FORESTRY COMMISSION
OCCASIONAL PAPER 45

# Forestry Expansion –
## a study of technical, economic and ecological factors

Forestry in the Rural Economy

J. Strak and C. Mackel

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**Forestry Commission, Edinburgh**

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## INTRODUCTION

It is generally accepted that over the next 10 years agriculture will face a period of rationalisation as it comes to terms both with an adverse economic climate and restrictive political framework*. It is therefore expected that agriculture will shed workers – as it has been doing for most of this century – and that this outmigration will increase from that experienced during the 1970s and 1980s, when agriculture was in an expansionary phase. However, it is also important to remember that agriculture is not the only, or even main, employer of labour in rural areas. Research by Whitby (1985) using general census data demonstrated the multidimensional nature of rural employment. Further, his research showed that the growth of the service sector was more than compensating for the decline in agricultural employment. In other words, it is easy to make simplistic assumptions about a pool of rurally unemployed from global data, which on more detailed evaluation is proved to be incorrect. The age, sex, marital status, qualifications, previous job experience and aspirations are all important factors which will determine both the job and geographical mobility of the worker leaving or entering any rural job – not just agriculture. Previous research has also shown that there is considerable cross-sectoral mobility of workers, i.e. workers do not just 'leave agriculture'. Often over their working lives they may actually hold a number of rural-based jobs – several of which may have been on farms. This farm employment may not have been continuous, but interspersed with periods as factory workers, auction mart workers, slaughtermen, local authority labourers, etc. The common link in these jobs is that they require a certain fairly basic level of manual skills to gain entry, with the minimum of relearning involved in switching jobs (Mackel, 1975).

*These issues are fully reviewed in (Harvey, 1991).

There may be an underlying problem, however, in that the total pool of manual employment opportunities is drying up as:

1. economic pressures increase;

2. each industry becomes more capitalised, creating fewer, more specialised jobs.

Under point 1. some sectors will close down altogether, e.g. coal mining is not thought of as a rural job, but in fact many of the pit heads were set in rural areas, with the miners living in small villages, e.g. Ayrshire, Derbyshire and South Wales. In other cases cost-cutting will squeeze out the marginal workers formerly kept on to ease labour peaks or simply to keep the place tidy.

Under point 2. the trend to bigger, more sophisticated machinery is well illustrated in agriculture by the transition in one generation from a tractor and binder (two men), plus stooking team (possibly another four or five men), to one man in an air-conditioned combine, with a supporting grain trailer.

The paper by Grundy (Grundy *et al.*, 1989) suggests that UK forestry may not be so amenable to mechanisation. Therefore forestry could have an important role to play in the rural scenario, which is showing evidence of a dual labour market* (Bosanquet and Doeringer, 1973; Mackel, 1975).

## DEFINITION OF RURAL AREAS

The major constraint that any comment on employment trends in the rural areas faces is that the UK Office of Population Census and Surveys (OPCS) has adopted a very limited definition of what constitutes a rural area. In fact, it identifies them as the residual in its identification of urban areas. This default definition means that rural areas are defined to have at least 20 hectares of land in continuous rural use and have a minimum population of about 1000†. The effect of this rather simplistic definition of what 'rural' means is that the UK is seen to have a relatively small rural population.

Because the OPCS definition is very strict, many 'rural' areas are effectively counted in to the *urban total,* and hence descriptive statistics of numbers employed and type of lifestyles, etc. based on this definition become much less useful. An indication of the scale of the problem is given by a comparison of the pre-1974 estimate for rural population

*Dual labour market describes a situation where there is a major discontinuity in the labour market, usually reflecting an increased demand for specialist skills, with general manual jobs occupying a poorly paid and residual part of the market. Workers without transferable skills face reduced opportunities for occupational and geographical mobility and increased competition for the remaining jobs in their geographical area.

†The definition used for Scotland is slightly different, but the Scotland and rest-of-UK figures are generally comparable.

(based on local authorities' description of rural districts) and the OPCS' estimate. The former amounted to about 10 million people – the latter, estimated in 1981, was only 5 million strong. The missing 5 million and all their socioeconomic and demographic characteristics would, if counted in, sharply alter the official statistical view of how rural areas are made up.

Work by the OPCS has suggested an alternative presentation of the urban:rural split of the population *(Population Trends,* No 47). By looking at the number/proportion of urban enumeration districts in an electoral ward the OPCS data can be set out in such a way as to identify some intermediate categories of rural and urban areas. Table 1 is reproduced from the analysis prepared by John Craig of OPCS and published in *Population Trends.* The wholly rural areas accounted for 3.3 million people in 1981 in England and Wales and occupied 8.8 million hectares (over half the land area). But the mixed rural and predominantly rural, which may have similar labour and land use problems/opportunities as the completely rural areas, make up a further 1 million people and 1.3 million hectares.

The lesson from these problems of definition is that it is unlikely that it will be possible to identify accurately the quantity and quality of occupations in the rural areas on a national scale. Progress will have to be made by a mixture of improvisation and qualified judgement in order to assess forestry's impact on rural employment. As a first step towards this there is a need to present a more sophisticated definition of rural areas than the standard one used by OPCS.

The criteria which need to be involved in definition of rural areas include settlement size, population density, occupational structure, land use classification, and transport and infrastructure measure. The Rural Development Commission for England has suggested that, in the UK context, these criteria could be used to produce a classification of rural areas along the following lines:

1. *Remote upland areas:* sparse population, difficult climate and agricultural conditions. Employment usually characterised by agriculture and forestry, total population in decline and few services.

2. *Remote lowland areas:* population sparse, but agriculture may be prosperous. Agricultural employment important, but in decline as mechanisation provides labour substitution.

3. *Less remote areas:* rural in character, but distances and access to services better; often rising population as second home and train commuters are increasing.

4. *Rural fringe:* within easy commuting distance of large town/conurbation, but still with a significant minority of population who depend on the land directly or indirectly for their employment.

5. *Areas of industrial decline:* industry's decline and urban decay are a characteristic of this group. Environmental pollution and relatively good access to services are common.

Discussions with the Rural Development Commission has revealed that, as yet, statistical information upon which to base a countrywide classification of this detail is extremely limited. Therefore, it has not proved possible to produce definitive maps of these areas.

However, this typology can be regarded as being very useful and a potentially rewarding analytical tool and it is used in an illustrative manner in the section examining regional trends in employment. Certainly, if these five types of rural area are relevant to the UK as a whole, the questions in the introductory paragraphs to this paper become more interesting, since it clearly identifies the need to know the potential drop in agricultural employment, and to assess what contribution forestry can make in each of these types of rural area.

## FORESTRY'S CONTRIBUTION

The Commission Study (op cit), referred to earlier, sets out the national scale of employment in forestry. From an employment survey of the industry, carried out in 1986 and 1987, a total of almost 40 000 jobs is estimated to be directly related to the forestry industry in the UK. Table 1 from that study is reproduced here.

Table 1 Categorisation of wards.

| *Category of ward* / *Description* | *Number/proportion of urban enumeration districts in the ward* | *Number of wards* | *Population* | | | *Area* (thousand hectares) | *Density 1981* (persons per hectare) |
|---|---|---|---|---|---|---|---|
| | | | *1971* (thousands) | *1981* (thousands) | *1971-1981 change* (%) | | |
| 1. Urban (wholly) | All | 4970 | 34798 | 34041 | -2.20 | 1878 | 18.10 |
| 2. Urban (predominantly) | 1/4 (or more) – but not all | 1332 | 7993 | 8667 | 8.40 | 1662 | 5.20 |
| 3. Mixed urban (more urban than rural) | 1/2 (or more) – but under | 575 | 1866 | 2073 | 11.10 | 1462 | 1.40 |
| 4. Mixed rural (more rural than urban) | 1/4 (or more) – but under | 243 | 651 | 719 | 10.40 | 837 | 0.90 |
| 5. Rural (predominantly) | One (or more) – but under | 131 | 286 | 312 | 9.10 | 493 | 0.60 |
| 6. Rural (wholly) | None | 2038 | 3155 | 3342 | 5.90 | 8788 | 0.40 |
| Total – England and Wales | | 9289 | 48750 | 49155 | 0.80 | 15121 | 3.25 |
| Enumeration district classification | | | | | | | |
| *Urban* | | | | *44111* | *0.00** | *1155* | *38.20* |
| *Rural* | | | | *5044* | *5.00** | *13966* | *0.36* |

*Not based on enumeration districts

The breaks between different types of forestry work and forestry employer, etc. shown in Table 2 are important. The Forestry Commission is seen to be the largest single employer in Scotland, but has a much less dominant role in England and Wales. The relative distribution of jobs across these different categories is, in forestry, markedly affected by the age and maturity of the forests concerned. Again, the Commission Study (op cit) recognised this and presented an illustration of the pattern of employment over the 50+ year rotation of a conifer forest. This shows that the employment potential of such a forest actually falls to virtually zero after the first 5 years and it is not until thinning starts in year 25 and haulage and processing from year 45 on that a significant number of jobs

is created. An average of around 2 man weeks per hectare of forest is required in the planting period (years 0-5), almost zero (years 5-25), 3 man weeks per hectare (years 25-45), 4 man weeks per hectare (years 45-55) and 15 man weeks per hectare (55+).

Table 2 Forestry employment: man year.

| | *England* | *Wales* | *Scotland* | *UK* |
|---|---|---|---|---|
| Forestry Commission | 2743 | 1447 | 3533 | 7722 |
| Private sector | 10694 | 1105 | 3522 | 15321 |
| Forest management companies | 698 | 193 | 1345 | 2236 |
| Merchants | 1224 | 615 | 3892 | 5731 |
| Industries processing domestically produced timber | 5670 | 1405 | 2965 | 10040 |
| Total | 21029 | 4764 | 15257 | 41051 |

The very low labour requirements of forestry work in the early years of a forest's life are amply demonstrated by Figure 1. On these labour needs, a doubling of the current annual rate of planting would only produce an extra 1000 jobs per annum in the first 5 years of the forest's life.

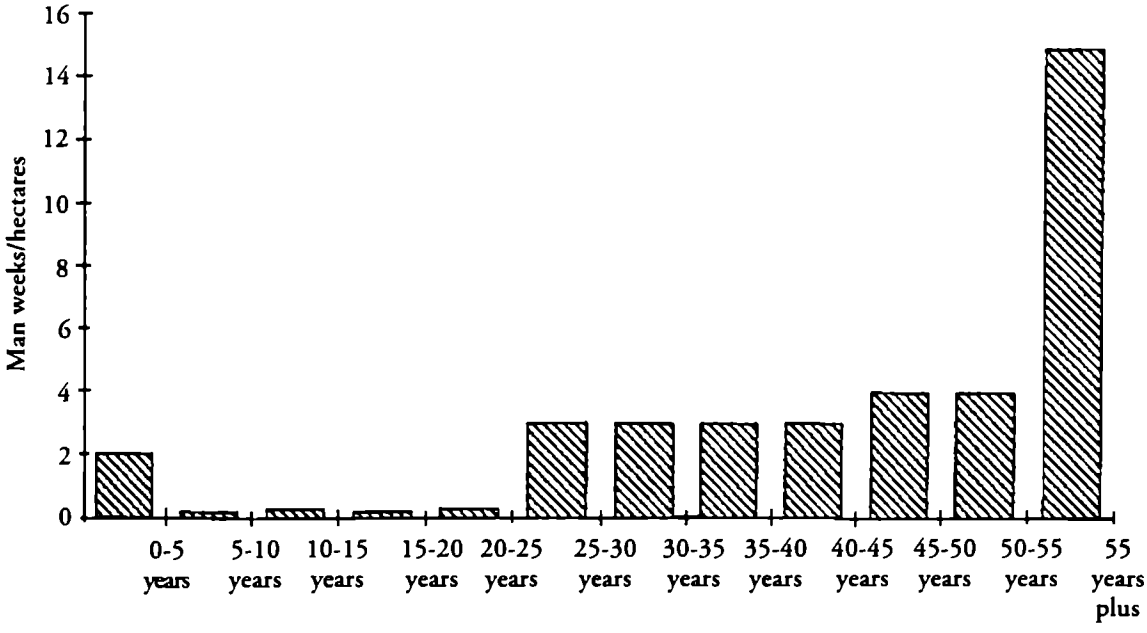


**Figure 1** Number of man weeks per hectare in the development of a forest

Across the UK the relatively innovative state of forestry means that the example pattern of employment given above translates into an average ratio of harvesting to other forest workers of about 2:1. A more mature state would probably give a ratio of around 5:1 (op cit). This sort of ratio will, of course, eventually arrive in the UK as the current afforested area matures. Table 3 presents the Forestry Commission Study's predicted pattern of employment over the next 20 years. Figures are given assuming a 2% annual improvement in labour productivity. They also assume that the area of new planting is equal to 33 300 hectares per annum from 1990.

Table 3 Forestry manpower predictions.

| | *Actual* | *Predictions* | | | |
|---|---|---|---|---|---|
| | 1987 | 1989 | 1994 | 1999 | 2004 |
| Forestry Commission | | | | | |
| England | 2 900 | 2 978 | 2 722 | 2 651 | 2 478 |
| Wales | 1 700 | 1 651 | 1 738 | 1 941 | 2 023 |
| Scotland | 3 500 | 3 697 | 3 397 | 3 850 | 4 332 |
| UK | 8 100 | 8 326 | 7 856 | 8 442 | 8 833 |
| Private sector | | | | | |
| England | 13 650 | 14 008 | 13 765 | 13 290 | 12 716 |
| Wales | 3 200 | 3 600 | 4 099 | 4 119 | 4 732 |
| Scotland | 5 350 | 6 177 | 6 986 | 7 243 | 7 465 |
| UK | 22 200 | 23 785 | 24 850 | 24 652 | 24 913 |
| Processing | | | | | |
| England | 5 700 | 5 124 | 5 069 | 4 997 | 4 827 |
| Wales | 1 100 | 1 658 | 1 843 | 2 045 | 2 231 |
| Scotland | 2 350 | 3 599 | 3 861 | 4 466 | 5 037 |
| UK | 9 150 | 10 380 | 10 772 | 11 509 | 12 096 |
| Total (UK) | 39 450 | 42 491 | 43 479 | 44 603 | 45 841 |

The numbers in Table 3 suggest that perhaps as many as 45 841 jobs could be involved in the forestry industry by the year 2004. Interestingly, 67% of these jobs are created by 1994. At this rate of growth in employment, the extra 4000 jobs in forestry in the UK as a whole is almost half the total number of Forestry Commission workers employed in 1987. The extra jobs are equivalent to creating another forestry labour force equivalent to that employed by the Commission in Scotland now.

## NATIONAL TRENDS IN AGRICULTURAL EMPLOYMENT

As mentioned in the introduction, the purpose of this chapter is not to discuss in detail the development of UK agriculture over the next 10 years as the possible policy scenarios take effect. However, a review of the general level of employment in agriculture will set the forestry option in context.

As Figure 2 shows, UK agriculture faced a steady decline of full-time labour in the 1980s.

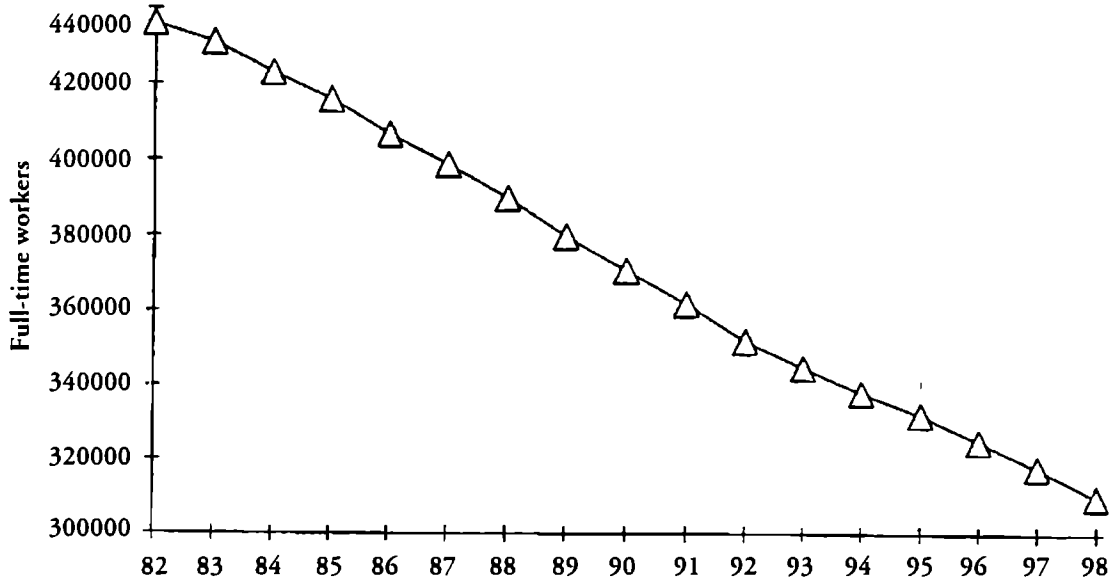


**Figure 2** Decline in the number of full-time agricultural workers (including farmers) 1982 to 1998

This decline from over 440 000 full-time workers at the beginning of the 1980s is forecast to reach 310 000 by the late 1990s – a reduction of almost 30%.

The rate of decline is most severe among non-family employees, as might be expected, with the decline running at a ratio of 3 to 1 in the early 1980s. If agriculture comes under increasing pressure, this ratio is expected to increase further as farm businesses shed labour to cut costs. Obviously farm businesses will also amalgamate and shed family labour, but this process of rationalisation will proceed more gradually. Underemployment of family workers will also be more readily tolerated.

For these non-family employees the policy of set-aside could have one of its most significant effects. The scale of the payments and the requirements of the current scheme make it attractive in some circumstances to put the whole farm into set-aside. There are already several well documented cases of this actually happening, resulting in the total loss of jobs on that unit.

Given the period of high farming in the 1970s and 1980s, the rate of loss from agriculture is possibly surprising. With a period of retrenchment forecast for the 1990s, the rate of reduction might well increase sharply. However, in considering this possibility it is important to remember the pull/push aspects of job mobility.

The past 5 years have seen both a steady decline in total unemployment, and a boom in a number of sectors which would have proved both attractive and easily entered sectors for ex-agricultural workers, e.g. general building work, van and lorry drivers. If the economy is to slow down in the next 3 years, then inevitably there will be some damming up of workers wishing to leave agriculture but unable to find alternative employment*.

*Incidentally it also illustrates the paucity of detailed labour market analysis. Are skill shortages apparent in agriculture? If so in which categories and geographical areas?

Accepting this *caveat,* the trends set out in Figure 2 are seen as realistic. Agriculture will continue to shed labour as the number of job opportunities within it are reduced. The state of the general job market will simply determine how these migrant workers fare in terms of new wage rates, geographical mobility and job development. It will also affect the mix of voluntary and involuntary mobility.

## SHADOW PRICES AND THE RESOURCE COST OF LABOUR

A shadow price is defined by Gittinger as one which more accurately reflects the 'true' value of a commodity or service rather than the market price – it is the price which would prevail in the economy if it were in perfect equilibrium under conditions of perfect competition (Price Gittinger, 1972).

This analytical technique has much to offer in peripheral areas of the UK where distance from markets, lack of alternative job opportunities, support measures for agriculture and other institutional factors do much to distort the labour market and disguise the true value of labour in the locality. The possible discrepancy between actual and shadow wage rates was discussed in the NAO Report (1986). The suggestion was that this indicated that the return to planting trees in these areas might be enhanced by the creation of jobs in a situation of disguised underemployment. It might also reduce the dependency upon other subsidised forms of income, e.g. agricultural subsidies or social security. However, it was also recognised that fixing an appropriate shadow wage rate can be extremely problematic. These difficulties were recognised as centring round the general paucity of data. However, a recently completed survey has given some basic data on rural employment, income and shadow wage rates in of Scotland (SAC, 1989a).

The report was based upon a sample of 100 farms drawn from the 2795 Scottish holdings in the 2-4 BSU* size category. The sample was stratified to reflect the geographical distribution of these farms. Of the 100 farms, 50 were in the HIDB area and 83 were in the Less Favoured Area (LFA). The total holdings recorded in the June Census had a comparative distribution of 27% in the HIDB region and 71% in the LFA. Average net farm income (NFI) was £565, with a range from £2322 on LFA mainly sheep, to -£2580 on lowground sheep and cattle.

In terms of hours spent on farm work by the farmer, the average was 1227 hours per year against a notional man year of 2200. The range was 828 hours (low ground cattle and sheep) to 1541 hours (LFA cattle and sheep). Only 5% of the farm households relied totally upon farm generated income, and only on 17 holdings was the occupier's farm income greater than that from non-farming activities.

On-farm non-agricultural activities were relatively unimportant as cash generators – only 12% had such income from a range of activities centred round tourism. Average time spent on these activities by the farmer was only 37 hours per year.

*BSU – British size unit is a financial measure of farm size with one BSU equivalent to 2000 ECU of gross margin at average 1979-80 values.

The average number of hours spent by the farmer in off-farm work was 957, ranging from 831 in LFA mainly sheep to 1488 in lowground sheep and cattle. The average income generated was £4399 per annum. Many were working more than 16 hours per week in a varied range of job, which were predominantly manual. Other members of the household, including the wife, generated a further £2476 of off-farm income.

From hours worked and total earnings it is possible to calculate the wage rates per hour*.

Table 4 Comparative hourly labour rates.

| | *LFA mainly sheep* | *LFA sheep and cattle* | *LFA mainly cattle* | *LFA arable* |
|---|---|---|---|---|
| Hourly rate (farming) | 1.97 | 0.60 | 0.24 | 0.94 |
| Hourly rate (non-farming) | 4.54 | 6.02 | 4.80 | 3.53 |

| | *Low-ground sheep and cattle* | *Low-ground arable* | *Horticulture* | *Total* |
|---|---|---|---|---|
| Hourly rate (farming) | - 0.75 | - 0.41 | - 1.57 | 0.62 |
| Hourly rate (non-farming) | 4.30 | 4.00 | 5.48 | 4.70 |

From Table 4 it is immediately obvious that the true hourly rate from agriculture is extremely low, at £0.62 on average. Without non-farm earnings it would be impossible to sustain either the family or the farm business. Further, agricultural wage rates are actually negative in the more lowground areas. Finally, while the hourly rate of £1.97 for LFA mainly sheep was the highest, the contribution to net farm income (NFI) on these farms by livestock subsidies was 97%. On crofting units it was even higher at 246%.

These findings were supported by a further survey (SAC, November 1989b) into crofts in the old crofting counties† – reinforcing the view that:

– income from agriculture is extremely low and variable;

– subsidy support costs represent a high proportion of NFI;

*Adapted from Table 16, op cit.

†Argyll, Caithness, Inverness, Orkney, Ross & Cromarty, Shetland, Sutherland.

– average hours spent in farm work represent at most 55% of the potential man year;

– that hours actually spent in farm work tend to be a residual fitted round alternative job opportunities;

– that off-farm earnings are of fundamental importance in maintaining the family income;

– that both farmer and household members would take up more man hours of non-farm work if it were available (op cit);

– and that the shadow wage rate for farm labour is extremely low at £0.62 per hour on average and may actually be negative in many cases.

The Cowal Report (McCreath, 1988) did not examine financial data, and therefore did not make any comment on shadow wage rates or the financial aspects of the afforestation of land formerly used for extensive sheep farming. However, it did show that the loss of agriculture jobs had been more than compensated for by the creation of forestry jobs. Also, given that these forests were still in the first 35 years of their life, the potential for further job creation in harvesting and processing was considerable.

The report pointed out that a number of these forestry workers no longer lived in the area, i.e. in the glens formerly run with sheep, but travelled in from nearby communities. However, this trend is in line with the existing socioeconomic pressures towards a less isolated family life close to shops, schools and other amenities.*

To conclude, the concept of the shadow wage rate is a useful one in measuring the returns to creating jobs in agriculture. Whilst similar detailed studies are not available for England and Wales, it is probable that areas like Somerset, Devon, Cornwall, Shropshire and Herefordshire, plus the Welsh counties, will hold disguised farm underemployment and similar low shadow wages rates for labour. These would be the Type I and Type II areas identified earlier.

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*On the subject of housing, the Commission study (op cit para 40) quite rightly points out the problem of isolated rural housing with poor services in both the agricultural and forestry sectors. However, a number of points can be made in this connection. First of all housing – its location and availability has a critical effect on both occupational and geographical mobility. Agricultural workers in 'remote' areas often face a double difficulty in leaving the industry. Firstly, their range of alternative jobs is extremely limited, a problem which is compounded by the second difficulty of housing. Often the worker occupies a tied house which he must vacate, and his only realistic option is local authority housing. Unfortunately this housing will be in his present area – an area with only limited job opportunities. Therefore, forestry offers the worker both a viable job and alternative housing. On the subject of quality, workers and their families now expect a higher standard of services. If these are to be provided, then the most cost-effective way of doing this is to have houses grouped in settlements – as they usually are in the case of forestry. It is simply not feasible to do this on agricultural holdings where the labour force is much smaller and the house must be on the job. This grouping of housing in settlements also helps support the social infrastructure since it provides improved contact between wives and families, it gives a common pick-up point for the school bus and a visiting point for other services, e.g. the travelling library or shop. Even in the less remote areas, forestry housing will be important since workers will find that alternative housing is increasingly out of their price range either to rent or buy.

Consideration of how much work is available on the farm suggests that it is not appropriate to criticise forestry as creating seasonal jobs compared with full-time jobs in farming. In practice, while many may appear to be employed full-time on the farm, they are actually underemployed for significant parts of the year. In addition, the true hourly rate for agricultural wages is extremely low and is dependent upon a high level of subsidies. Nor are there significant new opportunities for on-farm nonagricultural employment such as tourism in many areas. Rather, the solution would appear to be a mix of rural employment, a practice which would minimise resource costs to the individual enterprise and boost rural earning.

This view was supported by a senior DAFS official commenting on the Cowal Report as follows: *'The report clearly indicates that the level of agricultural productivity has not suffered as a direct result of afforestation, reinforcing the case that judicious tree planting can go hand-in-hand with developing agriculture to the mutual benefit of both land uses.'* (E. Arthur, personal communication).

It is certainly a policy and practice which seems to have worked very successfully in areas like Bavaria in the Federal Republic of Germany and the Vorarlberg in Austria, where there is a mix of forestry, agriculture, tourism and industry. It is quite common for some workers to hold jobs in more than one sector.

## REGIONAL TRENDS IN AGRICULTURAL EMPLOYMENT

Clearly, the impact of regional differences in the loss of labour from farming will be very important and this brings the analysis back to considering which rural areas will be hit hardest. Most of the discussion of surpluses in the European Community has revolved around the cereals and milk sectors and this would suggest that, in terms of the Rural Development Commission's classification, the Type 2 rural area would be hardest hit, i.e. marginal grain growing units in the Midlands of England and north-east Scotland, and livestock farms – again in the Midlands, but also in the south-west. Recent suggestions that hill livestock compensatory allowances will be restricted in their availability would also suggest that Type I areas would be subject to reduced margins.

The national scale of employment in forestry and the national trends in loss of labour from agriculture discussed earlier are relevant only in setting the background to any discussion of particular rural areas. The 1000 jobs created by an extra 25 000 ha of afforested area, or the extra 4000 jobs that might be expected even on current afforestation plans, may be very significant if concentrated in one or more of the areas of the country where agricultural labour loss will be greatest. They will be even more significant if they appear as part-time jobs contributing to existing low farm incomes. The remainder of the analysis will concentrate on identifying examples of different types of rural area and discussing their agricultural employment history and general employment background. The objective being to provide a guide to assessing where forestry's role can be maximized.

Looking at the 5 Rural Development Commission types of rural area it is possible to select rural areas which fit each one fairly well, although at the county/regional level it is possible to have several areas that each satisfy a different definition of rural area.

Caithness and Sutherland in Scotland, Cumbria in England and Dyfed and Clwyd in Wales fulfil the attributes of a Type I area. North-east Scotland, the Scottish Borders, Devon, Cornwall, Shropshire and parts of Wales fulfil Type II. East Anglia and the Midlands are Type Ill in their characteristics, though arguably showing attributes of Type IV. True Type IV is seen in Kent and the home counties. Type V is seen in parts of the Midlands, Humberside, Cumbria, the north-east of England and the central belt of Scotland.

The OPCS analysis noted earlier ranked the following local authorities according to the percentage of population categorised as urban, mixed and rural (Table 5). The ranking varies depending on whether just rural, or rural and mixed areas are considered. This illustrates the problems of definition explained previously and how important it is to consider employment patterns and job opportunities at the lowest possible level of disaggregation.

**Table 5** The most non-urban local authorities of England and Wales, 1981.

| *Ranking by % in rural wards* | | *% of population in ward categorised as:* | | | *Ranking by % in non-urban wards* |
|---|---|---|---|---|---|
| *Local authority* | | (1) *Urban* | (2) *Mixed* | (3) *Rural* | {(2) + (3)} |
| 1. | Isles of Scilly | 0.00 | 0.00 | 100.00 | 1 |
| 2. | South Herefordshire | 23.00 | 6.40 | 70.60 | 2 |
| 3. | Dwyfor | 28.20 | 8.00 | 63.90 | 4 |
| 4. | Leominster | 36.50 | 0.00 | 63.50 | 15 |
| 5. | Ceredigion | 28.60 | 8.40 | 63.00 | 6 |
| 6. | Eden | 33.20 | 5.00 | 61.80 | 9 |
| 7. | Carmarthen | 23.80 | 19.20 | 57.10 | 3 |
| 8. | South Shropshire | 34.70 | 8.90 | 56.40 | 11 |
| 9. | Montgomery | 28.60 | 15.20 | 56.20 | 5 |
| 10. | South Northamptonshire | 35.30 | 9.50 | 55.20 | 14 |
| 11. | Mid Suffolk | 29.10 | 18.30 | 52.70 | 7 |
| 12. | North Cornwall | 43.40 | 6.10 | 50.40 | 26 |
| 13. | Babergh | 40.20 | 9.60 | 50.20 | 18 |
| 14. | South Hams | 45.90 | 4.80 | 49.30 | 36 |
| 15. | Brecknock | 46.90 | 4.20 | 48.90 | 38 |
| 16. | West Somerset | 44.10 | 7.60 | 48.30 | 28 |
| 17. | West Devon | 31.10 | 20.70 | 48.20 | 8 |
| 18. | Kennet | 49.20 | 3.00 | 47.80 | 45 |
| 19. | Alnwick | 44.20 | 8.20 | 47.60 | 30 |
| 20. | Mid Devon | 47.00 | 5.60 | 47.40 | 39 |

Source: *Population trends*, No 47

Ideally the analysis of agricultural statistics would proceed by looking at figures for local authorities rather than counties and regions, but this has not been possible. From the MAFF agricultural statistics for 1987 and 1988 the records of full-time male employees (excluding farmers) – family and non-family – were compared for counties and regions of the UK which typified the most important of these categories. The areas selected were:

| *Area* | *Suggested category* |
|---|---|
| Caithness and Sutherland, Scotland | I |
| Clwyd and Dyfed, Wales | I |
| Borders, Banff and Buchan, Scotland | II |
| Cumbria, England | I/V |
| Norfolk, Hereford and Worcester, England | III |
| Fife, Scotland | III |

These statistics are set out for Scotland first of all in Table 6.

Table 6 Change in full-time male workers in selected Scottish countries.

| | *1977 Hired* | *1977 Family* | *1977 Total* | *Hired as % Total* | *1987 Hired* | *1987 Family* | *1987 Total* | *Hired as % Total* | *% change Hired* | *% changed Family* | *% change Total* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I Caithness and Sutherland | 359 | 159 | 518 | 69.31 | 241 | 147 | 388 | 62.11 | - 32.87 | - 7.55 | - 25.10 |
| II Banff and Buchan | 1206 | 467 | 1673 | 72.09 | 800 | 397 | 1197 | 66.83 | - 33.67 | - 14.99 | - 28.45 |
| III Fife | 1668 | 296 | 1964 | 84.93 | 975 | 286 | 1261 | 77.32 | - 41.55 | - 3.38 | - 35.79 |
| II Borders | 2380 | 378 | 2758 | 86.29 | 1667 | 452 | 2119 | 78.67 | - 29.96 | 19.58 | - 23.17 |

In terms of overall decline, Fife is seen to have shown the biggest percentage decline at over 35%, with a 41% decline in employed labour. As a county, Fife over this period witnessed a sharp increase in commuting workers travelling over the Forth Bridge to Edinburgh and the Tay Bridge to Dundee. It also has a number of growth centres for new industries which have more than compensated for the decline in the old industries like mining, ship building and floor coverings. However, the prospects of workers leaving agriculture in Fife have been shown to be greatly affected by the location of their last agricultural job (Mackel, op cit, Chapters 6 and 7). Workers leaving agriculture in the Glenrothes area, for example, have far more job opportunities than those living near St Andrews. The main forested area in the county is Tentsmuir, north of Leuchars, but other potential areas of afforestation, given the decline in agriculture, are along the western boundary of the county around the Lomond Hills. The relatively small decline in family workers indicates the fairly prosperous state of agriculture in the region, i.e. workers have been shed as either a cost-cutting exercise or because workers have been pulled into other employment. There has been little actual rationalisation of family farms.

The Scottish Borders show the lowest decline of the selected regions, with the number of family workers actually increasing. Hired workers as a percentage of the total fall from 86 to 78%. Once again the Borders shows a prosperous and viable farm structure. However, it does have less to offer in the way of alternative employment than Fife and has a bigger area which is more likely to convert to forestry. With the improvements in road/rail it has also become to some extent a Type III Region.

The north-east of Scotland, Banff and Buchan represent an interesting barometer for the development of agriculture in the 1970s and 1980s. Switching from predominantly livestock to fairly intensive arable, its number of agriculture workers fell by 28%. Given that the many parts of the area are in fact marginal for cereal production, there could well be a swing back to either grass or trees. There is already evidence of farm rationalisation with the highest outmigration of family workers.

Finally Caithness and Sutherland, which are generally recognised as typifying the UK's traditionally forested areas. Despite the large geographical area involved, the actual level of agricultural employment is very small – a reflection of both the limited agricultural land and the extensive type of farming practised. With only 241 full-time hired employees in 1987 it is probable that forestry can absorb the migrant workers in the 1990s, as forests planted in the 1960s begin to mature.

The area is of course the most isolated of the selected Scottish regions, with probably the most restricted range of alternative employment. It is also the area where part-time or under employment of family agriculture workers is most prevalent.

Turning to England and Wales, the statistics are set out in Table 7.

Table 7 Changes in full-time male workers in selected English and Welsh countries.

| | | *19[illegible] Hired* | *19[illegible] Family* | *19[illegible] Total* | *Hired as % Total* | *1987 Hired* | *1987 Family* | *1987 Total* | *Hired as % Total* | *% change Hired* | *% changed Family* | *% change Total* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I | Cumbria | 2085 | 1131 | 3216 | 64.83 | 1417 | 999 | 2416 | 58.65 | - 47.14 | -13.21 | - 33.11 |
| III/IV | Norfolk | 9043 | 785 | 9828 | 92.01 | 5693 | 592 | 6285 | 90.58 | - 58.84 | - 32.60 | - 56.37 |
| III | Hereford and Worcester | 3976 | 849 | 4825 | 82.40 | 2687 | 733 | 3420 | 78.57 | - 47.97 | - 15.83 | - 41.08 |
| IV | Nottingham | 2278 | 382 | 2660 | 85.64 | 1377 | 332 | 1709 | 80.57 | - 65.43 | - 15.06 | - 55.65 |
| I | Clwyd | 1006 | 554 | 1560 | 64.49 | 640 | 401 | 1041 | 61.48 | - 57.19 | - 38.15 | - 49.86 |
| I | Dyfed | 1577 | 1343 | 2920 | 54.01 | 1006 | 1020 | 2026 | 49.65 | - 56.76 | - 31.67 | - 44.13 |

Both Norfolk and Nottingham stand out as having had exceptional losses of workers since 1977. (Though it is significant to note that losses of agricultural workers in England and Wales were well ahead of those in Scotland.) Norfolk experienced a substantial cut in family workers – possibly an indication of farm rationalisation. Both counties offer substantial alternative employment opportunities and improved rail services are bringing them into the commuting belt.

There is also the potential for forestry to add to the mix of alternative employment, both in established forests like Thetford, but also in the proposals for a national forest in the Midlands.

Clwyd, Dyfed and Cumbria offer substantial tracts of land which might be expected to transfer easily into forestry given any squeeze on upland farming. As the Commission study showed (op cit, para 38), a switch to forestry from extensive hill farming would give a boost to local employment in these regions, which have few alternative employments, and which have seen the decline of older industries, e.g. mining and quarrying. Both Clwyd and Dyfed also show surprisingly high losses of family labour – possible indication of poor farm structure and rationalisation.

Herefordshire and Worcestershire could potentially benefit from the plans for community forests, with forestry taking up manual workers who will continue to leave agriculture in areas which are likely to be most heavily affected by any move out of marginal cereal growing.

## CONCLUSIONS

Throughout the 1960s and 1970s the agricultural industry has lost workers. This decline continued through the 1980s despite a relatively prosperous period for agriculture. This loss of workers is not unique to agriculture – many other sectors from mining, to car manufacturing, have seen even more radical reductions. However, it is the movement out of agriculture in areas which are often at some distance from a range of alternative employment which causes a particular social problem – either of population decline or of residual unemployment for the geographically immobile.

This decline in the agriculture work force is likely to continue under the economic pressure of the 1990s – possibly another 90 000 will leave the industry before the end of the century.

However, it is not sufficient to treat this on a national scale – a framework for classification must be established and areas analysed within this system. A preliminary attempt has been made to do this in this chapter, and some interesting differences in the rate and composition of losses emerges from looking at particular areas. Tentative attempts were made to relate these changes to the structure of agriculture in the area and alternative employment opportunities. However, a lack of detailed local statistics is a real problem in reaching a definite assessment of both the state of agricultural employment and housing.

Therefore it is very difficult to determine the impact of forestry in an accurate way. However, it can be said that workers with basic manual skills, i.e. able to use a selection of hand tools, possibly use simple machinery and hold a driving licence, face a shrinking job market. Agriculture used to be a major employer of such workers, but rationalisation and an increasingly high level of complex machinery is changing this situation. Forestry, for the reasons set out in the Commission paper (op cit), remains an important employer of those with these basic skills. It also provides a more worthwhile and attractive employment for workers used to the open air and a high level of self-motivation and monitoring. A series of in-depth studies in 'typical' areas would definitely help to elucidate these points.

It can also be said that there are likely to be areas of the UK, particularly the more remote ones, where returns from agriculture are low and alternative job opportunities are scarce. Furthermore, these conditions can be expected to persist into the foreseeable future. In these areas the cost of labour to forestry (or any other activity) will be relatively low. The evaluation of any expansion in forestry on a national scale has to take account of these low shadow prices for labour if these areas are to be part of any expansion scheme. An attempt has been made to identify the characteristics of the areas in which such low

labour costs are relevant and which areas in the UK would represent them. In other areas higher labour costs may be more appropriate and this suggests that, in any overall assessment of the role of forestry, a range of labour costs should be used, chosen to represent the various types of rural area in which further afforestation is being considered.

Finally, a note about the social aspects of rural living. As the number of workers per agricultural unit declines, the costs of providing services to isolated cottages becomes increasingly difficult to justify. Further the growing isolation is not attractive to the wife and family. Forestry, by the provision of small groups of houses and settlements, reduces the cost per house of services and provides at least a small nucleus for social activities. Also, given the removal of the need to live on the job, there is no reason why these settlements cannot be in or adjacent to villages or towns. In the age of the rural commuter there is no reason why all the journeys should always be towards an urban centre.

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## 'FORESTRY EXPANSION: A STUDY OF TECHNICAL, ECONOMIC AND ECOLOGICAL FACTORS'

This is one of a series of papers which form part of a study to consider the scale, location and nature of forestry expansion in Britain.

The Forestry Commission invited fourteen specialist authors, including economists, foresters, ecologists and biological scientists to write about current knowledge and to assess the main factors bearing on decisions about the future direction of forestry expansion. It is intended that the papers will form the basis for future discussions of the location and type of forestry that will best meet the demands of society for wood products, jobs, recreation, amenity, wildlife conservation, carbon storage and the other uses and public benefits supplied by the country's forests.

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The full list of papers is as follows:

| Occasional Paper No | Title | Author |
|---|---|---|
| 33 | Introduction | Professor Ian Cunningham, Macaulay Land Use Research Institute |
| 34 | British Forestry in 1990 | Hugh Miller, University of Aberdeen |
| 35 | International Environmental Impacts: Acid Rain and the Greenhouse Effect | Melvyn Cannell and John Cape, Institute of Terrestrial Ecology |
| 36 | The Long Term Global Demand for and Supply of Wood | Mike Arnold, Oxford Forestry Institute |
| 37 | UK Demand for and Supply of Wood and Wood Products | Adrian Whiteman, Forestry Commission |
| 38 | Development of the British Wood Processing Industries | Iain McNicoll and Peter McGregor, University of Strathclyde and Bill Mutch, Consultant |
| 39 | The Demand for Forests for Recreation | John Benson and Ken Willis, University of Newcastle |
| 40 | Forests as Wildlife Habitat | John Good, Ian Newton, John Miles, Rob Marrs and John Nicholas Greatorex-Davies, Institute of Terrestrial Ecology |
| 41 | Forestry and the Conservation and Enhancement of Landscape | Duncan Campbell and Roddie Fairley, Countryside Commission for Scotland |
| 42 | The Impacts on Water Quality and Quantity | Mike Hornung and John Adamson, Institute of Terrestrial Ecology |
| 43 | Sporting Recreational Use of Land | James McGilvray and Roger Perman, University of Strathclyde |
| 44 | The Agricultural Demand for Land: Its Availability and Cost for Forestry | David Harvey, University of Newcastle |
| 45 | Forestry in the Rural Economy | John Strak and Chris Mackel, Consultants |
| 46 | New Planting Methods, Costs and Returns | Jim Dewar, Forestry Commission |
| 47 | Assessing the Returns to the Economy and to Society from Investments in Forestry | David Pearce, University College London |

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