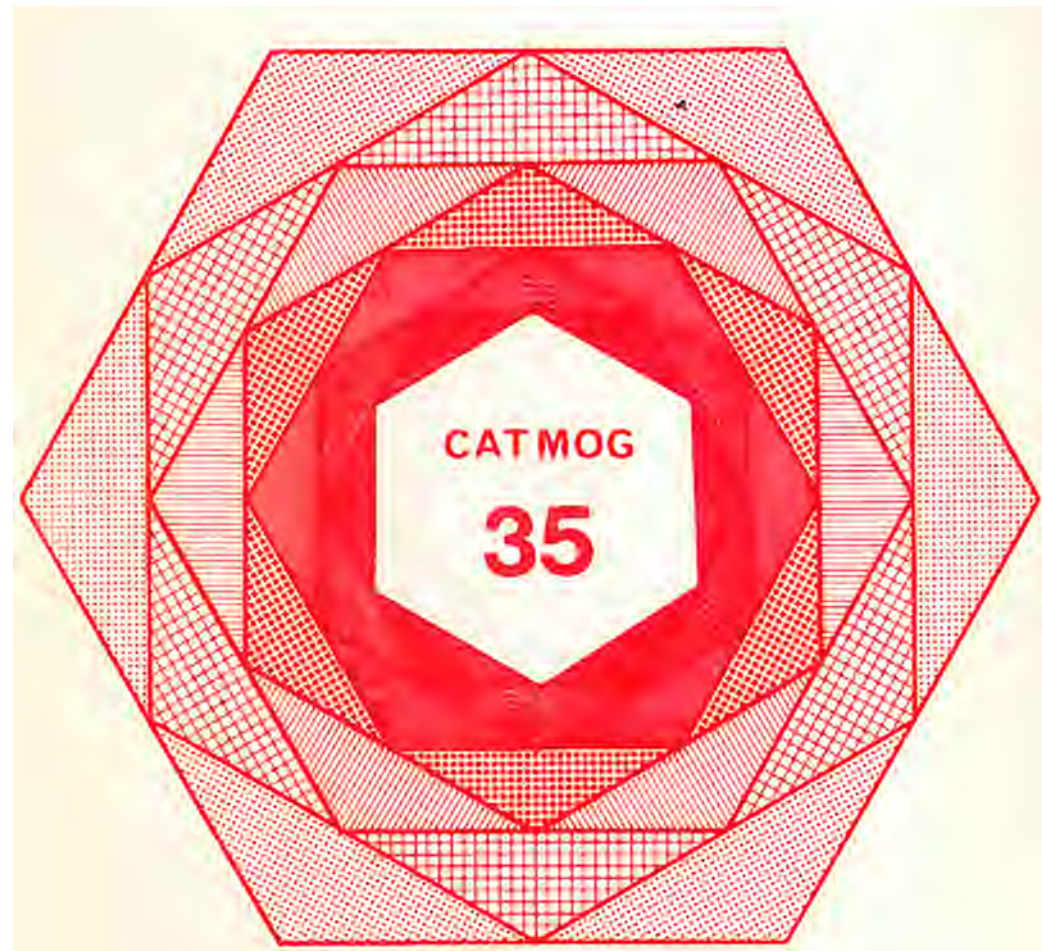


THE AGRICULTURAL CENSUS -  
UNITED KINGDOM AND UNITED STATES

G. CLARK



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CONCEPTS AND TECHNIQUES IN MODERN GEOGRAPHY No. 35

THE AGRICULTURAL CENSUS - UNITED KINGDOM AND UNITED STATES

by

G. Clark

(University of Lancaster)

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## Dedication

To my wife.

## Abbreviations used in the text

DAFS	- Department of Agriculture and Fisheries for Scotland (1912-1928 Board of Agriculture for Scotland, 1929-1960 Department of Agriculture for Scotland, after 1960 DAFS)
DANI/MANI	- Department of Agriculture for Northern Ireland (before 1974, Ministry of Agriculture, Northern Ireland).
EC	- European Community.
ha.	- hectare (1 ha. = 2.47 acres).
HMSO	- Her Majesty's Stationery Office.
MAFF	- Ministry of Agriculture, Fisheries and Food (1889-1903 Board of Agriculture, 1903-1918 Board of Agriculture and Fisheries, 1919-1955 Ministry of Agriculture and Fisheries, after 1955 MAFF).
smd	- standard man-day.
USDA	- United States Department of Agriculture.

## I INTRODUCTION

The agricultural census is one of the major sources of information for those engaged in rural studies. In most countries it provides long runs of information about farming which can form the basis for a variety of quantitative methods and can be used in the context of many philosophical approaches ranging from the neo-classical economic to the radical. This booklet's objective is to demonstrate the potential and pitfalls of this source of data for undergraduates and researchers in geography and other disciplines.

The origins and form of the agricultural censuses in the United Kingdom (UK) and the United States of America (USA) are surveyed. Then the problems and strengths of the censuses in terms of accuracy, definitional continuity, confidentiality and aggregated data will be explored. Finally, other sources of information on farming which can complement and elucidate the agricultural censuses will be discussed.

## II ORIGINS OF THE AGRICULTURAL CENSUSES

Most governments wish to know the state of farming in their country whether for reasons of improving public policy or regulating trade in food or providing vital strategic information during wartime. Censuses are not conducted for the benefit of academic research and the consequences of this will be explored later in detail. Precisely which aspects of agriculture are of primary concern will vary with political circumstances, but legislation to allow the collection of such information as is deemed necessary exists in most countries.

In the United Kingdom, the earliest experiments in collecting agricultural information in a recognisably modern form were conducted by Justices of the Peace or the clergy between 1795 and 1803 when the Napoleonic war was at its height. The Board of Agriculture also produced two sets of descriptive reports on the state of agriculture in each county, the earlier Quarto Series date from 1793-6 and the later series from after 1804 (Adams, 1976). The Dublin Society produced Statistical Surveys for Irish counties in 1801-2. In Scotland, the Old Statistical Account of 1791-9 provides a description of farming at parish level which was updated in the New Statistical Account, written around 1835 and published ten years later. The Board of Trade first became involved in the collection of agricultural statistics in 1836 when an experimental survey was conducted unsuccessfully in Bedfordshire (MAFF and DAFS, 1968). Another experimental survey was carried out by the Board of Trade and the Poor Law Board in the mid-1840s. This again failed to produce an acceptable rate of response in England but it was much more useful for Midlothian (Scotland) and Baileborough (Ireland). In 1847 the Registrar-General for Ireland used the constabulary to conduct an agricultural census throughout the island which still continues, although now it appears as separate censuses for the Republic of Ireland (published by the Central Statistical Office, Dublin) and Northern Ireland. The Northern Ireland census is currently based on statutory authority vested in the Department (before 1974, the Ministry) of Agriculture for Northern Ireland by the Agricultural Returns Act (Northern Ireland), 1939.

On the mainland the next experiment was carried out between 1854 and 1857 by the Poor Law Unions in eleven English and Welsh counties. The rate of response was again unsatisfactory. In Scotland the experiment was carried out by the Highland and Agricultural Society initially in Haddingtonshire, Roxburghshire and Sutherland in 1853. Between 1854 and 1857 the survey covered the whole of Scotland and, except in 1854, omitted land with a rental under £20 in the Highlands and under £10 in the Lowlands. In the county of Linlithgow crops were recorded on Ordnance Survey maps in 1857 (Whyte and Whyte, 1981).

In 1865 the Board of Trade granted funds for a full-scale national agricultural census of Great Britain which was first held the following year. This recorded livestock numbers on 5 March 1866 and acreages of crops on 25 June 1866. The need for information on the severity of the outbreak of rinderpest (a disease of cattle) in 1865 contributed to the official momentum to conduct an agricultural census despite considerable opposition to any such enquiry from some landowners in southern and eastern England. The use of officers of the Board of Inland Revenue to collect some of the returns for the Board of Trade may have strengthened this distrust of the census. The returns elsewhere in Great Britain were much more complete, although the use of income tax assessments on land and of parish rate books (in Scotland, the valuation rolls) as the basic source of information to identify farmers inevitably led to gaps in coverage which it took many years to rectify.

The Board of Trade conducted the British agricultural census each year between 1866 and 1888 (between 1883 and 1888 results were issued by the Agricultural Department of the Privy Council), then responsibility was transferred to the new Board of Agriculture which became the Ministry of Agriculture and Fisheries in 1919. In 1912 the conduct of the agricultural census in Scotland was devolved to the Board of Agriculture for Scotland (a part of the Scottish Office) which became the Department of Agriculture for Scotland in 1929 and then the Department of Agriculture and Fisheries for Scotland (DAFS) in 1960. The statutory authority for agricultural censuses in Great Britain was established in 1925 by the Agricultural Returns Act which was superseded by the Agriculture Act, 1947, sections 78-81 and, for England and Wales, by the Agricultural Statistics Act, 1979. The census was voluntary between 1866 and 1918 and between 1921 and 1925. After 1925 penalties could be imposed on the occupiers of farmland who did not return the information requested.

The collection of agricultural statistics in the USA started in 1840-1 in parallel with the sixth population census and continued on the same decennial basis until 1920. Thereafter an agricultural census has been held quinquennially, the most recent ones being in 1969, 1974 and 1979. The Census of Agriculture is carried out by the Agricultural Division of the Bureau of the Census which is part of the US Department of Commerce while additional information on crop acreages and farm numbers, for example, is available annually from what is now the Statistical Reporting Service of the US Department of Agriculture (USDA). Although some of the USDA's data are derived from sample surveys of around 17 000 area segments of the United States rather than from true censuses, these data should be noted here since they provide census-type information which is used in policy-related work as though it were census data. The legislative authority for the agricultural census in the United States is provided by 'Title 13, United States Code - Census' which was codified in 1954, amended several times thereafter and re-affirmed

by the Agriculture and Consumer Protection Act, 1973. The census covers the fifty states as well as Guam, Puerto Rico, the US Virgin Islands and, prior to 1974, American Samoa and the Pacific Islands Trust Territory.

### III GENERAL FEATURES OF THE AGRICULTURAL CENSUSES

The British and American censuses aim to obtain a standardized set of information about all farms, farmers or farmland throughout the nation. The British census is principally concerned with farmland and the occupiers of 'farms' (strictly called agricultural holdings) rather than with the owners of farmland. Apart from a door-to-door system last century of collecting the census schedules of non-respondents, it is a fully postal questionnaire with reminders posted to those not returning the census form. The growth of adult literacy and the early development of a reliable nationwide postal service speeded this trend. The Northern Ireland census converted to a postal system in 1954. Prior to that the police had collected the census forms as in the Republic of Ireland. The census in the United States has come to be more concerned with farms as business enterprises rather than as spatially distinct areas of land. Prior to 1950 the US census was conducted by personal enumeration, the field staff in each enumeration district having some discretion as to who was included in the census. Later, census forms were posted to farmers and collected by hand and finally a fully postal system of survey was adopted in the fifty states in 1969. Field enumeration was confined to the small number of counties where the initial rate of response to the postal survey was unacceptably low.

#### (i) Frequency of the census

Most agricultural censuses are held at regular intervals but the frequency of coverage varies both historically and from country to country. The main census in Great Britain was taken annually on 25 June until 1876 and subsequently on 4 June (1 June in Northern Ireland) and this remains the principal source of publicly available information on all the agricultural holdings covered by the census. In England and Wales a census in December was instituted in 1935 principally to record livestock numbers and further censuses, held in March and September, were introduced in 1940. These three censuses were later converted into sample surveys, taken from one-third of all holdings between 1953 and 1957 and subsequently from all holdings in one-third of the parishes between 1958 and 1972. After 1972 smaller stratified samples were used to reduce administrative costs with a minimal reduction in precision (Orton, 1972). The March and September surveys were cancelled in 1979. Some of the results of the Scottish census in December, which covers all holdings, are published for counties, districts or regions but those for England and Wales are not. There is also a full December census in Northern Ireland. Pig and poultry farmers, whose number of livestock may alter rapidly, are surveyed quarterly usually in April and August as well as June and December while a census of agricultural machinery has been held throughout Great Britain since 1942. This is held during the annual December sample survey in England and Wales and usually once every four years in Scotland and Northern Ireland but the interval between machinery censuses has varied between two and five years. Horticultural holdings in England and Wales which have glasshouses were surveyed separately in January and July until 1972 when these enquiries, which cover all holdings in this group, were incorporated

into the main censuses. Other horticultural holdings are surveyed separately in October (before 1972, in September and December).

In the United States the main census is now held every five years with the published reports taking three or four years to appear, while the Department of Agriculture's statistics are annual and results are available much more quickly. After 1959, the date of the census varied a little from state to state depending on the harvest period, being earliest in Alaska (often in October) and later in the coterminous United States (often November). Prior to 1959, census day varied widely from census to census. Some were held in late autumn and others in April or June. This clearly affects the historical comparability of the results. December 31 has been used as the notional census day throughout the US since 1974.

Efforts to reduce the cost of conducting agricultural censuses have led to the removal of very small farms from the censuses in both countries. In the UK, these 'statistically insignificant' holdings - whose often changing definition is described in Section IV(vi)b - are either surveyed fully every three years using a very short census form, or are sampled annually.

(ii) The information obtained

In both countries the early censuses of agriculture collected a limited amount of information. Only 34 questions were asked in the 1870 census in Great Britain compared with over 120 in the 1970s. Since these early days the information requested has expanded with more topics being covered in increasing detail. There were only three classes of cattle and two of sheep recorded in the British census of 1870 compared with twenty-one classes of cattle and five of sheep in the Scottish census of 1965. In addition to information on crops and livestock, questions have been added on land use (including non-agricultural land use), labour employed, trade in cattle and land tenure. A few questions have appeared briefly - the amount of binder twine on farms during the Second World War or the area under bracken in the Scottish census of 1957. A copy of the June 1981 census schedule for England and Wales is reproduced in Appendix 1.

On the basis of the information on crops and livestock, the agricultural departments calculated a 'standard man-day' size for each agricultural holding between 1963 and 1980-1. Each crop and head of livestock on a holding is weighted by its notional labour requirement and the summation of the labour requirements of all the enterprises on a holding gives that holding's size in standard man-days (smd). This development provided a fairer measure of a holding's economic size than just its area and only became feasible with the introduction of computers in the early 1960s for the collation of the census returns. The standard man-day weightings were changed from time to time reflecting improvements in labour productivity in the industry. The three census authorities in the UK have collaborated over this measure of size although until 1981 the minimum size to qualify as a full-time holding was 275 smd in England and Wales, 250 smd in Scotland and 200 smd in Northern Ireland. The harmonization of the British censuses with those of other member states of the European Community has led to the progressive replacement since 1980 of the standard man-day by the standard gross margin - another series of weightings applied to each enterprise. The total standard gross margin expressed in European Units of Account is converted into a new size classification of farms based on the European Size Unit (1 ESU equals 1000 European

Units of Account or approximately £500 of standard gross margin).

The separate agricultural censuses for the Isle of Man, Jersey and Guernsey are described in Appendix 2.

The American census not only enquires about land use, land tenure and labour, but has come to record the economics of farms much more fully than the British censuses. Except in Alaska and Hawaii, a long questionnaire (called A1) is sent to the larger operators selling over \$2500 worth of produce. In 1974 this group accounted for 69 per cent of all farmers and 99 per cent of the value of farm products sold. A short questionnaire (called A2) is sent to the other farmers. Altogether 4 133 000 census forms were sent out in 1974 compared with the 240 430 statistically significant agricultural holdings surveyed in Great Britain that year. The American census also asks detailed questions on the farmer's race, chemicals used, marketing agreements, irrigation, accidents at work, farm income and expenditure. Information is also needed on crop and livestock sales, subsidies, farm contract work and off-farm sources of income such as recreational enterprises. The questions asked on the census form vary slightly between states because of the immense environmental span of the United States from tundra to the sub-tropics, but they are all compatible for state, regional and national totals.

The most striking contrast between the British and American censuses is that the former does not measure sales of products. So, from the British census, one cannot tell if an arable area sells its cereal or feeds it to its livestock. The delimitation of economic regions of arable and livestock farming is therefore much more difficult in the United Kingdom than in the United States.

The American census still uses Imperial units of measurement as did the British censuses until 1976. One difference, however, is that the ton used in the American census is the short ton (2000 lbs) rather than the long ton (2240 lbs) used in Britain. The British censuses converted to metric units of measurement in 1976, including the use of the metric tonne (2200 lbs) and the hectare (ha) which equals approximately 2.47 acres. The use of non-Imperial measures such as the Scottish and Lancashire acre was a minor complication during the first thirty years of the British census.

(iii) Availability of information

Much of the information collected through the British agricultural censuses is made available to the public in the publications described in Table 1. Currently these volumes are published between one and two years after census day although preliminary results based on a sample of farms are available six to eight weeks after census day in the form of a Press Notice. Some of this information for the period 1866 to 1965 is also available on 35mm microfilm from commercial publishers, Chadwick-Healey in the UK and Somerset House in the USA. Summaries of results have also been published for Great Britain, Scotland, and England and Wales in A century of agricultural statistics, Great Britain, 1866-1966 (MAFF and DAFS, 1968). This volume also details the changes in definitions, questions asked, coverage and administrative procedures over the period. The Statistical Statements and Statistical Information Notices issued by the UK Agricultural Departments provide preliminary census results and additional information not published elsewhere.

Table 1. Published results of UK Agricultural censuses

United Kingdom	Year	Description	Source
United Kingdom	1866-1901	Agricultural returns of/for Great Britain	Parliamentary Papers (annual)
	1902-11	Agricultural statistics (Great Britain)	
	1912-20	Agricultural statistics (England & Wales)	
	Before 1921	Agricultural statistics, Scotland	
England	Before 1921	Agricultural statistics, Ireland (This included what is now the Republic of Ireland).	HMSO (annual)
	From 1929	MAFF Agricultural statistics, United Kingdom	
	From 1912 Since 1978/9	MAFF Agricultural statistics, England and Wales MAFF Agricultural statistics, England (These volumes give county results (see also Appendix 2))	
Wales	Before 1978/9 Since 1978/9	MAFF Agricultural statistics, England and Wales Welsh Office. Welsh agricultural statistics (These volumes give county results). Welsh Office. Digest of Welsh statistics	HMSO (annual) HMSO (annual)
Scotland	1912-78 Since 1980	DAFS Agricultural statistics, Scotland DAFS Economic report on Scottish agriculture (Only partial results of the June 1979 census have been published. Before 1975 results were published for counties and agricultural regions. After 1975 they were published for agricultural regions, local government regions and island authorities and, between 1975 and 1978, local government districts).	HMSO (annual) HMSO (annual)
Northern Ireland	Before 1921 Currently	Agricultural statistics, Ireland (This included what is now the Republic of Ireland). MANI/DANI Report on the agricultural statistics of Northern Ireland. (An irregular series, each volume covering a number of years, 9th edition 1977). MANI/DANI Statistical review of Northern Ireland agriculture MANI/DANI Annual general report (Results are published for counties and, sometimes, districts).	Parliamentary Paper (annual) HMSO (annual) HMSO (annual)

Information for areas in the United Kingdom smaller than counties and districts is not published but parish summaries for the June census of England and Wales are available for consultation at the Public Record Office (Kew, London), the MAFF's Agricultural Censuses and Surveys Branch (Guildford, Surrey) for the last ten years only, and from the regional offices of the Ministry's Agricultural Development and Advisory Service (ADAS). Photocopies and microfilm copies can be purchased from the Public Record Office. Parish summaries are not available for 1868, 1871, 1872, 1892 and 1893 (Adams, 1976). Scottish parish results are available from the Scottish Record Office (West Register House, Edinburgh) and the DAFS's Economics and Statistics Unit (Gorgie Road, Edinburgh). Photocopies and microfilm copies can be purchased from the Scottish Record Office. Parish summaries are not available for 1868, 1871, 1872, 1873 and 1876. Northern Ireland data for districts can be obtained for 1924-53 and since 1962 from the DANI's Farm Census Branch (Dundonald House, Belfast). Data for enumeration districts before 1954 do exist but are confidential. The regional offices of ADAS in England and Wales also have summaries from 1962 for the approximately 380 ADAS districts. The boundaries of these districts have altered from time to time so these data may not be historically comparable. Photocopies of parish summaries and machine-readable copies on magnetic tape can also be supplied by the census authorities although a charge will be made. The census schedules of individual holdings are kept for up to five years and then destroyed except for the world Agricultural Census years of 1960 and 1970. The advent of magnetic tape for storing census results opens up the prospect of individual returns being potentially accessible to researchers long after census day. Coppock's agricultural atlases for England and Wales (1976) and for Scotland (1976) provide useful summaries in cartographic form of census data, the Scottish volume also having a valuable historical comparison between the years 1870, 1938 and 1965.

Major holdings in the USA of British, but particularly English and Welsh, agricultural statistics are kept in New York (the Public Library and Columbia University), Washington, D.C. (Library of Congress and Department of State), Albany (New York State Library), Urbana (University of Illinois), Chicago (John Crerar Library and University of Chicago), Ann Arbor (University of Michigan), Pennsylvania State University, Berkeley (University of California) and Seattle (University of Washington).

Results from the quinquennial American census of agriculture are published by the Bureau of the Census, US Department of Commerce, Washington D.C. in a multi-volume set up to four years after census day. A separate volume is available for each state which gives state and county tabulations. There are also general volumes summarising the results for the whole of the United States and its nine major divisions along with reports on farm finance, irrigation and agricultural services. Most results relate only to farms with significant product sales (over \$2500) and some graphic summaries and maps are produced. Since 1969, tabulations for areas smaller than counties have not been published there being about 3000 counties or county groups in the most recent census. As with parish data in Great Britain, results are not published separately for counties with very few farms in order to protect the confidentiality of the returns from individual farmers.

The US Department of Agriculture (USDA) has produced since 1936 an annual volume, Agricultural Statistics, and a graphical presentation of data from 1910 has been published each year since 1967 in the Handbook of agricultural charts. The USDA also prepared a series of volumes in 1970-2 which updated

a series in 1957-60 on the Major statistical series of the US Department of Agriculture, how they are constructed and used. The census also provides a part of the statistical basis of the USDA's Major uses of land in the United States.

Major runs of the US Census of Agriculture are held in the United Kingdom by the Rhodes House Library, Oxford (from 1850), the London School of Economics Library (from 1860), the British Library Reference Division and the Library of the College of St. Mark and St. John in Plymouth. The USDA's Agricultural Statistics from 1936 are held in the University Libraries at Aberystwyth, Birmingham and the London School of Economics as well as in the Institute of Agricultural Economics (Oxford), the British Library Reference Division and the Ministry of Agriculture's Library. Current volumes may be purchased through Microinfo Ltd., Alton, Hampshire.

#### IV PROBLEMS IN USING AGRICULTURAL CENSUS DATA

The previous section has hinted at some of the practical difficulties which may arise in the conduct of agricultural censuses and in the presentation of the results to the public. None of these difficulties need necessarily deter the geographer from pursuing his studies using census data but the pitfalls need to be borne clearly in mind when interpreting the published data.

##### (i) Date of census

Each year the census is either taken on a single day, as in the United Kingdom, or is held over a short period, as in some recent American censuses. This allows for comparability of results within each census and, provided census day does not alter, between censuses. Census day has not materially altered in the UK but in the US the census period has varied by as much as eight months. This obviously reduces the historical comparability of the results as does the very long time it sometimes takes for the US Bureau of the Census to receive all the census returns. The 1974 US census was unusually poor in this respect due to some resistance to the census. Census schedules were posted early in December 1974 for completion on 31 December but replies were still being received as late as February 1976 (see also p. 26).

The use of a single day in the year as census day is also not without hazards. Early vegetable crops may have been harvested before the British census day of 4 June, while double cropping of a field may lead to the crop not in the ground on census day being omitted from the return. The census may also have some difficulty recording inter-cropping, such as where sheep graze the pasture between orchard trees. Similarly, a crop growing poorly on census day due to disease or adverse weather conditions may be ploughed in later and replaced by another crop which will not be recorded in the census. British censuses sometimes ask questions about the purpose to which a crop is to be put. In the case of maize, for example, the decision on use may not be taken until much nearer harvest, so farmers' replies on census day may not reflect the eventual disposal of maize for either human consumption or fodder (Tarrant, 1975). Livestock, being mobile, are even less well suited to a single census day. Areas which specialize in fattening livestock during the

winter (beef cattle in eastern Scotland, for example, or sheep in the English lowlands) will have their livestock enterprises under-recorded by a mid-summer census. Access to the results of a mid-winter census will help to give a more balanced view of the seasonal distribution of livestock, but this may not always be possible at the same level of detail as is provided by the June census.

##### (ii) Spatially variable response

A census is an invasion of privacy, though it may be one which the majority of farmers have come to accept. Alternatively, it may be that the questions asked or the use of certain types of enumerator (e.g. police or tax officers) will provoke greater resentment in some areas than in others. The early years of the British agricultural census were characterised by a marked refusal to cooperate among farm occupiers in southern and eastern England. In Hertfordshire in 1866, for example, 30 per cent of occupiers, accounting for 45 per cent of the county's farmland refused to complete the census. In contrast the non-response rate in England as a whole averaged only 5.5 per cent of occupiers and in Scotland was as low as 0.5 per cent. The hostile attitude of a relatively small number of large landowners in south-east England reduced the response rate among their tenantry to a point where the interpretation of the regional geography of mid- to late-Victorian farming must be more tentative than otherwise. Refusal to co-operate was partially offset by the enumerators estimating what the non-respondents' replies would have been - an advantage of a personal system of survey rather than a postal one - but the point must still be borne in mind.

Spatial variations in the completeness of the master list of all farms and farmers in the country may also contribute to a variation in the comprehensiveness of the census. Gaps in coverage tend to be most frequent in areas with a large number of small farms though the proportionate effect of the omission of one small farm is fairly minor. Spatial variation in response may also be associated with a poorer postal system, a lower level of education and literacy (Appalachia in the past, for example) and a confused system of land tenure where it may be unclear who is the effective or rightful farmer of an area. Districts with common land, common grazings in the uplands or fragmented landownership on the urban fringe may all suffer an above average incompleteness in the response to the census.

##### (iii) Spatial variation in the interpretation of terms and questions

Some variant of the English language is spoken by nearly all farmers in the United Kingdom and United States even where another language is also spoken. In the past, the number of Welsh- and Gaelic-only speaking farmers in Great Britain was much higher than today which may have reduced the accuracy of results in these areas. Since the First World War it has been relatively rare for newly arrived non-English speaking immigrants in either country to take up farming on their own account, but some language problems may persist in the Cajun-French speaking areas of Louisiana, in American Indian tribal areas, among Oriental farmers on the West Coast and Spanish speakers in the South-West.

More commonly there are regional variations among English speakers in the meaning given to widely used agricultural terms. The definition of 'permanent pasture' varies within Great Britain according to how long it must

survive unploughed or under grass to become 'permanent' rather than 'temporary'. The dividing line between permanent pasture and rough grazing is similarly not self-evident to all upland and lowland farmers. What would seem to be rough grazing to the lowland arable farmer may be fair permanent pasture in the eyes of the hill farmer. Sometimes permanent pasture has been used, particularly in England, not as an actual land use but as a balancing item, that is, as the area of the farm not under crops or temporary grass whatever the land's actual use, if any. There is also some evidence that the distinction made between beef and dairy cattle since 1933 in Scotland and since 1952 for part of the English and Welsh herd is rather differently interpreted on either side of the Border due to differences in cattle husbandry. The Scottish beef herd supplies the majority of beef produced in Scotland and is more clearly differentiated by breed from the dairy herd which, in England and Wales, provides both milk and the majority of beef produced there. Spatial variations in the interpretation of the terms used in the census are not usually a major difficulty in recent censuses but it is worth considering this possibility particularly where agricultural census data are to be used in historical or international studies.

(iv) Confidentiality

It will be clear already that census data are collected from individual farms, holdings or farmers but are normally released to the public in a more or less aggregated form to protect the privacy of the individual respondents to the census. The confidentiality serves the valuable function of maintaining a high rate of response to the census which enhances the value of the aggregated results for both academic studies and the government's policy-related work. The results for US counties are not published if there are less than ten farms in the county and in Scotland, fewer than five holdings in a parish (fewer than three in England and Wales) will lead to the results for that parish being amalgamated with those of a neighbouring parish.

The recent trend to behavioural and micro-studies in geography has tended to increase the severity of the loss felt by researchers who cannot obtain individual farm data from the census. The confidentiality of results has had the force of law in Great Britain since the Agricultural Returns Act, 1925 and similar statutory confidentiality is maintained in the USA. Authority does exist in both countries for individual returns to be made available to bona fide researchers if they obtain the written consent of the farmer concerned or if they are conducting research for or on behalf of the government. The latter discretion is used only occasionally. Addresses of farmers are the most likely information to be released along with holding size. The individual census schedules are the most confidential part of the census and so the least likely to be released.

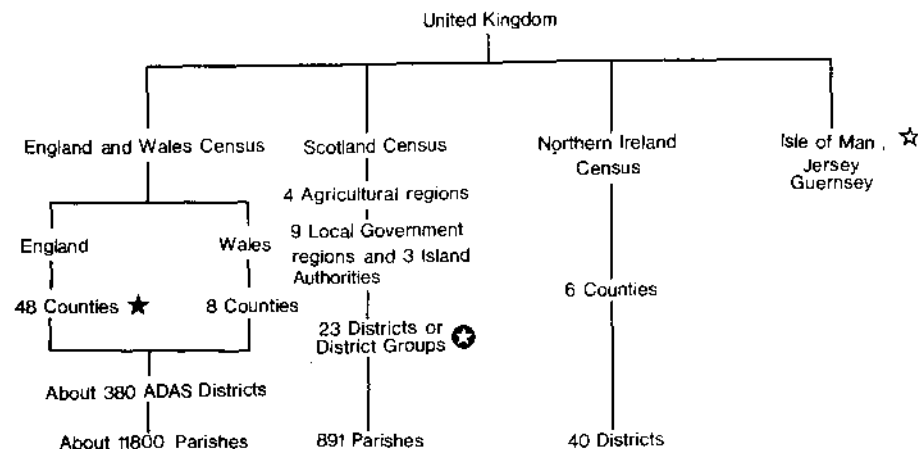
(v) Aggregated data

The confidentiality of individual census returns means that most studies must make do with aggregated data. This has several important consequences for the conduct of agricultural studies, relating to the degree of aggregation, the unequal and changing size of spatial units, and the link between the spatial units for which the data are published and the actual location of the farms assigned to each spatial unit. These important topics will be examined separately.

a) A hierarchy of spatial units

Most agricultural censuses provide a nested hierarchy of areas for which data can be provided. In the case of the United Kingdom the hierarchy is shown in Figure 1. In the USA the hierarchy includes 3 regions, 9 divisions, 50 states, 99 agricultural subregions, 220 county groupings and all the counties for which the confidentiality constraint allows data to be published. The exact number of the most minor subdivisions in both countries tends to vary slightly from census to census.

The selection of level in the hierarchy for a particular study will partly depend on the purpose of the research, the need for spatial detail and the resources and equipment available for handling the data. However, a few general points are worth making about the choice of scale. First, Robinson (1950) showed that the finer the spatial resolution of a set of data, the lower correlation coefficients tend to be between census variables. Statistically significant relationships calculated between variables measured over large areas tend to cease to be statistically significant when the relationship is re-calculated for smaller areas. More generally, the results of studies using spatially aggregated data cannot be interpreted as being necessarily independent of the degree of aggregation in the data used. However, in a study of a part of the Mid-west, Weaver (1956) observed that the simpler crop combinations established at county level were more likely to hold true at the finer level of the townships comprising the county. It is not clear if this finding can be validated for other areas. The interpretation



- ★ Greater London (Eastern) and (South Eastern) are recorded separately as are the Isle of Wight and Isles of Scilly
- ★ Isle of Man, Jersey and Guernsey have their own censuses (see Appendix 2)
- 1975-1978 only

Fig. 1 The hierarchy of UK agricultural census areas after 1974-5



of correlation and regression analyses will also have to take account of the fact that the smaller the areas used, the more agriculturally similar contiguous areas are likely to be and so the greater the degree of spatial autocorrelation in the data.

There is also the ever-present danger of the ecological fallacy. Relationships between variables calculated using aggregated data cannot necessarily be interpreted in terms of the individual farms and farmers. For example, the density of sheep and the proportion of upland may be correlated strongly at county level in the UK, but that does not mean sheep are found on upland farms. Under present-day conditions the relationship does, in fact, hold true for most sheep for part of the year whereas in 1870 lowland sheep were of greater importance even in counties with upland areas.

Different scales of study will produce different pictures of agriculture which will vary not only in detail but also in the extent to which they hint at relationships between agricultural variables or between farming and the physical environment, as is shown in the example from the Chilterns in Figure 2 (Coppock, 1960). This map shows clearly how the distribution of land uses (in this case, the percentage of arable land) changes when the scale of mapping is altered from that of individual farms to that of parishes. The classification of farming and the delimitation of agricultural regions is a process heavily dependent for its final outcome on the scale of data. The fundamental consequences of this scale or aggregation effect are clear if one approaches regionalizing as a device which is not an end in itself, but rather a means of prompting further questions from the researcher and provoking him to explain the regions he has created. Therefore, the explanation of a spatial distribution will also be partly a product of the initial decision on the scale of data to employ.

b) The instability of spatial units

The difficult choice of which scale of published data to utilize is compounded by a tendency for changes to be made in the basic areas for which data are aggregated. It is rare for areas at the top of the hierarchy in Figure 1 to change but changes in the boundaries of the smaller areas are more frequent. The British agricultural census lost the area of the Irish Free State in 1922 from United Kingdom data but kept Northern Ireland. County boundaries were altered in successive re-organisations of local government in 1889-91 (Great Britain), 1964-5 (Greater London), 1974 (England and Wales except Greater London) and 1975 (Scotland). The current county level (or equivalent) of census data in Great Britain is shown in Figure 3. At parish level there were major changes in boundaries following the Divided Parishes Acts of 1876 and 1882 and again on local government re-organisation in 1889-91. No fewer than 3258 of the 14 926 civil parishes in 1881 had altered their boundaries by 1891 (Morgan, 1979). Coppock (1960) has shown that, by and large, parishes have become larger and with fewer outliers since 1870 (Fig. 4) and today there are about 26 per cent fewer parishes than in 1870. Local government re-organisation in England and Wales in 1974 again altered a few parish boundaries.

In recent times, the United States has had more stable boundaries at state and county level although here, as in Great Britain, confidentiality constraints may cause some county data to be suppressed or amalgamated with the results from a neighbouring parish. This is less common in the US than in Great Britain since the counties are larger in proportion to farm size.

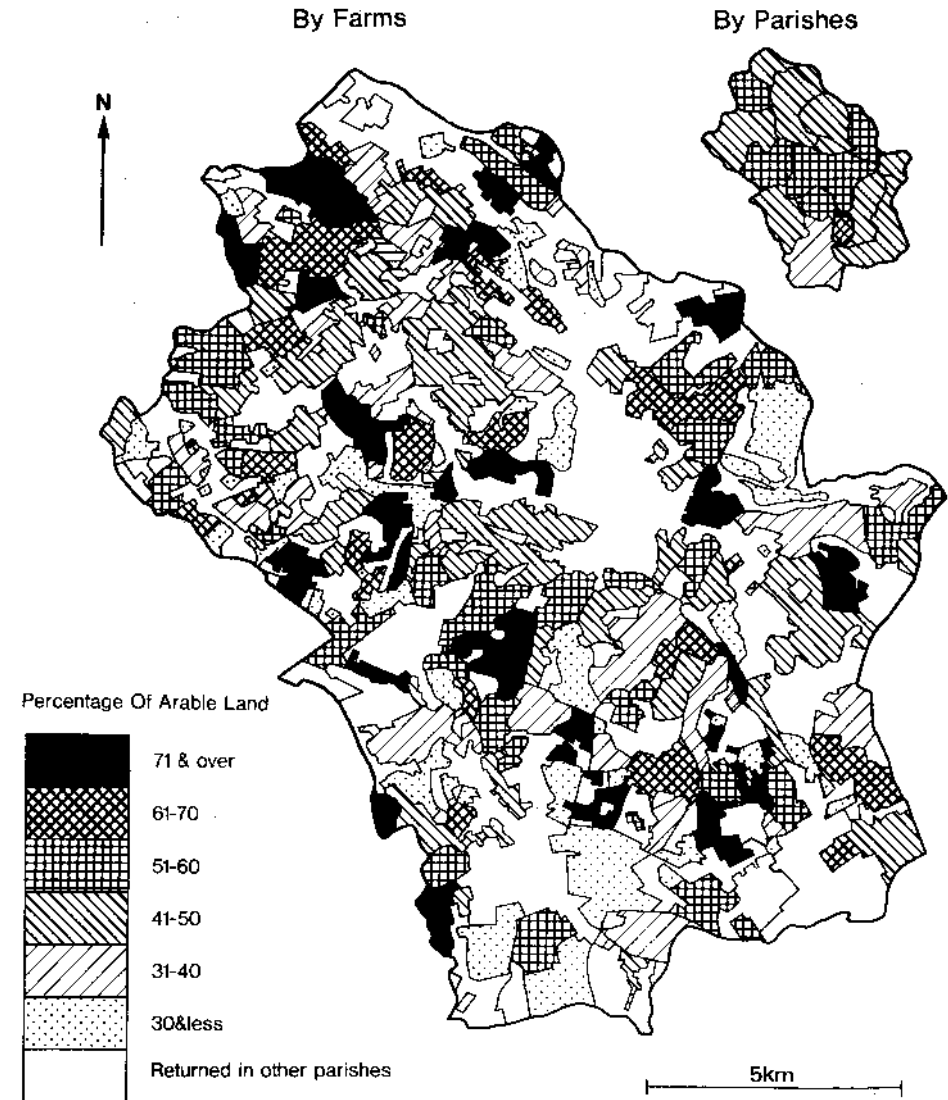


Fig. 2 Percentage arable by farm and parish, Amersham District, 1941. (After Coppock, 1960, p 321)

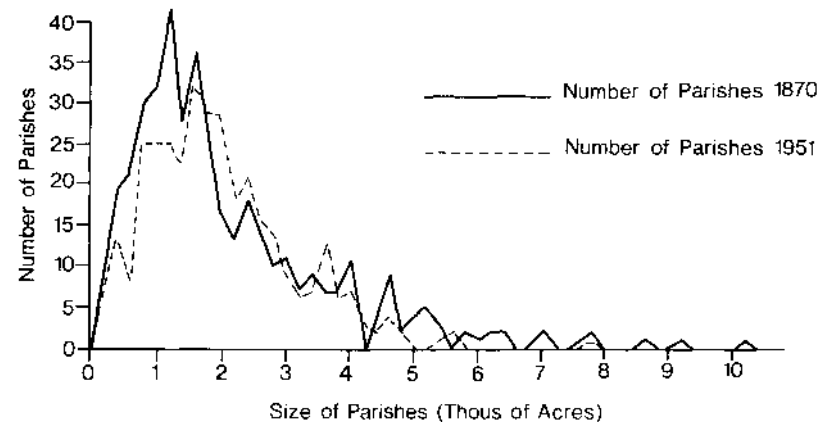
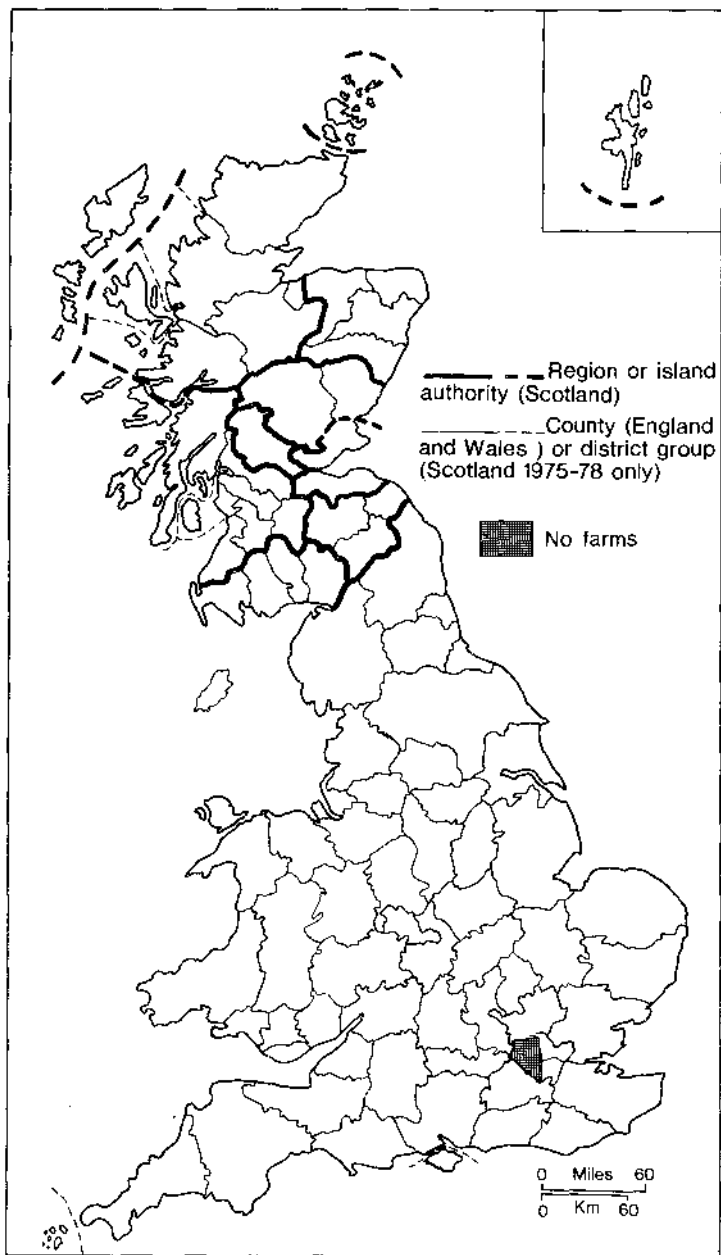


Fig. 4 Parish sizes in the Chilterns, 1870 and 1951. (After Coppock, 1960, p 320)

Only 25 out of 3077 counties or county groups were suppressed in this way in the 1969 census. Some parts of lowland England and east-central Scotland which have many very small parishes are particularly prone to such parish amalgamation in the published results.

### c) Allocation of farms to spatial units

Even if the basic spatial units do not change, there remains the task of allocating farms to spatial units. This is rarely a major problem with US states or British counties but for the smaller units such as parishes and US counties its proportionate effect on the interpretation of published data can be considerable. The procedure used to allocate farms to US counties was altered in 1969, the change being described by the Bureau of the Census in the following terms.

For 1964 and earlier censuses, each enumerator was assigned to enumerate all farms in a specific geographic area, and farms were allocated to the area in which their 'headquarters' was located.

For the 1969 census, each address on the mailing list was assigned to a most probable county and that county name was listed on the mailing list. The assignment was based upon factors such as records of the Agricultural Stabilization and Conservation Service, the location of the post office, and county of location of the majority of rural route patrons. The respondent was asked to check if all his agricultural operations were located in the county shown on the address label, otherwise to identify the 'principal' county in which his agricultural operations were conducted, and to name all other counties in which he had agricultural

Fig. 3 County or equivalent data for Great Britain.

operations. If he failed to do this correctly, and especially if the preassigned most probable' county was incorrect, the acres in the farm may have been tabulated for a different county than in 1964 and earlier censuses. In addition, even when the respondent replied correctly, if two counties or more were involved, his concept of the principal county where his agricultural operations were located might well have differed from the location of his 'headquarters' as determined by the enumerator in the earlier census. (U.S. Department of Commerce 1969 Census of Agriculture vol.2 p.7, Washington, D.C., U.S.A. (1973)).

In the United Kingdom the relationship between the civil parishes under whose name census data are aggregated and the actual areas on the ground of the holdings included is a close, but not exact, one. Coppock (1965) was able to show how, in the Chilterns, farm boundaries crossed parish boundaries so that the agricultural activity of parts of some parishes was recorded under the name of other parishes (Fig. 5). Before 1949, MAFF used the farmer's place of residence to determine the parish under which farmland would be returned. Since then, the location of the bulk of the farm's land has also been a criterion for allocating a farm to a parish.

More recently, the continued amalgamation of holdings and the growth of other spatially dispersed farm businesses have further reduced the correspondence between a parish and the area whose farming is recorded under its name. The desire of the census authorities both to reduce the number of census forms they have to process and to allow the structure of holdings in the census to reflect the realities of farming has accelerated this discordance between a parish on a map and the location of the agricultural activity published under a parish's name. An additional difficulty is that in the early period of the British agricultural census, it is often difficult to establish the exact boundaries of a parish for a specified year, let alone establish the boundaries of the farms recorded under that parish's name. A watch must also be kept for land common to two or more parishes.

#### d) Unequal spatial units

Another consequence of the way individual census returns are aggregated in both the UK and US is the very unequal size of the resulting spatial units. Parishes and counties were not designed for presenting census material, they are just the handy framework of local government taken over for this purpose. The 891 parishes in Scotland range in area from 40 ha to over 100 000 ha - the range in England is rather smaller (9 ha to 25 500 ha). The number of holdings in Scottish parishes varies from under 5 to over 1200 although the range of statistically significant holdings in parishes is smaller (under 5 holdings to 381 in 1976) (Fig. 6). The range in England and Wales is again smaller but the general point remains that the smallest census areas vary greatly in size by whatever criterion size is measured, and the distribution of sizes is usually positively skewed. From this it follows that all aggregated data provide a generalization about farming in a given area, and since the degree of aggregation varies, so does the degree of generalization. Other things being equal, generalization will be least in small parishes with a few large farms and greatest in large parishes with many small farms. The observation that large upland parishes tend to have large farms reduces the range of generalization as does that fact that neighbouring small farms are often agriculturally similar. Yet even here there are exceptions with large parishes having many holdings in parts of the Scottish Highlands, North Wales

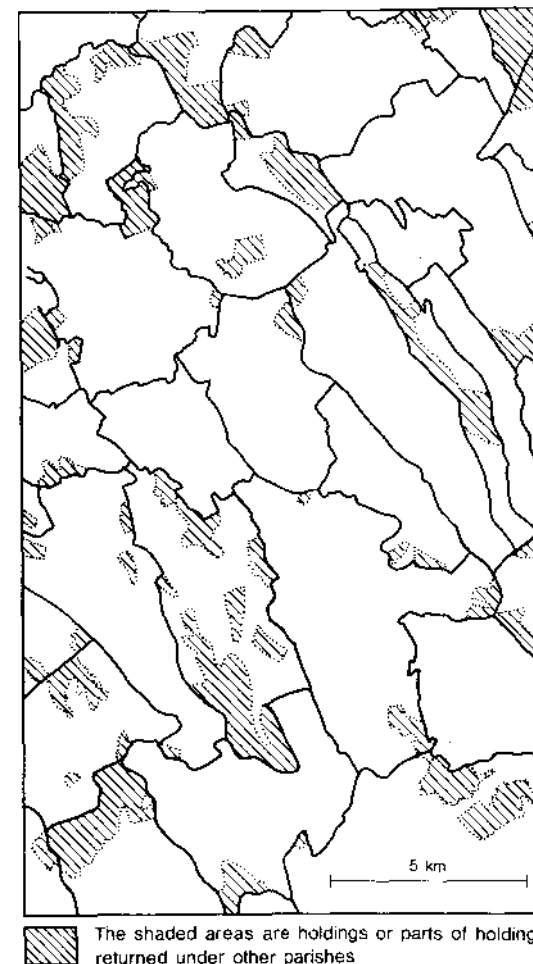


Fig. 5 Boundaries of holdings and civil parishes in Wendover District, 1941. (After Coppock, 1965, p104)

and the Pennine fringes. Even the smallest spatial aggregation may also tend excessively to 'average out' farming by combining areas of different agriculture. The many areas of strip parishes on the English scarpland and in eastern Scotland are of this type. The linear parish shape effectively conceals at least two different types of farming behind a single set of parish totals (Fig. 7).

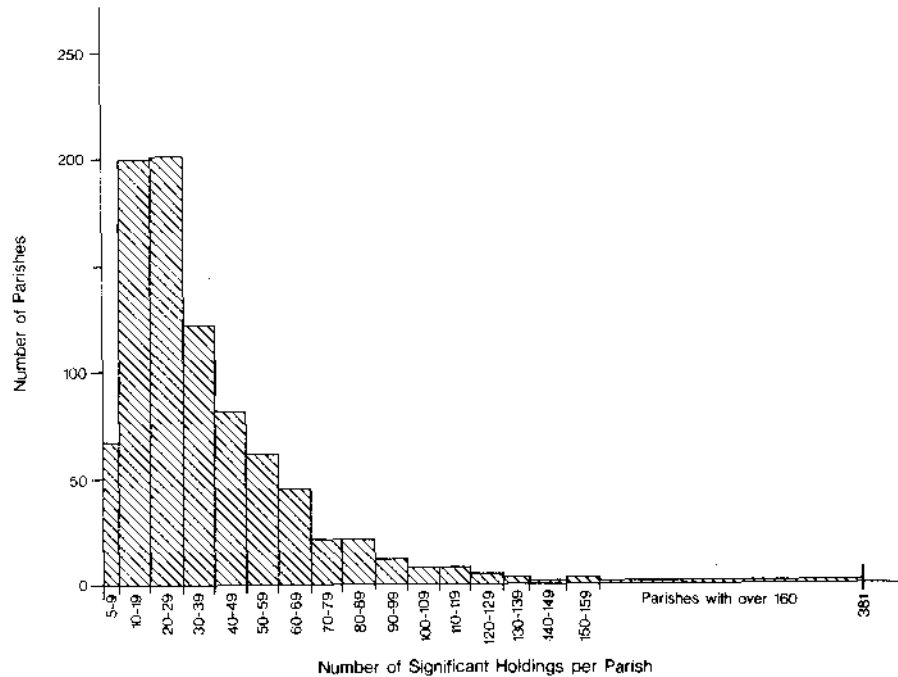


Fig. 6 Distribution of number of significant holdings per parish in Scotland, 1976. (NB Parishes with under 5 holdings have been amalgamated with neighbouring parishes).

It has been suggested that the unequal generalization inherent in the use of spatial units of variable size could be reduced by grouping spatial units to equalize them (Coppock, 1976). However, this raises several practical problems. Since the largest units cannot be split, the small units must be grouped to form larger ones. This worsens the problems of generalization and the loss of information inherent in all aggregation. It is not clear whether the advantage lies in equalizing the areas of the spatial units (using some of the arguments in favour of grid squares for the presentation of spatial data) or in equalizing the number of farms per spatial unit. One might be able to obtain a single aggregation to achieve both aims but, even with computer programs to check the immense number of possible grouping schemes, this is unlikely. Once the objective behind the grouping has been selected, there remains the practical task of knowing which spatial units to amalgamate since, even with a contiguity constraint and a small number of initial parishes, the number of combinations is very large. Openshaw and Taylor (1981) have drawn attention to our limited understanding of the effects on research of the choice of scheme to create a given number of larger spatial units. Robinson (1956) has provided useful guidance on the weighting of values referring to spatial units of unequal size when these values are used in correlation analyses.

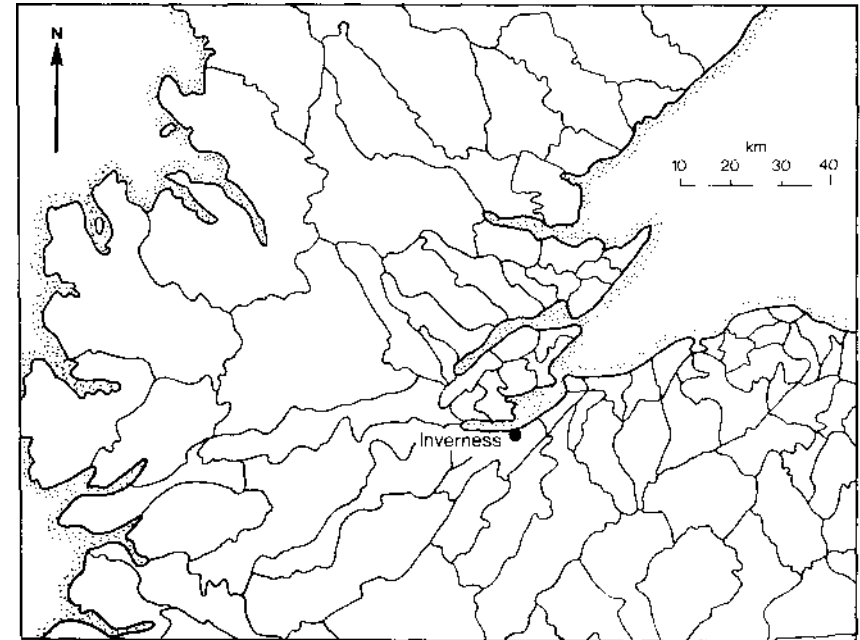


Fig. 7 Parish shapes and sizes in the Inverness area, northern Scotland

(vi) Definitional changes in basic census terms

Ideally the basic terms used in a census of agriculture such as 'farmland' 'farm' and 'farmer' should be self-evident and constant in definition between censuses. This is not so in practice. The census authorities not infrequently alter these basic definitions for a variety of reasons and this can have a marked effect on the interpretation of census data.

a) Farmland

In 1866 the definition of farmland in the United Kingdom was based on land of over 5 acres listed as being used for agricultural purposes in the local authorities' rate books (the valuation rolls in Scotland). In 1867 the 5 acre minimum size was removed and an extra 400 000 ha of farmland were included in the census. Areas which were farmed but not assessed for rates were progressively included in the census and a further 686 000 ha of farmland were added by 1875, only a part of which reflected a genuine expansion of the cultivated area. In 1892 mountainous areas used for rough grazing were included in the British census - the livestock grazing such land had always been included in the returns - and this marked the start of a long series of amendments and clarifications to the definition and accuracy of recording these areas. 'Rough grazing' was re-defined in 1911 to include unfenced land and in 1921 English and Welsh farmers were instructed to record all rough grazing to which they had sole grazing rights. Consequently, rough

grazing over which common rights extended ought not to have been included in the English and Welsh census although they probably were to some extent before 1921. Various rather uncertain estimates of common rough grazings were made by the Ministry of Agriculture between 1921 and 1952. Rough grazings were included in the Northern Ireland census after 1930.

The greater proportion of upland in Scotland has led to even greater apparent changes in the area of farmland there consequent upon definitional changes. Common grazings, which were regulated under the Crofters Holdings (Scotland) Act 1886, were included in the census and have been subject to progressively fuller survey and less double-counting during this century. Deer forests have presented further problems. These treeless moorlands, set aside by landowners for deer stalking, are generally believed to have expanded in area up to the early twentieth century and declined thereafter. The fact that some deer forests also provided poor pasture for sheep and cattle brought them to the attention of the agricultural census. In 1892 occupiers were requested to return as rough grazing all land used for grazing. This resulted in occupiers returning all, none or some more or less arbitrary part of their deer forests as rough grazing. There was also double or triple counting of some hill land as between the normal census returns, the special deer forest returns and the common grazings returns. The report of the Departmental Committee on Deer Forests (1922) estimated that the 189 deer forests had expanded in extent from 797 984 ha in 1883 to 1 386 651 ha in 1920. After this, however, the economics of deer stalking deteriorated, and some land reverted to grazing and was included in the census in the normal way. Scottish farm occupiers were asked in 1932 to return as agricultural land all deer forests capable of being grazed, irrespective of actual use. This added a further 363 000 ha to the area of farmland in Scotland. After 1959 the special deer forest census was included in the normal census and occupiers were asked to include as rough grazing all 'mountains, hill, moor, deer forest (whether grazed or not) situated on the farming unit, whether enclosed or not'. This new ruling produced a further net increase of 606 000 ha in the total rough grazings area of about 5 million hectares. Conversely, the removal of statistically insignificant holdings from the Scottish census in 1970 reduced the apparent area of rough grazings by 374 000 ha. In Northern Ireland, hill land held in undivided shares is excluded from the census while the conacre system (the leasing of the right to occupy farmland for a year and a day) has demanded great care on the part of the census authorities to avoid double counting land in both the owner's and conacre tenant's census returns.

The definition of farmland was also expanded by basing the census on the total area of the holding rather than on the area of crops, grass and rough grazing. This change took effect in 1960 in Scotland and in 1969 in England and Wales although it took several years for reliable returns to be recorded from farmers. The new definition of 'total area of holding' was first used in land-use statistics in 1978/9 although woodland was excluded. The main influence of this change has been on the statistics of land-use change rather than on the more narrowly defined indicators of farming (Baines and Lund, 1981).

In conclusion, any study of the area of farmland or losses of farmland must take into consideration the nature, timing and magnitude of changes in the agricultural area resulting from altered definitions of farmland and rough grazing. It should also be noted that, even when the same data are collected over the years, their presentation may vary which also effectively hinders historical studies. Thus the English census has collected information on the

area of cabbages since 1866, but at various times since then the area of cabbages has been published either by itself or sometimes combined with the areas of a variety of other crops including one or more of savoys, kale, rape and kohlrabi. The more complex changes in the sub-divisions of cattle and pig numbers are similarly destructive of comparisons over time. Also, the tendency to group minor crops under the heading 'other crops' or 'other small fruit' means that it is difficult to trace the origins of, for example, maize and oil-seed rape production and viticulture in Britain in the years before these crops are sufficiently common to merit recording separately.

#### b) Farm

The definition of a farm is another crucial factor in the interpretation of census data since this too has been altered several times in both the UK and USA, with effects of such magnitude that they reduce the historical comparability of census results. The minimum size of holding in the British census was 5 acres in 1866, there was no minimum size in 1867-8, the minimum was 1/4 acre from 1869 to 1891 and 1 acre from 1892 to 1968. In Northern Ireland the minimum was 1/2 acre up to 1954 and 1 acre from then until 1968. A new minimum size of holding was used in England and Wales in 1968 and this was set with reference to both the area of the holding and its size in standard man-days (see p.6). Holdings were excluded from the main census if they were smaller than 26 standard man-days (smaller than 40 smd after 1973), if they had under 10 acres (4 ha) of crops and grass and if they had no regular whole-time workers. Together these definitional changes removed 50 000 holdings from the census. From 1973, 2000 statistically significant holdings of under 1 acre (0.4 ha) were fully included in the census since they exceeded the 40 smd threshold. In Scotland and Northern Ireland the thresholds of 26 smd and 40 smd applied from 1970 and 1973 respectively. The holdings excluded from the census are called 'statistically insignificant' - a reference to their minimal contribution to food production rather than their numbers which are not inconsiderable. They were surveyed triennially in Scotland until 1976 and there are annual partial surveys in England and Wales. Those found to have grown large enough were restored to the main annual census, and holdings in the main census which had declined sufficiently in size were removed.

Since 1980, the European Community's scheme of measuring farm size by standard gross margins has been progressively adopted (see p.6) and holdings which were under 1 European Size Unit, employed no full-time labour (except for the occupier) and extended to less than 6 hectares were added to the category of statistically insignificant holdings and excluded from the main census. This again reduced the number of holdings considerably - by 21 per cent in Northern Ireland. Studies of changes in the number of holdings have to bear in mind these changes in the minimum size of holding included in the census. Figure 8 demonstrates the scale of these changes relative to the normal rate at which the number of holdings alters.

There have also been changes in the definition of a farm for the purpose of the US census which have had a major effect of farm numbers. For the censuses of 1959, 1964 and 1969, the farms included were either businesses of less than 10 acres but selling over 8250 worth of agricultural produce or they were businesses of over 10 acres and selling over \$50 worth of produce. The use of a monetary value as a minimum size implies a falling real minimum size given money inflation and also directs attention to the uncertainties

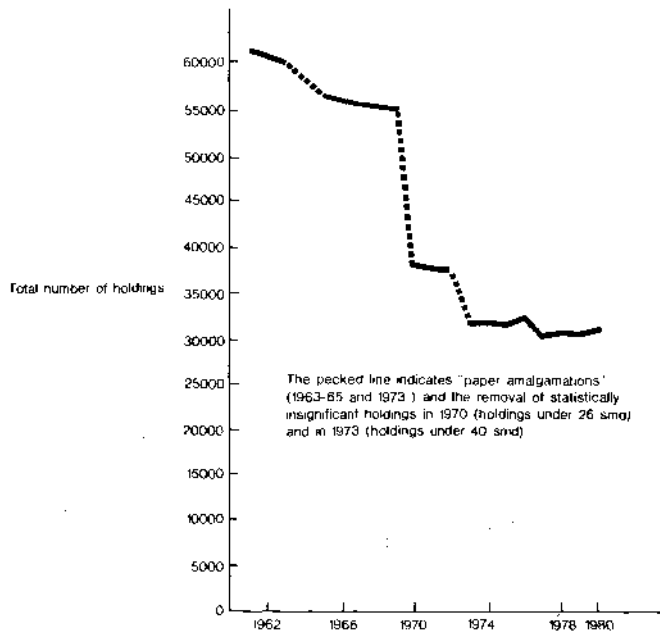


Fig. 8 Total number of holdings in Scotland, 1961-80. (Source: Agricultural Statistics, Scotland, 1961-80)

over the valuation of produce sold. It should also be noted that the primary sources of information for compiling the master list of all farm businesses are the Inland Revenue Service's records of persons completing tax forms 1040 Schedules C and F and form 1120S and the Social Security Administration's records of employers of farm labour. These sources are least useful for small-scale farmers who do not employ workers and for whom agriculture is not their main source of income. Consequently only 71 per cent of farms selling under £2500 worth of produce were included in the 1969 census compared with 81 per cent in 1964 and 86 per cent in 1959. These farms are of very minor importance in terms of food production, but in studies of the social structure of rural communities and of part-time farming, the definition of a farm and the variable comprehensiveness of coverage of farms of different sizes need to be kept in mind.

The definition of a farm was changed in 1976, the old definition being used in preliminary reports of the 1974 census and the new one in the final reports and again in the 1979 census. The new definition of a farm was that it was a business selling over £1000 worth of produce regardless of the area of the farm. This reduced the number of farms in the census by 300 000 or 11 per cent with a consequent reduction in administrative costs and a gain in the accuracy of the census, since it removed a part of that section of agriculture where coverage was most incomplete. In the 1950s and earlier, the definition of a farm was left to the discretion of the enumerator in the field who had to interpret a set of guidelines. This made a nationally consistent

definition of a 'farm' difficult to achieve in practice throughout the USA. The definitions since 1850 of places to be counted as farms are given in detail in the introduction to Volume II of the 1964 Census of Agriculture. The advent of computers has not only speeded the processing of results, it has made it easier to apply a nationally uniform definition of a farm and to consistently exclude small farms.

Both the British and American censuses have also had to come to terms with the expansion of farms which has produced business enterprises with several physically separate blocks of land under common management. This is no problem if the farmer agrees to all his farms being enumerated on a single census form. In the US a farm which includes land in more than one county is returned as though it was one unit in the county containing the majority of the farm's land except where the farm is very large, in which case separate returns are used. The Scottish Department of Agriculture (DAFS) has promoted this merging of census returns since 1957. The difficulties occur if the farmer refuses to combine his holdings for the purpose of the census. This may be legitimate if the holdings are so far apart that, except for sharing harvesting machinery, for example, they are in effect separately managed farms. A rough guideline, initially of 5 miles (8 km) and later 15 miles (24 km), was established in Scotland to mark the maximum separation between holdings which could still qualify for amalgamation for census purposes. It is estimated that about 15 per cent of Scottish holdings, often upland ones, are under common management. During the period 1963-5 and in 1973 the DAFS took the initiative in seeking to identify cases where holdings might be amalgamated in the census if the occupier agreed. This resulted in quite substantial numbers of 'paper amalgamations' which show up clearly in Figure 8. This exercise allowed the census to 'catch up' with the normal process of structural change. The US and English and Welsh censuses, being much larger, have to accept a longer lag between farms enlarging and this being reflected in the census. This can also be of regional significance since some areas, notably the uplands of eastern Scotland, appear to have more farms run by farmers elsewhere than other areas. The dilemma is that the more the census reflects the current structural position of the industry, the more difficult becomes the geographical interpretation of parish data, since the correspondence between farm and parish boundaries is further diminished. The desirability of the census reflecting structural changes makes the mapping of census data for small areas increasingly unrealistic in districts where there are many physically separated farms under common management recorded on a single census form. The small size of British parishes probably makes this a more serious consideration in the UK than in the United States although even here it cannot be ignored.

### c) Farmer

It is not clear how many farmers there are in the UK or the USA. This is partly a product of the difficulties already discussed in defining a farm, but an additional source of difficulty arises from the element of self-perception in any occupational classification. The Population Census in both countries usually records a smaller number of farmers than the number imputed from the Agricultural Census, since part-time farmers record themselves in the Population Census by their other (and usually principal) occupation. The American census of agriculture formerly included in the definition of a farmer the need for that person to see himself as a farmer. Information on the number of farmers and farm operators in the United Kingdom has improved

since the mid-1970s with modifications to the census and sample surveys (Rettie, 1975), while in the USA data on the number of farm operators (as distinct from the number of farms) is still scanty.

(vii) Accuracy

Ideally one would wish to regard all census data as completely accurate. This presupposes, among other things, that farmers know the correct answer to each question on the census schedule and that they are willing to give it. This is not always so. The areas of British hill farms are often suspiciously round numbers like 1000 acres. This is not just rounding up from, say, 998 acres but often reveals a real ignorance of the true area of upland in districts where maps do not show the area of unenclosed hill land. Farmers may perpetuate such errors by copying their answer from the previous year's census form. In the lowlands, the areas of fields are mapped in Great Britain but even here traditional field sizes - 'five-acre field' - rather than actual areas may sometimes be reported. More seriously, farmers may be uncertain as to which common hill land is theirs. Hart noted one case of 12 square miles of Scottish upland which nobody claimed while cases of double counting of farm land are not unknown (Coppock, 1978).

Even when the farmer knows the correct answer to the question, it is possible that, on occasion, he will not give it. If the census is conducted by tax officers, as the British one was in the nineteenth century, then farm area or numbers of livestock may be under-recorded in the belief or hope that this will reduce liability to local or national taxation. Alternatively, if a farmer is claiming a subsidy based on farm area (e.g. the former British subsidy for liming land) then farm area may be inflated.

Inaccuracy can also creep into the census in other ways. Incomplete coverage is one source of error. The 1969 US Census of Agriculture reached 97.1 per cent of the hopefully complete list of farms with sales of over \$2500 but coverage for smaller farms was only 71 per cent. The 1974 census met even greater resistance. Inaccuracy is greatest for small farms and for items such as the number of farms and farmers, and is least for crops such as wheat which are predominantly grown on large farms. The final rate of response to the US censuses is only achieved after numerous reminder letters, visits and telephone calls spread over 7 months for the 1969 census and nearly 14 months for the 1974 census as Figure 9 shows. The later replies are unlikely to be as accurate for census day as the earlier ones.

The British census claims 99 per cent accuracy on most items but even here parts of the census have to be treated with rather greater caution than this figure would warrant. Data on farm numbers, for example, are partly a reflection of the census authorities' ability to check on the completeness and currency of its master list of farms. Incompleteness of coverage is not only a feature of the earlier censuses. As late as 1941, the introduction of rationing for animal feedstuffs uncovered an extra 18 000 holdings in England and Wales covering 109 000 ha of farmland not previously included in the census. This can be compared with the Ministry's previous estimate of an under-enumeration by 40 000 ha. Similarly, holdings in England and Wales with over 1 acre (0.4 ha) of rough grazing but no crops or grass have been poorly recorded since their first inclusion in the census in 1907. Fortunately, they are not believed to be numerous.

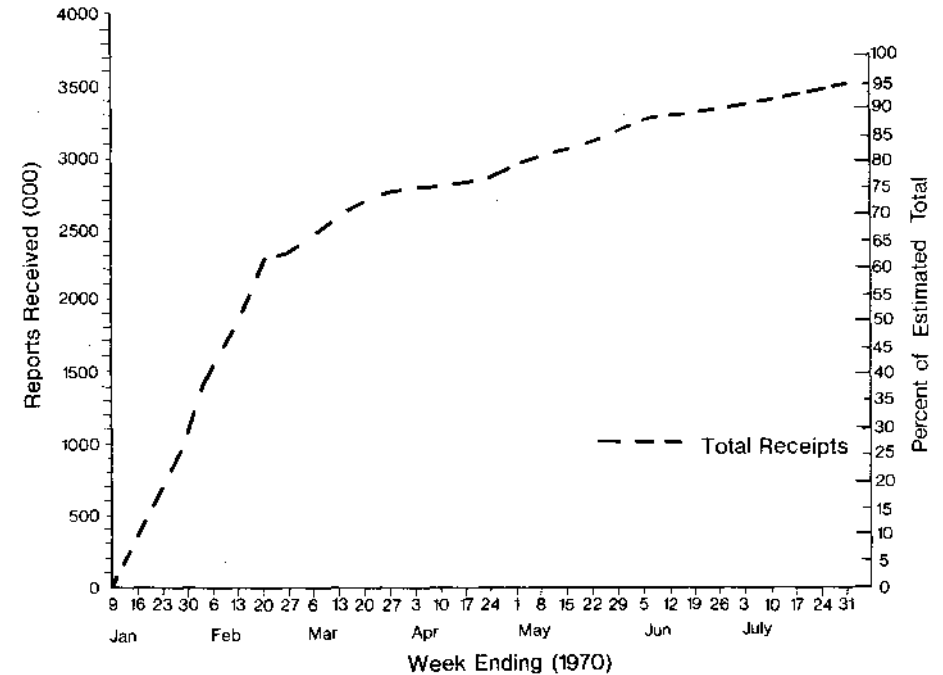


Fig. 9 Receipt of returns from 1969 US Census of Agriculture. (Source: US Department of Commerce (1973) 1969 Census of Agriculture vol 2, chap 1 (General Report) p.A29)

A study of the amalgamation of holdings in Scotland compared census results for holdings held on computer tape with clerical records, and noted a number of errors in one or other source which are worth recording for their more general interest (Clark, 1977). About 1 per cent of the recorded amalgamations were in fact the fragmentation of holdings, about 7 per cent of the recorded amalgamations did not appear to have occurred and about 3 per cent of the cases were not amalgamations by the official definition since only a part of another holding was taken over. About 4 per cent of amalgamations were incorrectly recorded as Farm A taking over Farm B whereas in fact it was the other way round. Finally, new amalgamations not recorded on the computer tapes were identified from clerical records and this increased the number of amalgamations by 1.5 per cent. Misunderstandings, errors in processing and a lack of staff to follow up problem cases are inevitable features of even the most effective organization. Each source of inaccuracy may be quite small but their cumulative effect needs to be remembered when interpreting results since, particularly in small areas, the errors may not 'cancel each other out'. Unfortunately most researchers do not get the opportunity to check the accuracy of census data they wish to use.

Certain aspects of the census are also believed to be recorded with less accuracy than other parts. Land-use changes measured from the census in England and Wales were widely regarded for many years as less accurate than they should have been (Centre for Agricultural Strategy, 1976). Information on land tenure is also not wholly satisfactory in England and Wales partly because the continuity of data for tenure of holdings is so poor (1887-91, 1908-14, 1919-29, 1941-43, 1950, 1960 and since 1970). In addition, the basis of calculating tenure has changed. Up to 1922 in England and Wales and until 1960 in Scotland, the tenure of a holding was calculated on the basis of its area of crops and grass. Thereafter either the crops, grass and rough grazings area was used or the total area of the holding. The Northfield Committee's Report (1979) observed that even modern data are misleading since the area of tenanted land is over-estimated by the inclusion of cases in which the tenant has an interest in the land. Such cases account for about 8 per cent of all tenancies in Scotland and so the Committee suggested that the true proportion of land rented at arm's length' in Great Britain was between 3 and 8 percentage points lower than the census figure (see also Rose *et al.*, 1977). Figures on owner-occupation were also believed to be misleading since they included land run by farm managers and some partnerships. The simple division of farmland into owner-occupied and tenanted increasingly fails to reflect the complexity and ingenuity of tenurial arrangements devised for fiscal reasons. The dilemma for the census authorities is that to bring the structure of the census questions on land tenure up-to-date is to lose some of the historical comparability in the data.

A recent study of the Lancashire horticulture industry by Phillips has uncovered another combination of types of error which is probably not uncommon. The published statistics show that between 1969 and 1979 there was an increase of 46 per cent (130 holdings) in the total number of horticultural holdings with glasshouses in the two parts of Lancashire used as study areas. Field survey on foot using maps, aerial photographs and a door-to-door survey estimated that there had actually been a reduction of 31 per cent or 198 holdings over the period (Table 2).

Table 2. Number of horticultural holdings with glasshouses in parts of Lancashire, 1969-79

	MAFF census data	Field survey data	Net under-enumeration by MAFF
1969	283	638	-355
1979	413	440	- 27
Change	+130	-198	

The difference is accounted for by partially compensating errors of over- and under-enumeration at both censuses. In 1969, 388 holdings escaped enumeration while 33 holdings were incorrectly included in the census. By 1979 coverage was much more complete, perhaps because more holdings became known to MAFF when grants were claimed under the Horticultural Improvement Scheme. Nevertheless, 97 holdings were still omitted from the census in 1979 and 70 wrongly included. Phillips also noted discrepancies in the data on the area under glass on holdings and in one, admittedly exceptional area, 15 per cent of holdings were allocated to the wrong parish.

Other specific sources of error in censuses include data on crop yields which are notoriously difficult to measure - less detailed information on yields is now published in the UK because of this unreliability. Reasonable doubts can also be raised regarding the information about the area cut for hay and silage since fields may be cut more than once in the year. In addition, any new question added to a census usually produces an incomplete and inaccurate response for the first few years. Coppock (1955) noted that only 70 per cent of farm occupiers answered satisfactorily a new question on the age of temporary grass when it was first asked in 1943. By 1950 a 94 per cent satisfactory response had been received. The US census of 1969 commented on the high rate of non-response (about 12 per cent) to the question on the total value of farm products sold. Non-response generally led to about 8.7 per cent of the returns included in the census being imputed by the Bureau of the Census. The use of imputed returns (usually the previous year's figures) is also known to occur in the British censuses but its current extent is not known. However, in 1891 estimated returns were made for 3.3 per cent of holdings (Coppock, 1955) and for 1.75 per cent in 1923.

The intention of this section is not to suggest that census material should not be used, but simply to draw attention to the quite understandable temptation for researchers to regard all census data as equally reliable. This is not so and care should be taken when interpreting the results of those parts of the census known to be prone to a rather greater inaccuracy than the majority of the census information.

#### v OTHER SOURCES OF AGRICULTURAL DATA

It would take too long to list all the other sources of agricultural data since they are very numerous, but a few are worth noting here since they either complement the information provided by the census or have a similar scope and quality to census data. Such information is often useful to set the census in perspective or to provide more detail on aspects of farming recorded only sketchily by the census.

Unlike the US census, the British ones provide little information on farmers' costs or revenues. This gap is filled by the Farm Management Scheme in England, Wales and Northern Ireland and the Farm Accounts Scheme in Scotland. They are both sample surveys which are co-ordinated with the European Community's Farm Accountancy Data Network and are run by University Departments of Agricultural Economics and Colleges of Agriculture. Special care must be taken while interpreting the results, since the data are based on farms not the holdings used in the census. Researchers also need to pay attention to the nature of the sample of farms collaborating in the surveys and to the precise, but not intuitively obvious, definition of net farm income. The classification of the farms surveyed changed in 1949-51 and in 1964, and from 1977/78 the system for measuring farm income in England and Wales was altered to conform to the European Community's conventions. This included the adoption of the standard gross margin as the unit for measuring farm size instead of the standard man-day (see p. 6). A farm's total standard gross margin (expressed in European Units of Accounts (EUA)) provides the basis for the division of farms into six size-classes based on European Size Units (1 ESU = 1000 EUA). The distribution of each holding's standard gross margins between enterprises determines the type of farm according to a ten-



fold classification which is a simplified version of the EC's 58-type scheme. The new and old definitions of farm types used in the Farm Management Survey are given in Appendices 3 and 4. Results are published annually in Farm incomes in England and Wales (MAFF, since 1944-5), Farm incomes in England (MAFF since 1978-9), the Supplement to the annual digest of Welsh agricultural statistics (Welsh Office), Economic report on Scottish agriculture (DAFS, before 1980 Scottish agricultural economics), the Statistical review of Northern Ireland agriculture (DANI) and Farm incomes and investment in Northern Ireland (DANI). The incomes of American farmers are recorded in the normal census reports with more detailed information for inter-censal periods available in the USDA's Farm income situation (annual), People with farm earnings (1972) and Families with farm incomes (1979).

The last ten years have witnessed considerable research and official interest in structural changes in agriculture on both sides of the Atlantic. The USDA's A time to choose (1981A) provides much useful data and has a valuable and comprehensive bibliography. The US Department of Commerce's The changing structure of U.S. agriculture and its contributions to the national economy (1974) is also useful in a broader context. The British scene is described in The changing structure of agriculture, 1968-1975 compiled by MAFF, DAFS and DANI. Both publications rely heavily on special analyses of census data to chart the increasing size of farms and their growing enterprise specialization and so the caveats in this booklet about the census apply to these publications as well.

Recent changes in landownership have also provoked some political controversy in Great Britain and America. The Committee of inquiry into the acquisition and occupancy of agricultural land (the Northfield Committee Report, 1979) investigated and reported on changes in farm size, farm ownership and land tenure using census and other sources and is a valuable compendium of information. In the US, the Departments of Commerce and Agriculture have both investigated foreign ownership of land and the Agriculture Committee of the House of Representatives has studied this and also the growth of institutional ownership of land (Hjort, 1978; USDA, 1980 and 1981B, and Lewis, 1980).

Micro-scale studies of farms may wish to know the boundaries of farms, but this presents serious problems since neither census records this information. In Great Britain there are maps of farm boundaries in 1941-3 but these are confidential and since they are not being updated, except partially in Scotland, they are seriously out of date. The Northern Ireland Agricultural Inspectorate have land-use and farm boundary maps which are revised each year (Coppock, 1978). There is no nationwide map coverage of farm boundaries in the USA either. Such maps as do exist in both countries have to be treated with great caution because not only are they subject to error in mapping the boundaries, they are also liable to the general census problems of defining farms. The need for the researcher to undertake his own fieldwork to map farm boundaries is as evident as it is time-consuming.

The quality of land on which the farming recorded in the census takes place is another area where data would be useful. Maps at a scale of 1:63 360 provide a simple five-grade classification of agricultural land quality in England and Wales. This map series is a valuable tool for examining the links between farming and the physical environment, although the limitations of the maps voiced by Dennis (1976) and others have to be borne in mind.

The Macaulay Institute's series of Land Capability maps provides analogous information for some of the lowland parts of Scotland while their climatic assessment maps cover the whole of Scotland. No nationwide maps of agricultural land quality in the USA are available at a scale which can be related to individual farms.

The agricultural census, in so far as it records the use of land on farms, is often employed as a source for wider studies of national land use. This may seem an obvious use for census data, but it is a dangerous one, as Coppock (1978) has observed. The census only records those land-use changes which come to its attention and the Centre for Agricultural Strategy's Land for agriculture (1976) has examined the validity and usefulness of agricultural census data in the context of studies of land-use change. The usefulness of such data is hotly contested and publications by Best and Coppock (1962), Rogers (1978) and Dickinson and Shaw (1978) describe the bases of the controversy. In the United States, the debate over the loss of farmland is less sharp at a national level, although in some states (Oregon, Vermont, California and Hawaii, for example) it has been an issue of political significance. The USDA's Major uses of land in the United States provides a summary of changes in land use based on each census. It is usually issued as one of the USDA's Agricultural Economic Reports and other information on farmland is available in the USDA's Farms and land in farms and in Blobaum (1974).

Classifications of the types of farm in both countries are also derived from the census. The British classifications vary somewhat between the three UK censuses and comprise classifications devised by the agricultural departments. The results are subject to changes due to the alterations in the minimum size of holding described in section IV(vi) and to the standard man-day weightings in 1976, for example. The English and Welsh scheme of classification for 1976/77 is reproduced in Appendix 4. Results are published annually in Farm classification in England and Wales (MAFF, since 1963), Economic report on Scottish agriculture (DAFS, formerly Agricultural statistics, Scotland) and Statistical review of Northern Ireland agriculture (DANI). The results are mostly confined to full-time holdings and the Scottish scheme classifies holdings for both the current year and also by keeping holdings in the group to which they were allocated in 1968. Since 1980 UK farm classification based on the distribution of standard man-days between enterprises has been progressively replaced by an EC-compatible scheme based on the distribution of standard gross-margins (see p. 6). The quinquennial American census classifies farms with over \$2500 worth of sales in four ways; by area, by value of agricultural products sold, by the Standard Industrial Classification (SIC) of farms and by the SIC subdivided by value of sales. The classifications for states are published in Volume 1 of the Census Reports.

Land prices are recorded annually in Scottish agricultural economics (since 1980 called Economic report on Scottish agriculture), the Statistical review of Northern Ireland agriculture and ADAS's Agricultural land prices in England and Wales. All these sources are based on Inland Revenue data which is not otherwise available to researchers. Changes in farm rents are published annually in Scottish agricultural economics (since 1980 called Economic report on Scottish agriculture), and in ADAS's Farm rents in England and Wales. Nearly all farms in Northern Ireland are owner-occupied.

Some sources of information deal with only one type of farm, but do so in much more detail than the census. British examples include the Annual

report of the Crofters Commission, the Ministry of Agriculture's Annual report on smallholdings in England and Wales and the Federation of United Kingdom Milk Marketing Boards' publications especially United Kingdom dairy facts and figures (annual). American examples include the USDA's Dairy situation, National food situation and Farm labor.

More general sources of information include the work of the Scottish and Agriculture Select Committees of the House of Commons and committees of Congress (particularly the Committee on Agriculture), the British Government's Annual review of agriculture and the OECD's Agricultural policy in the United Kingdom (1974A) and Agricultural policy in the United States (197413). The

Central Statistical Office's Guide to official statistics and Studies in official statistics - agriculture and food statistics are the most useful introductions to the wealth of other information available.

## VI CONCLUSION

The Agricultural Census does not reveal all there is to know about farming in either the United Kingdom or the United States. It does not provide fully accurate information on those aspects of farming it does record. It is certainly hazardous to make international comparisons using census data although the harmonization of censuses in the European Community is a useful step forward. Yet the Agricultural Census remains a source of information about current and past agricultural practices without which rural studies would be the poorer. Its value is enhanced if users of census data bear in mind that censuses are conducted at public expense for the purposes of public policy and not to meet the needs of academic research. The interpretation of the census needs to be circumspect, but it is still quite indispensable for rural studies.

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APPENDIX 1

Census schedule for England and Wales, June 1981

**Ministry of Agriculture, Fisheries and Food**  
**Agricultural and Horticultural Census: Return for 1 June, 1981**

NOTICE REQUIRING INFORMATION  
**To be completed and sent back by 8 June, 1981**

Agricultural Censuses and Surveys Branch,  
 Government Buildings (Block A),  
 Guildford, Surrey, GU1 2LD.

Agricultural Statistics Act 1979

The Minister of Agriculture, Fisheries and Food requires you to complete this form in respect of the land you occupy. Notes for your guidance are provided; please read these carefully before you complete the form. The information given should relate to the position on 1 June 1981 except where otherwise stated. The form must be returned by 8 June 1981 to the Collecting Officer at the address shown above.

No information you give on the return may be published or otherwise disclosed without your prior written consent, except as specified under Section 3 of the above Act.

Under Section 4 of the above Act penalties may be imposed on any person who, without reasonable excuse, fails to furnish information or knowingly or recklessly furnishes false information.

**B. D. HAYES**, Secretary

THIS IS A METRIC FORM:—

**1 ACRE = 0.4047 HECTARES**  
**1,000 SQ. FT. = 93.0 SQ. METRES**  
**1 TON = 1.016 TONNES**

In correspondence please quote your Holding Number

**POSTCODE**  
 Please enter correct postcode here if none is given alongside or if it is incorrect.

total area (hectares)

**0 F01**

B.R. 12 I.C. 13

J.81 F/

R6131—  
**LF81**

If the area of your holding is incorrectly stated in the address panel above please state the correct area here, and then complete page 6. Do not include land on which the keep is let to you or rented on a seasonal basis — see note 6.

Total area **1169 F9** hectares

If you are in doubt about the completion of this form write to the Collecting Officer, at the above address, quoting your holding number, or consult your Divisional Office.

AFTER COMPLETING THE FORM PLEASE SIGN THE  
 DECLARATION AT THE FOOT OF PAGE 6

**FARM AREA, CROPS, GRASS AND LABOUR**

JUNE 1981

**1 ACRE 0.4047 HECTARES**

Please enter all areas to the nearest 0.1 hectare

**1 TON = 1.018 TONNES**

AREA OF HOLDING		Hectares	
<b>TOTAL AREA OF YOUR HOLDING</b> <small>(to agree with total of items 4-9 below)</small>		<b>77,</b>	
<b>OF THE ABOVE AREA</b>	How much is <b>rented</b> by you?	2	
	How much is <b>owned</b> by you?	3	
<b>CROPS AND FALLOW</b> <small>(to agree with item 35 below)</small>		4	•
<b>GRASSLAND</b> <small>(Include Clover, Sainfoin and Lucerne)</small>	Put down in 1977 or later	5	
	All other grassland <b>excluding</b> rough grazing	6	•
<b>ROUGH GRAZING</b> on which you have <b>SOLE</b> grazing rights (note 31)		7	
<b>WOODLAND</b> on the holding (note 4)		8	•
<b>ALL OTHER LAND</b> not included above, eg farm roads, yards, buildings, gardens, ponds, derelict land, etc.		9	•

SEASONAL USE OF LAND		Hectares	
(this land should be included in items 1-351)		41	
Area of land <b>not</b> used seasonally, e.g. from grazing (this land should NOT be included in items 1-351)		42	

IRRIGATION		Yes/No	
Do you irrigate outdoor crops (except water-cress)? Please answer 'YES' or 'NO'		43	

HAY AND SILAGE STOCKS		Tonnes	
<b>HAY</b>	Enter stocks remaining from previous seasons		
<b>SILAGE</b>			

**CROPS AND FALLOW — see notes 7-9**

<b>Cereals for threshing</b>	<b>Wheat</b>		
	<b>Barley</b>	Winter	12
		Spring	13
	<b>Oats</b>		14
	<b>Mixed Corn</b>		15
<b>Rye</b>		16	
<b>Maize</b> for threshing or stockfeeding		17	
<b>Potatoes</b>	Already harvested or intended for harvesting by 31 July		18
	Intended for harvesting after 31 July		19
<b>Sugar beet</b> not for stockfeeding		20	
<b>Hops</b>		21	
<b>Mushrooms</b> (to be entered on separate page)		22	
<b>Crops for stock-feeding (excluding maize)</b>	<b>Bean</b>		
	<b>Turnips and Swedes</b>		
	<b>Fodder Beet and Marigolds</b>	25	
	<b>Kale, Cabbage, Savoy, Kohl Rabi and Rape</b>	25	
	<b>Other Crops (not Grass)</b> Please specify: .....		
<b>Rape</b> grown for oilseed		25	
<b>Other Crops (not for stockfeeding)</b> (note 91) Please specify: .....		31	
<b>Bare Fallow</b>		32	
<b>TOTAL CROPS AND FALLOW</b> <small>(to agree with item 4 above)</small>			

FARMERS AND WORKERS — see notes 10-18		Number	
Principal (holder or holding)	Whole-time	50	
	Part-time	51	
Other partners and directors (if working on the holding)		Whole-time	53
		Part-time	54
Wives or husbands of other partners and directors (if working on the holding)			55
Salaried Managers			56
Other Family	Regular Whole-time	Male	57
		Female	58
Workers (note 16)	Regular Part-time	Male	59
		Female	60
Hired Workers (note 17)	Regular Whole-time	Male	61
		Female	52
	Regular Part-time	Male	63
		Female	64
Seasonal or Casual Workers (hired or family)		Male	65
		Female	68
<b>TOTAL FARMERS AND WORKERS</b>			69

LIVESTOCK  
See notes 19-21

JUNE 1981

CATTLE		Number	
Cows and Heifers in milk	Mainly for producing milk or rearing calves for the dairy herd	70	
	Mainly for rearing calves for beef	71	
Cows in calf but not in milk	Intended mainly for producing milk or rearing calves for the dairy herd	72	
	Intended mainly for rearing calves for beef	73	
Heifers in calf (first calf)	Intended mainly for producing milk or rearing calves for the dairy herd	74	
	Intended mainly for rearing calves for beef	75	
Bulls for service	2 years old and over	76	
	1 year old and under 2	77	
All other Cattle and Calves	2 years old and over	Male (excluding bulls for service)	80
		Female (intended for slaughter)	81
	1 year old and under 2	Male (excluding bulls for service)	82
		Female (for dairy or beef herd replacements)	83
	8 months old and under 1 year	Male (including bull calves for service)	84
		Female (for dairy herd replacements)	85
	Under 6 months old	Male (including bull calves for service)	86
		Others	87
		Female	88
		Others	89
<b>TOTAL CATTLE and CALVES</b>		<b>92</b>	

CATTLE		Number
Please tick this box if all the cattle entered at 92 above belong to someone else, and you are only providing grazing		93
Heifers in calf (first calf)	Number	
Of the heifers in calf returned at items 74 and 76 above, how many were aged:—	2 years and over	94
	under 2 years	95
<b>Irish Stores</b>		
Store Cattle on the holding which have been imported from the Irish Republic (already included at items 80-85)		96
<b>CALVINGS on the holding during 6 months December 1980 to May 1981</b>		
Heifers that calved for the first time during the period December 1980 to May 1981	Number	97
All other cows that calved during the period December 1980 to May 1981		98

PIGS		Number
Breeding Pigs	Sows in pig	100 B0
	Gilts in pig	101 B1
	Other Sows (either being suckled or dry sows being kept for further breeding)	102 B2
	Sows being used for service	103 B3
	Gilts 50kg (110lb) and over (liveweight) not yet in pig but expected to be used for breeding	104 B4
Barren sows for fattening	110 kg (240 lb) and over liveweight	105 B5
	80 kg (175 lb) and under 110 kg (240 lb) liveweight	106 B6
	50 kg (110 lb) and under 80 kg (175 lb) liveweight	107 B7
	20 kg (45 lb) and under 50 kg (110 lb) liveweight	108 B8
	Under 20 kg (45 lb) liveweight	109 B9
<b>TOTAL PIGS</b>		<b>111 A1</b>
<b>SHEEP AND LAMBS</b>		
Ewes kept for breeding (do not include two-tooth ewes, item 114, or draft and cast ewes, item 116)		113 A3
Two-tooth Ewes (Shearing Ewes or Gimmers) put, or to be put, to the ram in 1981		114 A4
Rams for service		115 A5
Draft and cast Ewes (do not include at item 113)		116 A6
Wethers and other sheep		117 A7
Lambs under 1 year old		118 A8
<b>TOTAL SHEEP and LAMBS</b>		<b>119 A9</b>
<b>POULTRY</b> Do not include the same birds under more than one heading and do not include game birds		
Hens and Pullets kept mainly for producing eggs for eating	Growing pullets (from day old to point of lay)	121 B1
	Birds that have been in the laying flock for:—	
	less than 12 months	122 B2
	12 months but less than 18 months	123 B3
18 months or more	124 B4	
Fowls for breeding	Hens and Pullets of all ages kept mainly for producing eggs for hatching	125 B5
	Cocks and Cockerels of all ages kept for breeding	126 B6
Broilers (for killing up to 10 weeks of age)		127 B7
Capons, Poussins and Other table fowl (not guinea fowl)		128 B8
Ducks of all ages		129 B9
Geese of all ages		130 C0
Turkey Hens used for breeding		131 C1
All other Turkeys (including staggs)		132 C2
<b>TOTAL POULTRY</b>		<b>139 C9</b>

HORTICULTURE

Please enter all areas to the nearest 0.1 hectare

VEGETABLES GROWN IN THE OPEN — for human consumption

Vegetables		Hectares
See notes 7 and 22-23		
Brussels Sprouts for market	170 G0	*
for processing	171 G1	*
Remaining spring cabbage (planted in 1980)		172 G2
Cabbage and Savoys	173 G3	*
Cauliflower, Sprouting broccoli and Kale (note 22)	174 G4	*
Carrots	175 G5	*
Parsnips	181 H1	*
Turnips and Swedes (not for stockfeeding)	182 H2	*
Beetroot (red beet - not sugar beet or fodder beet)	183 H3	*
for market	184 H4	*
for processing	185 H5	*
Onions for sale	186 H6	*
Dry Bulb - include previous autumn plantings	187 H7	*
Broad Beans	188 H8	*
Runner Beans (pinched)	189 H9	*
Runner Beans (limbing)	190 I0	*
French Beans	191 I1	*
Peas for harvesting dry	192 I2	*
Green Peas	193 I3	*
Celery (not under glass)	197 I7	*
Lettuce (not under glass)	198 I8	*
Other vegetables and mixed areas (include sweet corn and Watercress) (note 23)	200 I9	*
<b>TOTAL VEGETABLES grown in the open</b>	<b>201 I10</b>	<b>*</b>

CLASSHOUSE AREA

Note: 1,000 sq. metres = 0.1 hectare

Classhouse Area		Hectares
Total area under glass or plastic structures excluding lights, cloches and plastic tunnels - see note A on page 5	205 J5	*

ORCHARDS

Orchards, not grown commercially

Orchards, not grown commercially	207 J7	*
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COMMERCIAL ORCHARDS

Orchards		Hectares
Orchards, grown commercially (include area of young non-bearing orchards but not fruit stock) (item 230)		
Desert apples	208 J9	*
Cooking apples	210 J0	*
Cider apples and Perry pears	211 J1	*
Pears	212 J2	*
Plums	214 J4	*
Cherries	215 J5	*
Other top fruit (including nuts)	216 J6	*

SMALL FRUIT

Include at items 218-225 (but not at 226) any area of small fruit grown under orchard trees

Small Fruit		Hectares
Strawberries (Open grown only)	218 J8	*
(Under cloches, low tunnels, etc.)	219 J9	*
Raspberries	220 K0	*
Blackcurrants for market	221 K1	*
for processing	222 K2	*
Gooseberries	223 K3	*
Other small fruit (including grapes) (note 23)	225 K5	*
<b>TOTAL ORCHARDS AND SMALL FRUITS</b> (items 207-225 above less any area of small fruit grown under orchard trees)		<b>226 K6</b>

HARDY NURSERY STOCK

Fruit trees, bushes and canes, strawberries for runner production and other fruit stock for transplanting

Hardy Nursery Stock		Hectares
Roses (including stock for budding)	230 L0	*
Field grown (Shrubs, conifers, hedging plants and Christmas trees (not roses))	231 L1	*
Ornamental trees	232 L2	*
Perennial herbaceous plants (not for cut flowers)	233 L3	*
Other hardy nursery stock and mixed areas (include the area of land used for container grown plants)	234 L4	*
<b>TOTAL HARDY NURSERY STOCK</b>	<b>236 L6</b>	<b>*</b>
Number of container grown plants produced on holding in last 12 months	237 L7	To nearest 100

BULBS (corms, tubers and rhizomes) and FLOWERS in the open

Bulbs and Flowers		Hectares
All Bulbs grown in the open for cut flowers or bulbs	240 M0	*
Other flowers (in the open) for cutting	243 M3	*
<b>TOTAL BULBS and FLOWERS</b>	<b>244 M4</b>	<b>*</b>

TOTAL HORTICULTURAL CROPS (excluding mushrooms) (to agree with item 22 on page 2)

Items 201 - 205 + 226 + 236 + 244	249 M9	*
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1 GLASSHOUSE AND PLASTIC COVERED STRUCTURES

1000 SQ. FT. = 93.0 SQ. METRES

A "Glasshouse" includes any fixed or mobile structure of a height sufficient to allow persons to enter in an upright position and which is glazed or clad with film or rigid plastic or other glass substitutes. In the case of mobile structures return only the area covered by the structures themselves and not the total area of the sites that could be covered by moving the structures. Do not include lights and cloches or low plastic tunnels.

TOTAL AREA (whether in use or not - See note A)		Square metres	
Area covered by glass	With heating equipment	250	N0
	Without heating equipment	251	N1
Area covered by plastics or other glass substitutes	With heating equipment	252	N2
	Without heating equipment	253	N3
TOTAL AREA (to agree with total at 274)		254	N4

AREA OF CROPS (do not include crops under lights or cloches)

VEGETABLES	Tomatoes	heated crop	Planted by 28 February 1981	255	N5
			Planted after 28 February 1981	256	N6
		unheated crop		257	N7
	Cucumbers		258	N8	
	Sweet peppers		259	N9	
	Other vegetables and herbs (including vegetables grown for sale in pots or boxes)			260	N0
FLOWERS	Carnations			261	#1
	Roses			262	#2
	Chrysanthemums			263	#3
	Plants in pots (note B)	flowering plants other than chrysanthemum		268	#8
		for foliage		269	#9
	All other flowers, foliage crops, nursery crops, seedlings and bedding plants			270	P0
FRUIT	Strawberries and any other fruit			271	P1
REMAINING GLASSHOUSE AREA AT 1 JUNE				272	P2
TOTAL AREA (to agree with total at 254 above)				274	P4

B Items 268 and 269 give the total area of glasshouse floor space, not the total area of benches or beds.

SELF-BLANCHING CELERY (grown as a protected crop)

Area of Self-Blanching Celery grown this season	275	P5
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BEDDING PLANTS IN BOXES IN GLASSHOUSES - See note C

		Number of boxes	
Bedding plants grown in boxes during the current season	Vegetables	276	P6
	Ornamental bedding plants	277	P7

C Bedding plants the number of boxes recorded should be in terms of the standard 14" x 8" box or its metric equivalent 350mm x 210mm.

2 MUSHROOMS GROWN AS A PROTECTED CROP

		Square metres	
Total basic bed area used for production, i.e. area of shelves, trays, boxes or bags at 1 June, excluding that of peak heat or spawn running rooms		278	P8

N.B. The land on which the sheds or buildings stand should be returned at item 9 "other land"

Please give details in sections 1 and 2 below of any changes in the area of the holding

1 LAND GIVEN UP

Hectares		
281	R1	.

Please state area of land given up and (if known) how it will be used: -

(a) farmed by another person

Please give name and address of new occupier(s)

(b) for urban, industrial or recreational development

Hectares		
284	R4	.

(c) for mineral working

Hectares		
286	R5	.

(d) for forestry or private woods

Hectares		
287	R7	.

(e) for Ministry of Defence purposes

Hectares		
288	R8	.

(f) Other reasons for decrease in area

2 LAND TAKEN OVER

Hectares		
281	Q1	.

Please state area of land taken over and (if known) its previous use: -

(a) farmed by another person

Please give name and address of previous occupier(s)

(b) from urban, industrial or recreational use

Hectares		
284	Q4	.

(c) from mineral working

Hectares		
286	Q5	.

(d) from forestry or private woods

Hectares		
287	Q7	.

(e) from Ministry of Defence

Hectares		
288	Q8	.

(f) Other reasons for increase in area

3 CHANGE OF ADDRESS

Please give any necessary correction to name and address shown on Page 1 in BLOCK LETTERS

Postcode

4 OTHER HOLDINGS IN THE SAME OCCUPANCY

Please list here any other holding reference numbers under which you make agricultural census returns

DECLARATION

I declare the particulars given in this return to be correct to the best of my knowledge and belief.

Signature of Occupier ..... Date ..... 1981

Tel. No. ....

The present occupier should complete and sign this return even if he has only recently taken over the holding and the name given on the form is not his. If an accredited agent signs the form the name of the occupier should also be shown.

## APPENDIX 2

### A. The Agricultural Census in the Isle of Man

Agricultural information for the Isle of Man is available since 1866 though the modern Manx census only began in 1929. The census is conducted on 4 June each year by the Manx Board of Agriculture and Fisheries under the authority of the (Manx) Agricultural Returns Act, 1955. Results are available from the Board of Agriculture and Fisheries, Government Offices, Buck's Road, Douglas, Isle of Man. An abridged version of the results, modified to conform to the English and Welsh census, is published annually in MAFF's Agricultural statistics, England and Wales, now called Agricultural statistics, England.

There is no official minimum size of holding included in the census but in most respects the census collects similar information to that in the English census. Some of the detailed questions on livestock differ slightly between the Manx census and that in England and Wales. Results are normally published by the Manx Government using Imperial rather than metric measurements. It is a small census covering only 811 holdings in 1981, and results are based on the agricultural area of the holding not its total area as in the UK. Farmers are urged to return only one census form for all their farmland even when the farm is split between several blocks in different parishes.

### B. The Agricultural Census in Jersey

Agricultural information for Jersey is available between 1866 and 1922 and during this period was published along with the results of the English census (Table 1). The collection of agricultural statistics in their modern form in Jersey was begun in the early 1930s by the Department of Agriculture and Fisheries of the States of Jersey. An annual census is held on 1 October and results are available in Agricultural statistics from the States of Jersey Bookshop, States Greffe, Royal Square, St. Helier, Jersey or from the Department of Agriculture and Fisheries, 44 Esplanade, St. Helier, Jersey. Abridged results have also been published since 1973 in Agricultural statistics, England and Wales, now called Agricultural statistics, England. There is no formal minimum size of holding included in the census and results are only available for the whole island, not for parts of it. In the published statistics, metric units are used except for land area which is measured in vergées (1 Jersey vergée = 0.444 acres or 0.18 hectares). The census is particularly detailed for the horticulture sector although land which is double-cropped may be recorded more than once. Occasional *ad hoc* surveys are also undertaken on matters of topical interest (e.g. methods of heating glasshouses).

### C. The Agricultural Censuses in Guernsey

Agricultural information for Guernsey is available between 1866 and 1922 and during this period was published along with the results of the English census (Table 1). The modern farming censuses for Guernsey are carried out by the States Committees for Agriculture and Horticulture and have been held each year since 1953 for agricultural holdings and since 1965 for horticultural holdings. There is also a voluntary census of female cattle, the other two censuses being compulsory under Guernsey law. Census day is 1 July for agriculture, 30 September for horticulture and 1 January for female cattle.

There is no formal minimum size of holding included in the census. Results are available only for the whole island, not parts of it, and may be obtained from the States Committees for Horticulture, Agriculture and Sea Fisheries, Burnt Lane, St. Martins, Guernsey. Abridged results have also been published since 1973 in Agricultural statistics, England and Wales, now called Agricultural statistics, England. The census uses Imperial units except that milk production is measured in pots and area is measured in verges (1 Guernsey verge = 0.405 acres or 0.164 hectares).

## APPENDIX 3

### Adaptation of European Community's Typology of Farms to the Farm Management Survey of England and Wales, 1978/79 --

In the EC Typology, 58 particular types of farm are grouped into 17 principal types. The latter are not entirely suitable for use in the United Kingdom and 10 alternative groupings have been adopted for the Farm Management Survey in England.

The varied nature of the definitions used for the EC particular types of farming does not permit a simple description to be given of all the main types adopted in the Survey but the chief characteristics may be summarised as follows:-

Specialist Dairy	- Dairy cows account for over 4 of total SGM
Mainly Dairy	- Dairy cows account for not more than 4 but the dairy enterprise, including followers, accounts for over 1/3 of total SGM and is the largest enterprise group.
Hill and Upland (LFA) Sheep	- Farms in the EC Less Favoured Areas with sheep accounting for over 4 of total SGM.
Hill and Upland (LFA) Cattle and Sheep	- Farms in the EC Less Favoured Areas on which cattle or cattle and sheep together, other than dairy cattle, account for over 3 of total SGM, commonly over 4, and are the largest enterprise group.
Lowland Cattle and Sheep	- Farms outside the EC Less Favoured Areas on which grazing livestock other than dairy cattle account for over 3 of total SGM, commonly over 3, and are the largest enterprise group.
Lowland Cropping, Cattle and Sheep	- Farms outside the EC Less Favoured Areas on which, most commonly, grazing livestock other than dairy cattle, and field crops each account for over 1/3 but not more than 1/3 of total SGM, together with farms having crop and livestock enterprises in combinations not specified in the definitions of the 57 other types of farming.
Specialist Cereals	- Cereals account for over 4 of total SGM.



- General Cropping - Field crops account for over 1/3, 1/4, of total SGM and are the largest enterprise group either alone or in combination with horticultural crops or permanent crops including fruit.
- Pigs and Poultry - Pigs and poultry account for over 3, commonly over 4, of total SGM, but either dairy cattle, other grazing livestock or field crops may also account for over 1/3 but not more than 1/4 of the total. This group may in due course be subdivided with specialist pig or poultry farms (over 4 of SGM) shown separately.
- Horticulture - Horticultural crops or permanent crops including fruit, alone or in combination, account for over 1/4, most commonly over 1/4, of total SGM and are the largest enterprise group. This group may in due course be subdivided to show specialist horticultural farms (over 1/4 of SGM) separately.

Source: MAFF (1980) Farm incomes in England, 1978/79. (HMSO, London) pp. 49-50.

Note: SGM Standard Gross Margin.

APPENDIX 4

Farm Classification Scheme for England and Wales, 1976/77

Source: MAFF (1979) Farm Classification in England and Wales, 1976-77. (HMSO, London) p 2.

