted as a separate factor. They load on the first three factors, i.e., tillage, regionality of beef and milk production, and most heavily on store (i.e., young) cattle production. Factor 1 (tillage) is associated with large farms, high valuation, a youthful population and balanced sex ratios. The profile of the third factor suggests a close association between store cattle production and poor demographic structure, i.e., an aged population of old single people with very poor sex ratio. These findings confirm those of Scully (1962), Symes (1972), and Johnson and Conway (1976) which indicated a relationship between household size and efficiency.

The remaining factors (F.4 and F.5) are not characterised by any demographic dimension. In the case of F.5, i.e., letting of land in areas of small farms, the lack of a demographic dimension is in line with research on retirement in farming (Macra na Feirme, 1973a), which shows no significant relationship between a farmer's age and his willingness to sell or lease land. In fact, young men taking non-farm jobs may be letting land, while older

men cling to the traditional way of life except for the minority who become incapacitated through ill health. One could speculate that letting of land demands a balance between the young active farmers who are prepared to expand their business, and older farmers or widows prepared to abandon farming. Factor five suggests that, as far as letting is concerned, these conditions have not been met in areas with poor demographic structure.

In considering the findings of this section one finds it difficult to speculate on the relationship between the major dimensions of the system of agriculture in terms of causality. There is always the danger of the "fallacy of the wrong level", i.e., to explain in a plausible but misleading way observations on aggregate data by reference to individual behaviour.⁵ It could be argued that, in the short term, demographic structure affects choice of enterprise through its effect on labour availability, household needs, and managerial calibre (including motivation to maximise income rather than merely satisfying household needs), and that these forces are manifest at the ecological level. While this interpretation may hold to some extent, the data also suggest complementary explanations. The emergence of a "block" of variables from the correlation matrix with correlations of 0.50 and over comprised of VALUATION, YOUNG MEN and SEX RATIO, and the nature of the performance of the factor analysis which relates the youthful population to cereal production (F1) and store cattle production to very poor demographic characteristics (F.3), suggest interpretations more appropriate to an ecological level of analysis. Since enterprise variables as well as demographic and land characteristics manifest a general NE-SW divide (cf. Table 5), we suggest that soil quality and farm size may be considered as the determinants of the regional pattern of agriculture. As is shown by VALUATION (Table 5), the quality of land both for grass and for tillage is better in the east and south-east than in the west. Choice of enterprise is related to this fact. Furthermore, farms tend, generally, to be smaller where the soil is of poor quality thus limiting further farming prospects.

Consequently, the rate of emigration is higher and the marriage rate lowest (cf. Variables 12-14 in Table 5) in western areas of poor soils. The failure to adopt more lucrative farm enterprises in these areas can be considered as the cumulative effect of poor soils, small farms and incomplete farm households.

This suggestion is supported by the implications of the data in Table 4.

Table 4 shows the original correlations between the land structure variables (10-11) and choice of enterprise (1 to 8), and the partial correlations when two of the demographic variables are controlled.

5. A review of such fallacies has been given by Alker (1969).

Table 4.: *The relationship between land structure (variables 10 and 11) and choice of farm enterprise (variables 1 to 8) controlling for demographic circumstances (variables 12 and 14)*

<i>(a) The uncontrolled relationship between land structure and choice of enterprise</i>	<i>(b) Controlled for young men/old men</i>	<i>(c) Controlled for sex ratio</i>
$r(10) (1) = 0.39$	0.03	0.19
$r(10) (2) = 0.55$	0.15	0.40
$r(10) (3) = 0.13$	0.01	0.06
$r(10) (4) = -0.27$	0.02	-0.05
$r(10) (5) = -0.28$	-0.39	-0.39
$r(10) (6) = 0.48$	0.34	0.38
$r(10) (7) = -0.29$	-0.18	-0.35
$r(10) (8) = 0.29$	0.28	0.28
$r(11) (1) = -0.48$	-0.37	-0.38
$r(11) (2) = -0.50$	-0.38	-0.45
$r(11) (3) = 0.00$	0.06	0.04
$r(11) (4) = 0.21$	0.08	0.11
$r(11) (5) = 0.17$	0.18	0.20
$r(11) (6) = -0.00$	0.23	0.10
$r(11) (7) = -0.12$	-0.22	-0.13
$r(11) (8) = -0.48$	-0.45	-0.47

The pattern of differences between the simple and partial correlations supports the above hypothesis because when variable 12 is controlled the coefficients drop considerably for the first four variables which tend to be related to soil quality; the first three positively and the fourth negatively. The structure of agriculture thus reflects, at ecological level, the on-farm relationships between the three basic dimensions of the system.

However, further considerations of the general NE-SW divide in enterprise, land, and demographic variables suggests indirectly that "urban proximity" may be an additional factor in the explanation of rural agricultural patterns. The high valuations of Munster and Leinster reflect generally the high levels of urbanisation in those areas as well as the superior quality of the soil. Regrettably, a measure of "urban proximity" was not included in the study but a strong argument can be made for including measures of its various aspects in future studies.

Although the on-farm relationship between land, household and output may have its own dynamics, as outlined above, it will not be totally independent of external influences. By providing market outlets, non-farm employment, and social and cultural opportunities, the larger towns present a more favourable environment for farming, especially through their effect on the demographic structure. As most of the towns with such advantages are located in eastern and south-eastern counties, urban influences will be most important in these areas. Here the need to leave the countryside is less urgent, resulting in more balanced age and sex ratios. The realisation of marriage opportunities is less difficult as farm youth more easily acquire a style of life attractive to potential wives in urban employment. Furthermore, even if farm youth are engaged in off-farm employment and thus are more likely to marry than if they are assisting on the farm, many of them will inherit a farm eventually, thus ensuring good demographic structure.

Traditionally much more attention has been paid to the relationship between land structure and choice of enterprise (and thus farm income), than to the role of demographic factors, despite the fact that several authors⁶ have shown that both land and demographic factors are closely related to each other and to choice of enterprise.

In Table 4 the magnitude of the difference between the partial correlation and the corresponding simple correlation reflects the importance of demographic conditions for the relevant enterprise. In the case of the tillage variables and young cattle, the correlations are considerably reduced or have the sign altered. Demographic conditions seem, therefore, an intrinsic part of the operation of these enterprises, whether it is related to soil quality or urbanisation, or both.

In summary, the main characteristics of the structure of agriculture which underlie regional differentiation are:

- (1) A highly differentiated demographic and enterprise dimension, and a less differentiated land dimension showing some evidence of land pressure in areas of small farms. The poor differentiation along the land dimension is an artifact of the measure of farm size used which was based on growth potential.
- (2) Localities with high sex ratios tend to have a youthful population, and remaining areas have an ageing population with large numbers of old single people.
- (3) Regional differentiation of farm produce is seen mainly in the major live-stock enterprises and in commercial cereal production.

6. Arensberg and Kimball (1940), Symes (1972), Johnson and Conway (1976).

- (4) A strong association between demographic structure and choice of enterprise.
- (5) A NE/SW divide on many variables, such as valuation, holding size, demography and the more remunerative farm enterprises, suggesting strong background influences of soil quality or urban proximity.

In the next section the regions which reflect this structure are delineated, their characteristics examined, and their more stable areas identified.

IV THE REGIONS

Regional classes may be produced either by subdividing an area into relatively similar parts on the basis of *a priori* decisions concerning the relative importance of different variables, or by aggregating small areal components step by step. In the absence of a theoretical framework, the Rural Districts were aggregated by means of a stepwise clustering procedure. A contiguity constraint was not imposed in order to achieve minimum variance within the classes. It was hoped that classification would produce spatially closed areas.

The clustering procedure is known as Ward's algorithm.⁷ "Distances" between units are measured in multidimensional space, which is defined by z-scores of the 14 variables. Each variable is thus given equal weight and the condition of linearity is satisfied. The squared distance (D^2) between any two Rural Districts is the sum of the squared differences between z-scores on all 14 variables. The D^2 -matrix, representing the distance between all pairs of Rural Districts, is the input for stepwise clustering. In each step a Rural District is combined with another, or with an earlier established cluster which is 'nearest' to it. Programs for this procedure have been published most recently by Baker.⁸ As the process of clustering continues the internal homogeneity of each cluster decreases and an arbitrary decision must be made as to the number of clusters which is most meaningful and convenient. A decision was made to halt the process when 12 regions had emerged.

It is obvious that the results may vary when different data sets are used. Accordingly, three different data sets were chosen and the stability of the resulting regions was judged by the extent to which each classification overlapped. The data sets chosen were as follows:

I. all 14 variables; II. the eight enterprise variables; and III. four enterprise

7. Recently the techniques of grouping have been reviewed in several publications, e.g., by Bijnen (1973) and Everitt (1974).

8. Baker (1974). We were able to use a version adapted for the Amsterdam University's computer, kindly provided by Messrs. Deurloo and Dieleman, Department of Geography, Free University, Amsterdam.

Table 5.: The profiles of the regions emerging from the three groupings

	Grouping	Tillage	Wheat and Barley	Oats	Young cattle	Sheep	Older cattle	Milch cows	Pigs	Letting	Valuation	Smallholders	Young men	Old singles	Sex Ratio
A. East Donegal	I	++	—	+++	+	++	—	—	—	+	—	+	+++	++	
A. East Donegal	II	++	—	+++	+	++	—	—	—	+	—	+	+++	++	
B. Atl. Fringe	I	—	—	—	—	+++	—	+	—	—	—	+++	—	+	
B. Atl. Fringe	II	—	—	—	—	+++	—	+	—	—	—	++	—	+	—
B1 Atl. Fringe	III	—	—	—	—	+	—	—	—	+	—	+	+	++	—
B2 Mount. Sheep	III	—	—	—	—	+++	—	—	—	—	—	—	—	—	++
C. East Connacht	I	—	—	++++	+++	—	—	—	—	—	—	+	—	—	—
C. East Connacht	II	—	—	++++	+++	—	—	—	—	—	—	+	—	—	—
C. East Connacht	III	—	—	++++	+++	—	—	—	—	—	—	—	—	—	—
D1 Western, general	I	—	—	—	+	—	—	—	—	+	—	+	—	—	—
D2 Cavan-Monaghan	II	—	—	—	++	—	—	—	++	++	+	++	—	+	—
D. Western general	II	—	—	—	+	—	—	—	—	+	—	+	—	—	—
D1 Western general	III	—	—	—	+	—	—	—	—	+	—	+	—	—	—
D2 Western grazing	III	—	—	+	++	—	—	—	—	+	—	++	—	—	—
E. Munster Dairying	I	—	—	—	—	—	—	+++	+	—	—	—	—	—	—
E. Munster Dairying	II	—	—	—	—	—	—	+++	—	—	—	—	—	—	—
E. Munster Dairying	III	—	—	—	—	—	—	+++	+	—	—	—	—	—	—
F. East Cork-Waterford	I	++	+	+	—	—	—	+	++	—	—	—	+	+	—
F. East Cork-Waterford	II	+	+	++	—	—	—	++++	—	—	+	—	—	—	+
F. East Cork	III	++	++	++	—	—	—	++++	—	—	++	—	+	—	++
G. Southern Midlands	I	—	—	—	+	—	—	—	—	—	—	—	—	—	—
G. Southern Midlands	II	+	+	—	+	—	—	—	+	—	+	—	—	—	—
G. Midlands and South	III	+	++	—	+	—	—	—	++	—	+	—	—	+	—
H. Arable South-East	I	++++	+	+	+	+	—	+	—	—	+	—	++	—	+
H1 Arable South-East	II	++++	+	+	+	—	—	+	—	—	+	—	++	—	++
H2 Wicklow-Wexford	III	++++	+	+	+	—	—	+	—	—	+	—	+	—	+
H. Arable country	III	++++	+	+	+	—	—	+	+	++	—	—	++	—	++
I. Louth+town areas	I	++++	++	—	+	—	+	+	++++	—	+	+	+++	—	+++
I. Louth	II	++++	++	—	+	—	++	—	—	++++	—	+	+++	—	+++
I. Ardee No. 1 R.D.	III	++++	++	—	+	—	+	—	—	++++	—	+	+++	—	+++
J. Dublin hinterland	I	+	++	—	—	—	++++	—	—	+	+	+	+++	—	+++
J. Dublin hinterland	II	+	++	—	—	—	++++	—	—	+	+	+	+++	—	+++
J. Dublin hinterland	III	+	++	—	—	—	+++	—	—	+	+	+	+++	—	+++
K. Westmeath fattening	I	—	—	—	—	—	+++	—	—	++	++	—	+	—	—
K. Westmeath fattening	II	—	—	—	—	—	+++	—	—	+	+	+	—	—	—
K. Westmeath-Offaly	III	—	—	—	—	—	++	—	—	++	—	—	—	+	—

— = Average z-score —0,25 to —0,75;

+ = +0,25 to +0,75

— = Average z-score —0,75 to —1,25;

++ = +0,75 to +1,25

— = Average z-score —1,25 and less;

+++ = +1,25 and more

variables (Numbers 2, 4, 5, 7) chosen from the results of the factor analysis so as to avoid over representation of any one factor, e.g., variables No. 1 and 2 load heavily on the first factor, therefore only No. 2 was used. The variables chosen load heavily on demographic characteristics.

Twelve regions were delineated in each case, and the internal variance was 34 per cent, 22 per cent and 17 per cent respectively. In Table 5 the profile of each region is presented for each of the three data bases. These are assessed by calculating the average scores on the 14 variables.

Grouping No. 1: Characteristics of the Regions Derived from the 14 Variable matrix.

The regions are illustrated in Figure 2 and the following description is based on Grouping I in Table 5.

(A.) *The East Donegal Area* — This area is similar to other areas West of the Shannon (Types B to D) but is differentiated from them by the presence of a tillage tradition. The area is known for its production of oats and potatoes. The concentration of old single people is the highest in the country and, paradoxically, this is found side-by-side with a high sex ratio. The latter may reflect its proximity to Derry. Farms are small and valuations rather low. The main enterprises are young cattle and sheep with an average concentration of dairy cows.

(B.) *The Atlantic Small Farm Fringe* — This most marginal area in the country has the smallest holdings, the lowest valuation and the least letting of all regions. It stretches along the Western seaboard from Donegal to Kerry. Sheep are in high concentration and milch cows are above average. The latter characteristic can be interpreted in the light of a subsistence farming pattern in a very poor area where a high proportion of young stock cannot be overwintered due to lack of winterfeed. The presence of a high proportion of old single people is associated with a very low amount of letting of land. This is possibly due to a paucity of young men in the area as well as to a tradition of subsistence farming.

(C.) *East Connaught Stock Raising and Sheep Breeding Area* — Central and East Galway and adjacent parts of Mayo and Roscommon are well known as sheep producing areas. The traditional farming of these areas is represented by high concentration in the producing of young cattle, sheep and oats. Farms are small and valuations are low, but not as low as in the regions A and B, suggesting better quality soil. The very low sex ratio may reflect the

low degree of urbanisation of this area. The lack of interest in dairying indicates the strength of attachment to the traditional enterprises despite the market fluctuations associated with them. Unlike the other western areas, the proportion of old single people is low, suggesting better household structure, possibly associated with a comfortable if frugal income.

(D1.) *The Western Grazing and Dairying Area* — This area covers a large part of the northwest, and includes Leitrim, Sligo, Longford and parts of Mayo, Roscommon and Donegal, as well as some parts of Clare and Kerry. No clear specialisation dominates. It is an area of small holders, low valuation, and poor demographic structure. The numbers of young cattle are slightly above average but the proportion of sheep, milch cows and older cattle are about average for the country. The absence of pig production is associated with very low levels of tillage.

(D2.) *The Northern Grazing and Pig Fattening Area* — While this area resembles D1, the tradition of pig production and the high valuation (associated with the growing of flax at the time of valuation) clearly differentiates it as a different type of area. Sheep are in very low concentration. More younger and fewer older cattle are produced. Farms are smaller and more holdings are let. The sex ratio is lower and there are more old single people. The concentration of pig production in this area indicates more intensive farm production than in D1.

(E.) *The Munster Intensive Dairying Area* — In this area, covering all of Limerick and large portions of Cork and Kerry, milk production is the basis of the rural economy.

Extreme concentration of dairy cows on large farms to the exclusion of other grazing livestock categories and of tillage is the distinguishing feature of this area. The demographic structure is balanced and there are few old single people, which may result from the relatively better incomes associated with dairying.

(F.) *The Mixed Farming Areas of the South and East* — This type comprises parts of the southern and eastern seaboard counties from Wicklow as far as Clonakilty. Like elsewhere in the east (Regions H to F) tillage is an important activity. Farms are considerably above average in size and the population is young. Dairying is the second most important enterprise and in the southern part it is associated with pig production. Sheep production is the ancillary enterprise in the eastern portion.

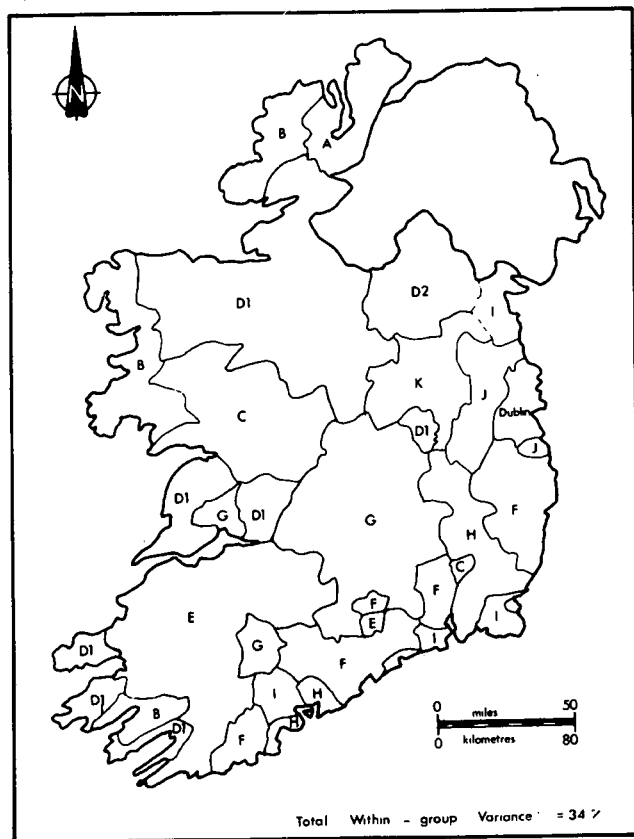


Figure 2.

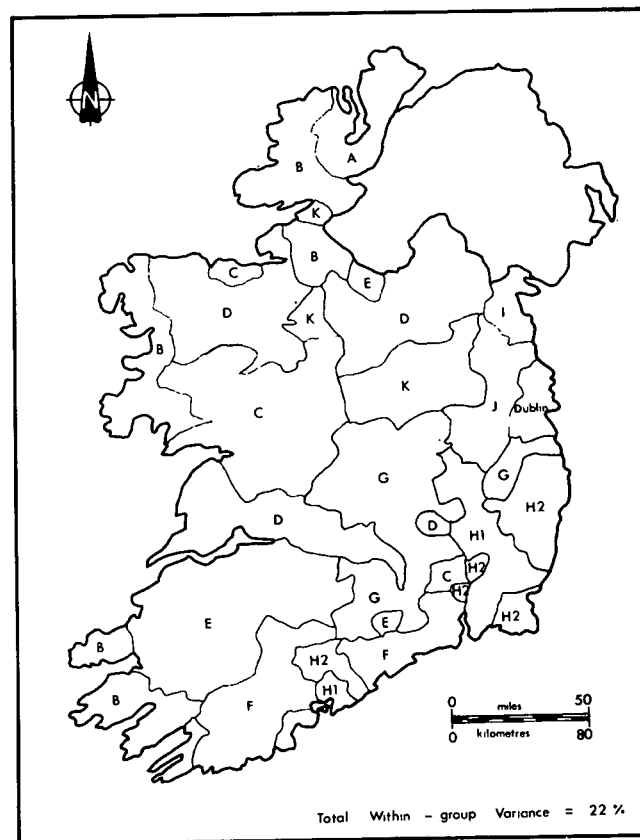


Figure 3.

(G.) *The Southern Midlands Tillage and Grazing Area* — This includes most of counties Tipperary, Offaly, Laois and Kilkenny. Like region D1 it shows low specialisation. Farms are above average in size and demographic structure is good. The absence of pig production, the low concentration of milch cows, and the lack of specialisation suggest that the larger size of farms generates a satisfactory income without the need for intensive farming.

(H.) *The Arable Counties* — The basins of the rivers Barrow and Slaney form the bulk of this region. Wexford, Carlow, South Kildare and two localities around Cork city are all important tillage areas. This region along with Region F has the largest farms in the country. The demographic structure here may be associated with a high level of urbanisation but, certainly is also due to farm size and hired labour. Young cattle and pigs are above average in concentration and sheep predominate in upland areas.

(I.) *Urban Hinterlands of the East and South* — All Rural Districts grouped in this class are in the vicinity of the ports of Dundalk, Drogheda, Rosslare, Waterford and Cork. Their agricultural and demographic characteristics may reflect both the industrial and harbour functions of these larger towns. Valuation is high but farm size is smaller than in Region H suggesting a kind of von Thunen zoning. Tillage is important, but here it is found in conjunction with fattening of older cattle and pigs.

(J.) *The Dublin Cattle Finishing Hinterland* — This area covering parts of Meath, Kildare and Wicklow is remarkable for its concentration on the fattening of older cattle. The population is very youthful, has a very good sex ratio, and a very low proportion of old single people. Valuations are high but as in Region I, farm size is average. Tillage and sheep are over represented and dairying is considerably under represented.

(K.) *The Northern Midlands Cattle Finishing Area* — Most of Meath, Westmeath and some areas of Kildare show the same pattern as Region J; i.e., the dominance of beef cattle enterprise. The difference is in the lower valuation and poorer demographic structure and in the small proportion of tillage. The transition toward the Western type may be noted in these characteristics.

When the characteristics of these regions are examined in sequence a number of patterns emerge (See Table 5). Commerical cereal production (wheat and barley) is associated with Regions, F, G, H, I and J, all of which are in the east and south. Valuations and demography follow the same

pattern. This explains the high correlations between valuation, youthfulness and tillage variables in Table 2. The regionality of the livestock enterprises is likewise associated with valuation and demographic factors. Taken together these two factors explain much of the structure of agriculture. The second pattern to emerge is suggested by the close correlation between the regions A, B, C, D and E and the topographical, climatic and soil variations in these regions. The climatic and soil differences between east and west Donegal, the poor soils and mountainous terrain of region B, the drumlin soils and wet lowlands of region D, the dry lowlands of region C, and the heavy clay soils of Region E are well known. In the next two sections two data sets are chosen from the 14 variables and the regions which result are compared. The stability of the three data sets are then examined.

Grouping No. II: Characteristics of the Regions Derived from the Eight Agricultural Enterprise Variables.

Figure 3 illustrates the regions which are derived from the second data set. The characteristics of the regions are described in Table 5 Grouping No. II. The data set was chosen because of the popular definition of areas in terms of their products. We are interested in comparing the circumstances of land structure and demography in these "pure" agricultural regions with the profiles of regions produced from variables representing all three dimensions of agriculture, i.e., comparing Grouping I and Grouping II in Table 5. It is not proposed to examine all the changes in detail since the main purpose of comparison of the regions based on three different data sets is to infer the degree of their stability, and this is later discussed in relation to Figure 5. Regions A (East Donegal), C (East Connaught), E (Munster Dairying), H (Arable South and East), and J (Dublin Hinterland) all appear almost within the same boundaries as in Fig. 2. In most regions the demographic and land variable scores are modified. Region D2 disappeared because its valuation is no longer considered. Since the clustering process was deliberately run until 12 regions were produced, a new region H2 emerged (Wicklow — Wexford — East Cork). This is characterised by tillage and store (young) cattle production. This type comprises several areas which belonged to Region F in the first clustering and which were characterised by the production of tillage and sheep rather than by the production of tillage, dairying and pigs. In most other regions changes were of the same nature. A steady core emerged in the same class in both clusterings and there were some losses and some additions. These arose from a degree of heterogeneity in the "mix" of enterprises in regions identified by Grouping I, or from the exclusion of land or demographic variables which originally contributed to a degree to the character of the region or portion thereof. The overall effect of Grouping No. II was that five regions appeared

exactly as outlined before, one disappeared and others were partially rearranged. It is concluded that the popular definition of regions on the basis of their agricultural products is a good approximation of regional variation of land and demographic characteristics. The above correlation matrix and factor analysis give the underlying reasons.

Grouping No. III: Regions Derived from a Selection of Agricultural Production Variables, Based on Factor Analysis.

The data set on which Grouping No. II is based contains variables shown to be unimportant, e.g., No. 3, and also a number of pairs of variables which represent the same dimension e.g. No. 1/2, No. 5/8 and No. 6/7.

Accordingly, the final data set is comprised of one variable from each of the above pairs and the remaining important variable (No. 4). These are No. 2 (WHEAT AND BARLEY), No. 4 (YOUNG CATTLE), No. 5 (SHEEP) and No. 7 (MILCH COWS).

Figure 4 illustrates the regions which were delineated, and the profile of each region is shown on Table 5. Regions C, E, H and J, are reproduced without much geographical redistribution. Region A no longer appears because OATS is excluded. Region H2 also disappears. Both now contribute to the classes into which the Atlantic Seaboard is divided, i.e., B1 and B2, which are differentiated from each other by the presence of a high concentration of sheep in the mountainous areas of the latter. Region D, as defined by the second grouping, is now sub-divided into a western region D2 distinguished by its greater proportion of oats, sheep and young cattle. It, therefore, represents a transition zone between D1 and C.

This type of instability is also seen in the southern midlands and south in the major reallocation of large portions of Region G and F (as they appeared in Grouping I and II). The Southern Midlands region has moved further south, losing Offaly but gaining areas in Kilkenny and Waterford. The proportion of tillage and pigs increased as a result. The demographic and land scores remain much the same.

In the North East most of Louth has been assigned to region H (Arable). Only Ardee No. 1 R D still remains as a separate "region". The neighbouring region K has been extended to include Offaly. The reallocation has decreased the concentration of older cattle and increased the importance of tillage in the locality.

The Stability of the Regions

Three different regional classifications have been produced by the same clustering procedure using different data sets. The extent to which the

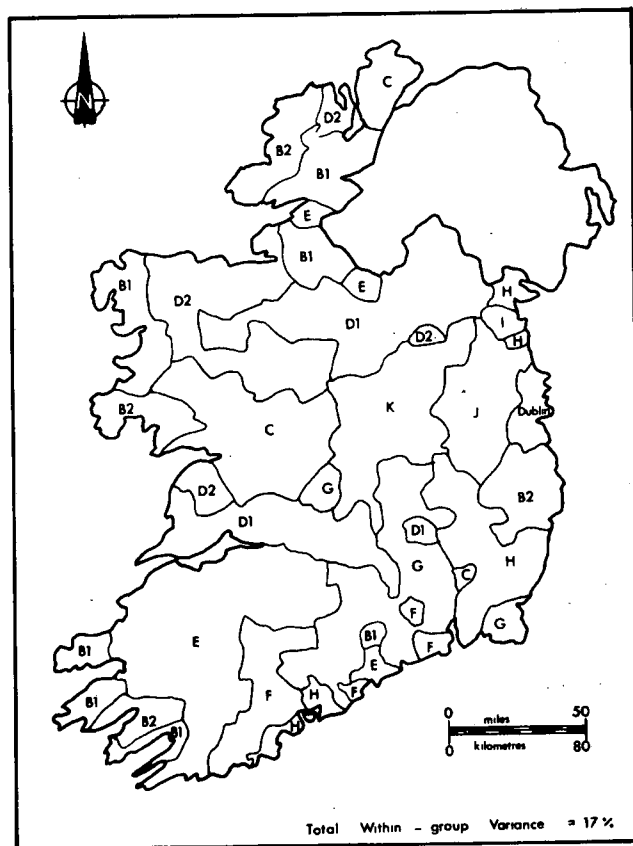


Figure 4.

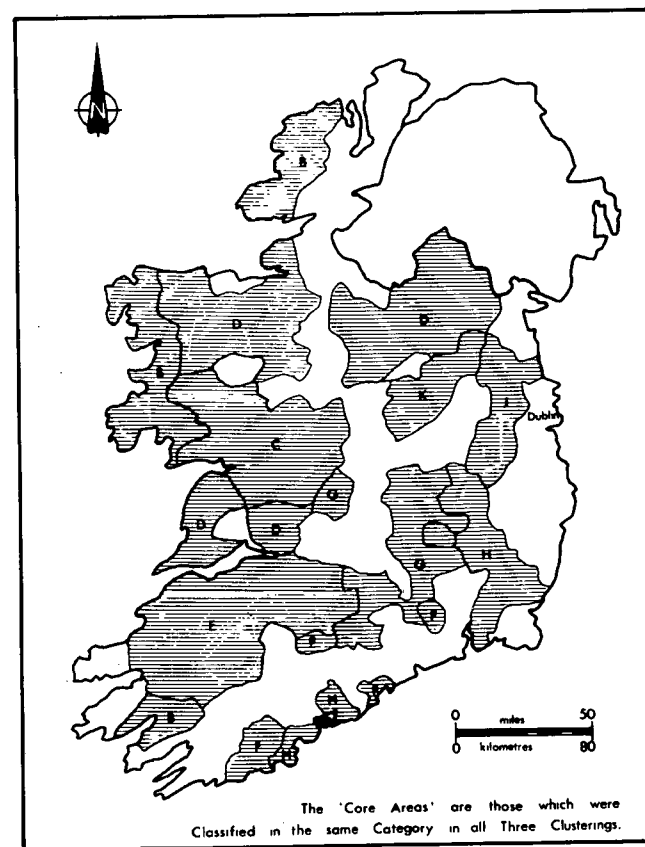


Figure 5.

regions are stable in indicated by the degree of overlap which occurs when they are superimposed. Nine regions emerge as stable and recurring types.

These cover approximately two thirds of the area of the country (shaded portions of Fig. 5). On the whole, the profiles of the regions derived from the use of all 14 variables (Fig. 2) show a high degree of stability. These areas are regarded as the "core" areas of the regions as they are allocated to all three classifications. They are prototypical in the sense that they represent the highest degree of non-random combination within the regions of the dimension of land, enterprise and demography which describe the system of agriculture. When compared to the regions produced by the three data sets (Figs. 2, 3, 4) they enable one to evaluate the proportion of the area of each region which is dependent on the contribution of one or a few variables.

The instability of non-shaded areas in Fig. 5 arises mainly from the fact that in regions where "mixed" farming occurs (F, G and D) a slight change in emphasis in the data set used results in portions of these regions being allocated to different classes. In such cases these areas can be regarded as areas of transition between regions. Another source of instability is to be found in areas which were discriminated originally by the preponderance of a single factor. Such incidental regions could be considered as a "subtype" of larger areas according to their profile (Table 5). For example, East Donegal is distinguished from the Western general pattern (D) by the amount of tillage, and when this criterion is excluded in Fig. 4 it is merged with this grouping which it resembles in other respects. It is obvious, therefore, that the unstable areas are to a large extent artifacts of the classification procedure. Some of the areas could be interpreted as transitional zones where the diffusion of modern farm enterprises is taking place. However, without the benefit of data which depict changes over time this hypothesis cannot be tested. On the other hand, the mix of enterprises on larger farms appears to be a traditional pattern of adjustment to values which aim at satisfaction of family needs rather than at maximisation of income through specialisation.

Previous Studies

As a final check the plausibility of these classifications may be estimated from comparison with previous studies on the subject. Freeman (1972), although discussing many aspects of agriculture, has used a regional division of Ireland based on physical and landscape features which show little resemblance to the regions produced here. Tarrant (1974, p. 143), using the data similar to the agricultural production enterprise variables used in this study, produced a very large number of regions based on enterprise combinations. It was possible to generalise from his regions only by considering the leading enterprise which in most areas in Ireland is some form of livestock produc-

tion. Thus the effectiveness of the classification was reduced. Nevertheless, the main regional divisions in Irish farming are highlighted.

The classification presented by Ross (1969, p. 101, Map on p. 78) is an improvement on earlier attempts. They were constructed by estimating farm income from the enterprise mix of each area. Variations in soil, output and "farming pattern" are considered. Since he aimed to derive a small number of areas by incorporating as many whole counties as possible the regions are rather heterogeneous internally. The main regions appear, however.

The studies by Gillmor (1967, 1977) produced results most comparable and most similar to ours. He used variables such as valuation, area under crops, and dominant type of livestock, but no demographic variables were included. The regions which were identified as stable in this study emerged in his: East Donegal, East Galway sheep and stock breeding area, the Munster dairy belt, the Atlantic fringe, the arable south east, the Meath and Westmeath grazing areas are clearly identified. In fact, we took several of our labels from this study.

V THE IMPLICATIONS OF THE REGIONS FOR RESTRUCTURING OF AGRICULTURE

The regions represent aggregations of Rural Districts in which the dimensions of agriculture are relatively homogeneous. Table 5 specifies the conditions in each region, and from these conditions some suggestions as to the need for, and likelihood of restructuring of agriculture can be made. Regionalisation imparts a spatial dimension to the problem of restructuring which data, aggregated at national or provincial level, do not demonstrate. Furthermore, regionalisation based on multidimensional criteria which embrace the demographic, land and production aspects of the problem, gives a more comprehensive picture of the areas in which the problem may be different, and of how it differs.

Three types of restructuring are considered: (1) transfer within the kinship system of ownership or use of land to a younger generation; (2) transfer by sale or leasing of land, by older landowners who lack successors to younger progressive farmers who need more land; and (3) part-time farming organised for efficient land use.

Most transfers take place within the family, but generally after the successor has lost the resilience of youth. The lack of an institutionalised pattern of gradual exchange of control and ownership which protects the rights of both parties is needed. The oldest populations are in Regions B, C and D, with the Munster Dairying area and the South Midlands about average.

Regions H, I and J have remarkably youthful populations. Early transfer is probably associated with the larger farms in these areas, and probably with the example of retirement in the local urban environment. Given the age structure of the rural population it is obvious that incentives are needed to encourage transfer of land within the family at an age when the successor can create the greatest impact on the management of the holding. It is obvious that this type of restructuring will be most effective in regions where the majority of farms are viable. It is non-selective in the sense that the ability to farm properly is not a criterion for succession. Its success depends on the degree to which the promise of youth is fulfilled.

On the other hand, if restructuring is to mean the creation of holdings of viable size throughout the country, then adequate assessment of the extent of the *need* for restructuring of this type depends first on a knowledge of holding size and of land quality. Table 5 indicates the extent to which each region falls above or below the national average in regard to the proportion of small holders (50 acres or less). Regions A, B, C and D are above average in this respect. However, when variation in soil quality is considered, and when it is realised that the limit of viability (as judged by the criterion of income comparability with the non-farm population) in many cases is well above 50 acres, it will be clear that the criterion is conservative. Furthermore, for restructuring to be effective it is necessary that the new farms created be capable of growth in output. Johnson and Conway (1976) have shown that growth has occurred in recent years on farms of over 50 acres only if they had good soil, and on farms of over 100 acres on medium soil. In addition, the base line from which the deviations in Table 5 are calculated considerably understates the need for restructuring, because the proportion of holdings in the country which are below 50 acres in extent is almost two thirds. It follows that Regions I, J and K have considerable need for restructuring. The potential for success in this area is high, however, because of superior land quality and a tradition of renting land. When holding size and valuation are considered together, it may be suggested that only regions F, G and H are without a major restructuring problem.

Letting represents an attempt to increase holding size, and therefore a commitment to expansion. While it is lowest in areas of large holdings (Regions E, F, G and H) and highest in Regions A, D, I, J and K where holdings are small, there is little evidence of farm expansion in Region B where holdings are very small, and in Region C where they are below average size. The absence of letting in these regions may indicate an unwillingness on the part of the owners to allow others the use of the land, rather than a reluctance on the part of others to use it.

When the problem of restructuring is considered using aggregate data it is

usually forgotten that the extent of the *need* for restructuring, as indicated by holding size, age and marital structure of the population, is not a measure of the *likelihood of its being carried out*. Usually the inadequate size of holdings, and both ageing and failure to marry of the large portion of the farm population is pointed out. From this information a calculation is made of the amount of land which it is presumed will become available due to lack of direct successors. However, a recent study of retirement in agriculture indicated no significant relationship between a farmer's age and his willingness to sell or lease (Macra na Feirme, 1973b). In addition, for restructuring of this type to be successful, young men (assumed to be willing and able to farm) must be available in adequate numbers in close proximity to older single men who may be prepared to retire. In this respect Regions A and B constitute a direct contrast. Region A has a surfeit of older men and is about average in the youthfulness of the population. Prospects for restructuring would appear much better here than in Region B which also has a surplus of older men, but a dearth of younger men who might enter farming or expand their holdings. The opposite condition holds in the Dublin hinterland (Region J), where a high proportion of young men suggests no scarcity of potential young farmers, but the absence of older unmarried people in the population indicates that very little land will become available for restructuring of the type which would involve transfer of land outside the family.

A further dimension which should be considered in conjunction with the land and demographic characteristics of the regions is the effect of the local choice of farm enterprises. The cost of restructuring to the farmer will be so high that enterprises which yield a high return per acre will much more likely be associated with widescale restructuring than those which give a meagre return. Regions engaged in commercial cereal production and in intensive dairying will offer much greater incentives to young men to expand their holdings. Ironically, these two enterprises are found in the regions which have average or above average proportions of holdings over 50 acres, i.e., Regions E, F, G, H, I, J, K, i.e. — in the regions which least need restructuring.

It must be pointed out that ecological data can never adequately describe the detailed structure of local communities, nor examine subjective aspects of the problem of restructuring. The data do suggest how the parameters of the problems of restructuring may vary from region to region. In previous work in this programme of research on subjective aspects of the problem in a number of regions it was discovered that in the regions where restructuring needs are greatest, older farmers who had no successors expressed attitudes in relation to disposal of land which indicated they were much less likely to allow restructuring to take place than their counterparts in regions where

land structure was better.⁹ Most respondents felt it was unthinkable that land should be transferred to persons outside the kinship system. When asked for criteria for choosing among a number of equally closely related male relatives as to which should inherit, the overwhelming majority replied in personalistic terms. Many felt that even after sale of his land to the Land Commission a farmer should have a right to choose who should be given the land. In the light of these attitudes considerable opposition to the above type of restructuring can be expected.

Rural attitudes in relation to farming as a full-time occupation are gradually changing the meaning of land ownership. These attitudes are more in line with a policy of supplementing farm incomes by part-time employment — the third possible type of restructuring. Young farmers and farmers' sons expressed much more confidence in part-time farming than in full-time farming, even when the holdings could, if properly organised, offer them an income much greater than they could earn in off-farm employment supplemented by farm income. Likewise in the localities examined a number of farmers' sons, who were employed locally, had purchased holdings with a view to entering the ranks of part-time rather than full-time farmers. Furthermore, many parents with quite large holdings saw part-time farming as a desirable aim for their children because, in their view, it offset the cyclical pattern of price fluctuations for some farm commodities. They expressed the desire that the holding should be divided among a number of sons who would work locally and farm part time. If this trend continues, there is the danger that productivity will fall considerably and that a large proportion of land near areas of high employment will become unavailable to the more productive full-time farmer. However, if part-time farmers can be organised to farm efficiently and if the expansion of off-farm employment continues, this form of restructuring could maximise the number of families on the land.

Some Broader Implications of the Regions

Although the regions were defined in relation to a specific aspect of Irish agriculture they have considerable general implications for the study in many aspects of the rural life. Because they are based on land, demography and enterprise they would contribute an important spatial dimension to the study of any aspects of rural life related to these variables, e.g., the rural family, diffusion of innovation, part-time employment, and differences in patterns of farm inheritance. In particular, they would complement the type

9. This unpublished work was carried out during the observational study referred to in footnote 3.

of information which surveys and public records provide. The former has the disadvantage of using the individual or household as the unit of analysis, and thus fails to consider contextual effects, while the latter are usually aggregated on a national, provincial or county basis, and thus give no information as to how the many dimensions of rural life combine in a non-random way to form regions of reasonably distinct character. Awareness of regionality based on a number of dimensions offsets the danger of making naive inferences from national statistics of one or a few variables. In relation to the study of the diffusion of innovations the perspective of regionality alerts one to the fact that the social territory of the country is not an even plane over which innovations diffuse evenly, rather it is a territory of uneven surfaces which either accelerate or impede diffusion.

A more important contribution of the regional perspective can be made if it is used with time series data. The historical pattern of regional change, e.g., farm subsistence to market farming, the changes in family structure, the relationship of changes in agriculture to the pattern of emigration, to rural unrest, and to political activity, would add considerably to our understanding of history and of the processes of change within the rural community. The regions could also be used as a sampling frame for sample surveys into which a contextual dimension could then be built. In the same way they would greatly enhance the contribution of community studies by providing a measure of the spatial extent to which the findings of such studies could be validly extrapolated.

Finally, the importance of regional delineation for administration of services in relation to agriculture is that regions based on the structure of rural life may differ considerably from those based on administrative imperatives. In policy formation and in the evaluation of previous policies, regions of the above type may provide a more meaningful basis for aggregation.

REFERENCES

- ALKER, H. R., Jun., 1969. *A Typology of Ecological Fallacies*, in M. Dogan and S. Rokkan (eds.): *Quantitative Ecological Analysis in the Social Sciences*, Cambridge, Mass.: MIT Press, pp. 69-86.
- ARENSBERG, C. M. and S. T. KIMBALL, 1940. *Family and Community in Ireland*. Cambridge, Mass.: Harvard University Press.
- BAKER, L., 1974. *A Selection of Geographical Computer Programs*. London School of Economics and Political Science, Geographical Papers, No. 6.
- BIJNEN, E. J., 1973. *Cluster Analysis: Surveys and Evaluation of Techniques*. Tilburg, the Netherlands: Tilburg University Press.
- CONWAY, A. G., 1975. "Inter-Farm Differences in Growth of Output". Paper read at *An Foras Talúntais Conference*.

- DOGAN, M. and S. ROKKAN, (eds.), 1969. *Quantitative Ecological Analysis in the Social Sciences*. Cambridge, Mass.: MIT Press.
- EVERITT, B., 1974. *Cluster Analysis*. SSRC Review of Current Research, London: Heinemann.
- FREEMAN, T. W., 1972. *Ireland: A General and Regional Geography*, London: Methuen.
- GILLMOR, D. A., 1967. "The Agricultural Regions of the Republic of Ireland". *Irish Geography*, Vol. 1964/68, pp. 245-261.
- GILLMOR, D. A., 1977. "The Spatial Structure of Agricultural Output in the Republic of Ireland". *The Economic and Social Review*, Vol. 8, No. 2.
- JOHNSON, R. G. and A. G. CONWAY, 1976. "Factors Associated with Growth in Farm Output". Paper read to the *Agricultural Economics Society of Ireland*.
- LEE, J., 1973. *The Modernisation of Irish Society, 1848-1918*. Dublin: Gill and Macmillan.
- MACRA NA FEIRME, 1973(a). *Farm Inheritance and Succession*. Dublin: Irish Farm Centre.
- MACRA NA FEIRME, 1973(b). *Retirement in Agriculture*. Dublin: Irish Farm Centre.
- ROSS, M., 1969. "A Regional Study of the Relative Prosperity of Irish Farms of Different Sizes". *The Economic and Social Review*, Vol. 1, No. 1, pp. 77-107.
- RUMPF, E., 1959. *Nationalismus und Sozialismus in Irland*. Meisenheim am Glan.
- SCULLY, JOHN J., 1962. "The Influence of Family Size on Efficiency within the Farm". *Journal of Agricultural Economics*, Vol. 15, No. 1.
- SCULLY, JOHN J., 1971. "Agriculture in the West of Ireland". The Stationery Office, Dublin.
- SHANIN, T., 1971. "Peasants and Peasant Societies". Penguin, London.
- SYMES, D. G. 1972. "Farm Household and Farm Performance: A Study of Twentieth Century Changes in Ballyferriter, Southwest Ireland". *Ethnology*, Vol. 11, pp.25-38.
- TARRANT, J. R., 1974. *Agricultural Geography*. Newton Abbot: David & Charles Ltd.