



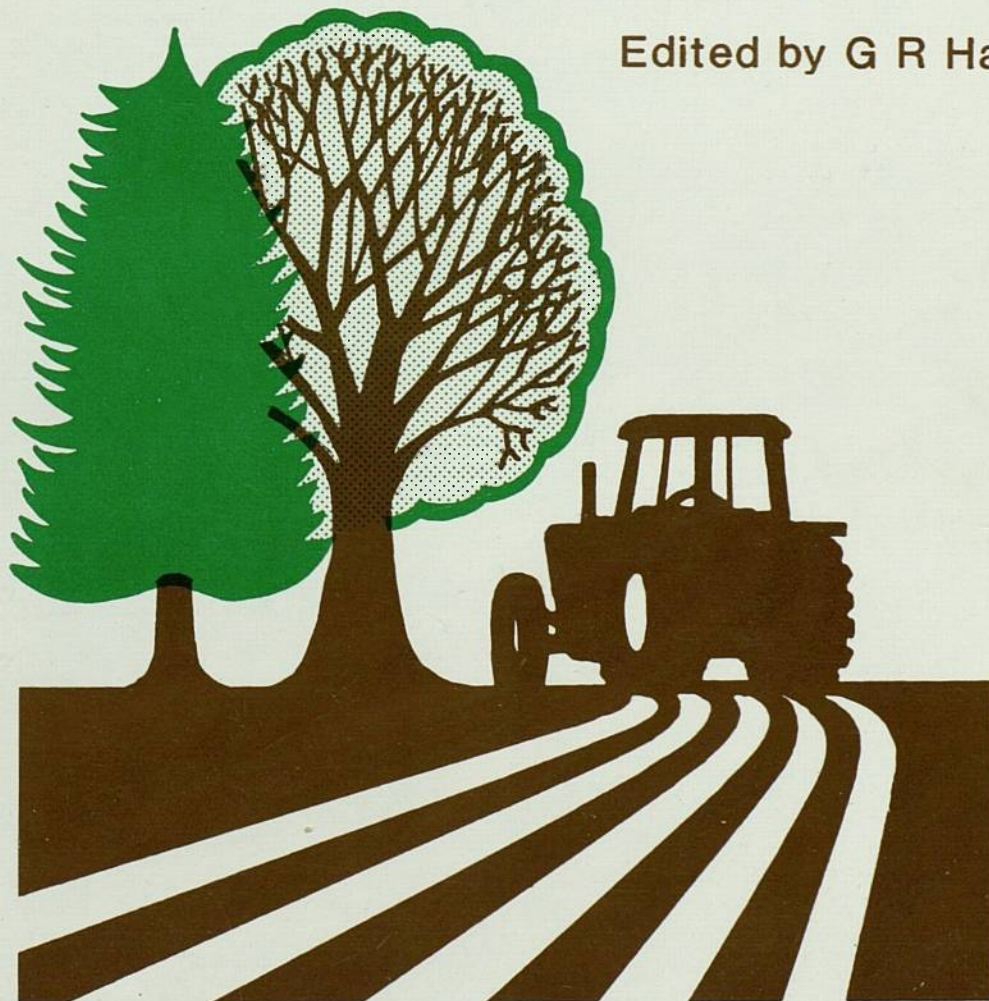
Forestry Commission

Occasional Paper 17

Farming and Forestry

Proceedings of a Conference held at
Loughborough University 26-28 Sept 86

Edited by G R Hatfield



Farming and Wildlife Advisory Group
Institute of Chartered Foresters
Royal Agricultural Society of England
Timber Growers (UK) Ltd
in association with
Agricultural Development and Advisory Service
Forestry Commission



FARMING AND FORESTRY

Proceedings of a Conference held at
Loughborough University
26-28 September 1986

Edited by G R Hatfield, BSc (For), MIC For, ARICS

Land Use Planning Officer,
Forestry Commission

Conference Organised by

Farming and Wildlife Advisory Group
Institute of Chartered Foresters
Royal Agricultural Society of England
Timber Growers (UK) Ltd

In Association with

Agricultural Development and Advisory Service
Forestry Commission

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Foreword

In September 1986, when this conference was held at Loughborough University the first cold draughts of impending change had begun to disturb the system of agricultural funding founded on the Common Agricultural Policy. It is perhaps a measure of the crisis facing EEC Governments, and indicates how seriously the need to solve the problems of over-production of agricultural products is being treated, that now only 18 months after the Loughborough Farming and Forestry Conference enabling legislation for a Farm Woodland Scheme is under consideration in Parliament. Even more impressive has been the way in which farmers have begun to listen seriously to what foresters have to offer. There can be few farmers in Britain who have not at least thought about the possibilities of improving the management of their farm woodland or establishing new woodland and the thirst for information and demand for solid professional advice is growing rapidly.

The conference was organised as a result of a joint initiative by the National Farming and Wildlife Advisory Group and the Institute of Chartered Foresters. It set the scene for a period of unprecedented co-operation between the farming and forestry industries at all levels. This collection of papers given at Loughborough provides a baseline against which the developments of the last year may be assessed.

Most successful conferences owe their success to dedicated organisers working away behind the scenes, usually with few thanks and no reward, other than the success of their efforts. We owe a debt of gratitude to the staff of the Royal Agricultural Society of England, who handled the administration and Loughborough University whose splendid conference facilities and accommodation helped us to concentrate upon the true purpose of our meeting. The financial support of the Scottish Forestry Trust is gratefully acknowledged.

The steering group for the Conference was:-

Eric Carter	Farming and Wildlife Advisory Group.
Nick Beard	Agricultural Development and Advisory Service.
Geoff Hatfield	Forestry Commission
Peter Watkins	Royal Agricultural Society of England
Ronnie Williams	Timber Growers UK.
Pat Winchester	Institute of Chartered Foresters

Introduction

The Farming and Forestry Conference at Loughborough University in September 1986 was held as a result of the dual realisation that something needed to be done, and soon, to cut back and bring under control the over-production of key agricultural products, and secondly that farm woodlands provided one of the few realistic alternatives.

The farming and forestry industries have both developed with a degree of technological innovation, productivity and efficiency that many other industries would do well to follow, but in the main each has developed independently of the other. Moreover, since both industries are primary land users there has even been a degree of wary distrust as each has regarded the other as a competitor for the land both need. Integration and rational land use planning have only developed gradually over the years.

The conference brought together the disciplines of farming and forestry to discuss the opportunities which farm forestry might offer towards solving the problems increasingly besetting agriculture; and for the foresters the contribution the forestry industry might make.

Attention was focussed particularly on the potential contribution of farm forestry to agricultural enterprises, but also upon the alternative of transferring farm land to the forestry sector. In addition the mechanisms which would be required to encourage farmers to become involved in farm forestry were discussed.

The papers commissioned were intended to reflect the wide range of research data and expertise available, with a view to encouraging greater co-ordination amongst those concerned. They are presented here, together with a record of the discussion, as an anthology of background information which can be used to inform further debate, and to place subsequent policy developments in perspective.

From the outset, the sessional debates revealed very considerable differences of perception, both between forestry and farming interests and between the various research programmes presented. This demonstrated an immediate need for greater information exchange, better co-ordination between the agencies involved and a consistent database on which to found analysis.

Whilst it was generally agreed that a proportion of land will move out of agricultural production, opinions as to the scale, location and nature of this trend differed according to the assumptions adopted. The approach to agricultural surpluses adopted by the EEC was acknowledged as a key factor. Nor would surplus land automatically be available or attractive for afforestation: farm woodlands are, of course, only one of the options available.

Developments were thus considered likely to be several rather than singular. The expectation of an extension of forestry on farms has been confirmed by the announcement, since the conference, of the Government's proposals for alternative land use, including the Farm Woodland Scheme. Enabling legislation for this in the form of clause 2 of the Farm Land and Rural Development Bill is now under consideration in Parliament, with a view to establishment of the scheme in time for the 1988/89 planting season. The central feature is annual payments to farmers over a period of 20-40 years in lieu of the agricultural income previously generated by the land planted, and these are to be paid in addition to existing Forestry Commission grants.

Introducing the second reading of the Bill in the House of Lords on 5 November 1987, Baroness Trumpington, Under-Secretary of State, MAFF, outlined the Government's proposals, the details of which are to be included in Statutory Instruments to be laid before the House in due course. The scheme is of sufficient relevance to the conference for it to be worth describing the main points here. The scheme is to be concentrated on so-called improved land by restricting eligibility to arable land and grassland up to 10 years old. The rates of annual payment proposed are £100 per hectare in the Severely Disadvantaged category of the Less Favoured Areas, £150 per hectare in the Disadvantaged Areas and £190 per hectare in the lowlands. The target for the scheme is 36 000 hectares over the first 3 years.

However, because there is proportionately less improved land in hill areas — particularly in Scotland and Wales — the Government has decided that within this overall target some 3 000 hectares will be allocated for applications arising on unimproved land planted in the Less Favoured Areas. To qualify, land will have to have been in productive agricultural use, and the rate of aid proposed here is £30 per hectare for both Disadvantaged and Severely Disadvantaged Areas. It is proposed that rates of aid should be reviewed from time to time in the light of relevant factors.

In order to encourage mixed woodlands containing a high percentage of broadleaves it is proposed to extend the payment period to 30 years for mixed woodlands containing more than 50 per cent broadleaves, and to 40 years for crops containing only oak and beech on grounds that these species take longer to mature. Other woodlands will qualify for 20 year payments as originally proposed. New planting of coppice crops will be eligible provided that it qualifies for Forestry Commission grants but annual payments will be for 10 years only, and short rotation coppice will not qualify. It is hoped that the aim of securing at least one-third of planting under the scheme with broadleaved species will be achieved without the need to introduce compulsory minimum proportions.

The minimum area eligible per holding will be 3 hectares (one hectare in Northern Ireland), although individual blocks of one hectare will be eligible towards the minimum for each holding. The proposed maximum area per holding is 40 hectares. In order to simplify the scheme as far as possible and keep administrative costs to the minimum it is intended to reduce consultation with local authorities where small areas are involved. Existing arrangements in national designated areas are likely to stand. The scheme is to be founded on existing Forestry Commission grant arrangements, and annual payments will be available in addition to Forestry Grant Scheme or Broadleaved Woodland Grant Scheme grants.

The Government is keen that tenant farmers should be able to participate, subject to landlords' agreement. Discussions have been taking place between representatives of the National Farmers Union, the Country Landowners Association and the Royal Institution of Chartered Surveyors on the best way to achieve this, and progress is being made towards agreed model clauses for inclusion in tenancy agreements under the Agricultural Holdings Acts, and towards a model forestry lease for use in circumstances where a separate long lease is preferred by the parties concerned.

The new approach to farm woodlands should not be seen as an alternative forestry policy. Farm woodlands are unlikely to substantially decrease the timber deficit, nor to significantly affect supplies available to industrial processors; but they could, once established, thrive as an adjunct to the traditional forestry industry which has developed since 1919.

Another facet of the Government's alternative land use proposals was the announcement of an increase in the area of new planting sought annually from the forestry sector. This is a related issue in that it can only be met by the continued uptake of land sold or leased by farmers. Within the overall new planting target for traditional forestry, now standing at 33 000 hectares per annum, planting of a higher proportion of better quality land is sought. The attraction to the forestry industry of agricultural land released on to the market for planting will depend on site conditions, the price and a range of other factors. However, there does seem a strong likelihood, that forestry will have an opportunity to 'come down the hill' to some degree, perhaps on to areas recently brought into arable production because of EEC subsidy. If conditions are right for this opportunity to be taken, a greater flexibility of approach can be expected in terms of viable unit size and species selection.

Within this complex field, the conference identified the following basic questions to which answers need to be found as new policy measures develop:-

- a. On what scale is land likely to become surplus to agriculture? Of what type, in what locations, and of what value will it be?
- b. How much of it will be suitable and available for forestry, and where and of what kind will this be?
- c. If farmers are to be encouraged to take up farm forestry what sort of planting is desirable, and will it make fundamental economic sense?
- d. If farmers are to plant woodlands, what sort of grants or incentives will be required; and how are these to be reconciled with existing forestry schemes?
- e. Who is going to carry out woodland work on farms; who will advise on the transfer and management of forest land; how will forestry training be extended to cope with the wide range of conditions and the relative lack of forestry experience amongst farmers?
- f. What further management and marketing mechanisms will need to be developed?
- g. How can better co-ordination between the farming and forestry disciplines be achieved, particularly the research effort, land-use decisions, and advice to farmers?

The conference elaborated these important questions as a first step, without pre-empting final answers. It effectively rejected a 'single solution' approach and demonstrated the need to bring farming and forestry interests together in a practical working atmosphere, rather than a theoretical political one. To a debate which remains highly speculative as a result of continuing uncertainty, it introduced a healthy element of sceptical analysis.

Keynote Speech

E J G Smith, CB

*Deputy Secretary, Land and Resources
Ministry of Agriculture, Fisheries and Food*

When I was at school, I was much influenced by the "Men of the Trees" and thought hard about forestry as a career. I might now have been working at the Forestry Commission in Edinburgh. But my career took a different course and I have to make it clear that I have no responsibility for forestry policy. On these matters, the Forestry Commission reports direct to Ministers. But I do of course have certain responsibilities relating to farming and it is from that angle that I will approach the theme of your Conference.

In his discussion paper on *Community Action in the Forestry Sector* earlier this year Mr Andriessen, Vice-President of the European Commission, drew attention to the fact that the need for a reduction in agricultural surpluses would "lead to a search for alternative crops, including forests". The paper noted the Community's considerable trade deficit in wood and envisaged that the expansion of the forest area of the Community could be important in maintaining employment in those parts of the Community affected by agricultural decline.

This is a theme that has been taken up by others. For example, the Centre for Agriculture Strategy at Reading has produced a number of papers on land use alternatives for UK agriculture which reflect the collective wisdom of many of the main thinkers and organisations in the field. There have also been contributions to the debate which address themselves directly to the forestry issue, such as the UK Centre for Economic and Environmental Development's *Forestry - Britain's Growing Resource* and the NFU policy document *Farming Trees*. I was also interested to see that the Dartington Institute have recently published the results of their study of the Culm Measures in Devon. This promising study concludes that there could be scope both for new planting in areas like the Culm and for the improved management of existing lowland woodland.

In the European Community we are faced with surpluses of most of the main agricultural products. Left unchecked these surpluses will increase further as a result of technological advance and its continuing and more widespread application. Indeed, the problem of overproduction and surpluses is a worldwide one. The new GATT round launched in Uruguay last week will address the general problem of agricultural support and its effect on world trade. This process, in which the Community will be very much involved, and the escalating cost of the CAP, seem bound to result in further restrictive action by the Community. With little scope for shifting from surplus commodities to other forms of agricultural production, such measures — whatever form they take — seem likely to release land for afforestation. Restrictive Community policies could also create a need for ancillary activities on farms to help augment farm income and maintain the prosperity of the rural economy. Greater attention is therefore focussing on forestry in the hope that this might be more fully developed as a complement to agricultural activity, and help to ease the process of adjustment. There is a general recognition that, in contrast to milk, meat or vegetables there is a large and increasing European market for timber, and nowhere more so than in the UK. Forestry is better developed in many other Member States, but even the Community as a whole is only 50 per cent self-sufficient in timber, while the figure for the UK is nearer 10 per cent.

Traditional forestry managed by private forestry companies and by the Forestry Commission will continue to play the major role in forestry policy. Levels of grant under the forestry grant schemes were revised last year. At the same time the Forestry Commission launched a new initiative on broadleaved woodlands backed by the Broadleaved Woodland Grant Scheme, which provides for more generous rates of grant for the planting of hardwood trees. With falling land prices the prospects for traditional forestry are good. There may even be some moves on to somewhat better quality land.

However, most traditional afforestation seems likely to remain on poorer land, much of which lies in remote and hill areas. Many of these areas are environmentally sensitive and we therefore attach importance to the forestry grant scheme consultation procedures as a means of reconciling the different land use interests. Equally, of course, there are significant upland areas where afforestation would be appropriate and can offer significant advantages to the rural economy.

But the Conference will no doubt be much concerned with the potential for forestry on lower-lying land and in particular the possibilities for the development of farm woodlands. Not only could their expansion be a sensible use of land which might otherwise be contributing to surpluses, but new or revived woodland could provide an additional source of income and employment. If handled sensitively, woodlands also offer obvious environmental benefits. However a number of issues still have to be tackled if farm woodlands are to make a significant new contribution.

First, there is the question of *management expertise*. Historically, agricultural woodland has been mainly estate woodland managed by the landowner. As a result there is no real tradition of farm woodland management. In this country most farmers know little about how to manage their woods. No doubt the Conference will address itself to how farmers might acquire the necessary technical expertise, how forestry might be integrated into the farming cycle and what scale of operation is likely to be viable with modern machinery and management methods. The system of agricultural education can be adapted and management skills can be acquired through training, but this will take time. There may also be questions of attitudes. We need to consider whether the advisory effort already devoted to woodland needs to be expanded. Should this be done by the agricultural advisory services and the Forestry Commission, or can the private sector meet the demand? There is also the difficult question of who should pay for such advice.

Second, there is a *marketing* problem. Many farmers will be able to make greater use of timber on their own holdings than they do already, for example, for fencing and fuel. However, there is also a huge timber market to be exploited, and we need to consider how the small producer might take advantage of this and indeed cultivate high value outlets. Can a wholesale network be developed or should farmers get together to form wood marketing co-operatives? Certainly farmers today must have the same market-oriented approach to their woodlands as they need on the whole range of their activities.

Third, there are the *environmental considerations*. These are very important. We need to consider how farm woodlands can be developed in a way which does not cut across environmental objectives. Careful planting is needed to maximise the wildlife and landscape benefits that afforestation can bring, particularly in the lowlands. Valuable work on the conservation of farm woodlands and small-scale planting has already been done by the Farming and Wildlife Advisory Groups and, of course, by the advisory services. Continued effort is needed, especially on the environmental impact of larger-scale planting. I am sure this Conference could do a very useful service in seeing how commercial and conservation considerations, where they conflict, can be reconciled.

Fourth, there could be *legal* problems. The development of farm woodland might have complex ramifications for the landlord/tenant relationship given that the land committed to woodland could not be used for other purposes for many years. These need to be thought through and solutions found.

Fifth, there is the question of *ancillary activities*. To what extent can the economic viability of farm woodlands be improved by exploiting their use for game? Farmers might also try to develop other money-making activities, including adding value through processing of various kinds on the farm.

Could I digress for a moment to say that most discussion on farm woodlands tends to concentrate on traditional tree planting methods. But another interesting area for consideration is the potential for development of short rotation coppicing, both as a source of energy and for other uses such as chipboard and chemical production. Clearly much research is still needed here. Movements in oil prices will also be critical and at current levels would seem to make coppicing economically unattractive. But should this, and the technology situation, change, there could be real attractions for farmers in terms of scale of enterprise, speed of financial return and compatibility with environmental requirements.

Having ranged over the various issues which will clearly be pursued in more detail throughout this Conference, you will not expect me to ignore the whole question of the *role of Government*. In *Farming Trees* the NFU suggested annual support payments per hectare for farm woodland, in addition to existing Forestry Commission grants to compensate for the loss of annual income until timber came into production. A figure of £150 per hectare on average was quoted. By way of justification the report also pointed to the associated savings in support costs for surplus commodities such as cereals and beef, which should accrue if planting took place on better land. In this connection, I should mention that the Government is seeking to promote discussion within the Community of a voluntary scheme for diverting land away from cereals production. Here again the farmer would receive an annual payment as an incentive to reduce cereals production and either fallow the land or use it in ways which did not add to other surpluses. Trees are an obvious candidate. These various ideas clearly merit further discussion here. But before rushing off enthusiastically towards the hope of more Government spending, I hope you will look to see whether farmers could not make better use of the already significant Government contribution to forestry in terms of both grants and tax incentives. For example, it might be possible for the institutions or the commercial forestry groups to encourage farm forestry by reverse mortgages or other devices such as share farming. There could be considerable advantage in bringing further institutional and private capital into play given the long-term nature of forestry. I hope the Conference will be able to identify some realistic possibilities.

I should like to mention *research and development*. Considerable research is already being done, largely at Government expense, on a range of forestry problems including agroforestry, biomass and tree breeding. There is a widespread feeling that work of this kind could, in time, make a considerable impact on the economics of forestry, including farm forestry. Continued Government-funded research is obviously required and will no doubt continue but, given the prospective returns, should not the industry also consider providing additional money itself for forestry research? And do we have the direction of the research effort right?

In conclusion may I say that I regard this Conference as very timely indeed. A great deal of thought is being given inside the Government, as well as in Brussels and elsewhere, to the proposals for forestry as a complement to agriculture. In his speech to the RURAL Conference earlier this week, the Minister of Agriculture said:-

“The prospects for traditional forestry are good and it is my hope that afforestation will start to take place on rather better land. The development of farm forestry as a complement to conventional agriculture is also rightly receiving renewed attention. This might involve the better use of existing woodlands, many of which are sadly neglected and could yield a fairly immediate benefit if properly managed. The Forestry Commission’s new Broadleaved Woodland Grant Scheme has an important part to play here. There is also scope for the planting of new farm woodlands. There are, of course, a number of problems to be resolved. However, the indications so far are that new woodland could provide a useful source of farm income and in due course enhance the quality of the countryside”.

Since it is my task to try to solve the problems to which the Minister refers, I attach a great deal of importance to the work of this Conference and I shall await with keen interest the results of your deliberations. We are engaged in a significant adjustment process in this country and indeed throughout the Community. Given the tight constraints on both national and Community budgets we shall have to move primarily by way of redistributing our resources and re-ordering priorities, but I am in little doubt that our forests and woods are destined to play a larger role than in the past as a source of rural income and employment, as a vehicle for conservation, a home for recreation and a contributor to the rural economy in general.

SESSION I: PROSPECTS FOR AGRICULTURE

The CAP, Changes in Land Use, and Land Availability

C W Capstick
*Director, Economics and Statistics
Ministry of Agriculture, Fisheries and Food*

Abstract

The scale of adjustment facing Community agriculture is considered: is it a repeat of previous temporary problems or something more fundamental? Prediction of policy and technical developments is difficult and we can only estimate the effects on land use, but should not be complacent. The broad outlook for cereals, milk and beef/sheep is considered. If the assumptions made are correct, some one million hectares could be available for change of use over the next decade. The economic and farm structure implications are reviewed, and the distinction between Community level initiation of change and its expression through the decisions of individual farmers is highlighted.

Introduction

For the first paper of this session my aim is to consider the scale of adjustments that seem now to be facing Community agriculture. I shall then examine the implications for our own industry, including some generalised and heavily qualified assessments. Many questions will emerge but the intention is to provide some background before you come to consider specific aspects of the forestry option.

Now is not, of course, the first time that the Community has found itself confronted with apparently intractable surplus problems. From time to time since the early 1970s stock records were broken and the associated costs demanded corrective policy actions. On several occasions temporary world shortages emerged and new or enlarged export outlets enabled stocks to be reduced, or at least contained, and Community agriculture was thus able to proceed broadly on course. The production trend line remained a gently rising one. What we need to consider, if this conference is to have any relevance, is whether Community agriculture is facing yet again either a temporary hiccup in its progress or something much more fundamental. In other words might we be worrying unduly since something could turn up, ease the pressures and save the day yet again.

Such an attitude would I fear be dangerously complacent and it is essential that we examine the prospects with as much care and objectivity as we can muster. One of the difficulties is that the consequences of rapidly developing technology present stern tests for the robustness of the decision making institutions of the Community. Such challenges are not, of course, unique to agriculture but for this industry the issues appear starkly in the form of physical surpluses, budget expenditure, farm income pressures and much speculation on the prognoses and prescriptions. The nature of the policy decisions and their timing, whilst obviously crucial, simply cannot be foreseen so that any predictions of future land use must, unavoidably, be subject to numerous caveats. Another issue concerns the pace of technical change. New techniques know no frontiers and the scope for further transforming traditional agriculture remains considerable. New developments that will come on stream, so we are told, over the next decade already exist and their adoption is probably inevitable. But how rapidly will they be taken up and at what pace will yield curves and input/output ratios improve? We can only do our best to arrive at the most probable outcomes. Fortunately many studies are now proceeding in the Universities, research units and by the Economic Development Committee for Agriculture. What I have to say is very preliminary, very tentative, a sort of hors d'oeuvre to be followed by something much more substantial when the results of these exercises emerge in the coming months.

Community Commodity Issues

I will deal only with the main products and start with cereals. I shall not go into detail but will concentrate on orders of magnitude. You will need to weigh the validity of the key assumptions since the ones I have chosen are certainly not sacrosanct.

Cereals

The Community (of 12) produced from the 1985 crop about 160 million tonnes of cereals. It was not a particularly good harvest yet closing intervention stocks were some 17 million tonnes. Figure 1 shows the latest stock position for the main products. Exports reached 26 m tonnes and the whole cost of running the cereals regime will probably be around 3.2 billion ecus (about £2 billion) in 1986. Questions to emerge are what level of intervention stocks might be considered tolerable by the Community over the coming years and what volume of production would be needed to prevent stocks from exceeding that level? I can shed little light on the first question and will, therefore, rely — as economists often do — on an assumption. If we suppose that 20-25 m tonnes is a reasonable limit and additionally, assert that exports are unlikely to rise much above 25 m tonnes (given the intense competition from other surplus producers), and accept that consumption in the Community will rise only marginally then it would follow that production would not have to exceed the 155-160 m tonne level. This is a possible starting point and you will wish to judge whether it is reasonable and rational. You will note that nothing draconian has been assumed. Indeed a continuing surplus has been incorporated which, if we had decided entirely to eliminate, so saving the cereals side of the Community budget considerable sums, would have meant a much lower Community production level.

Even though the 1985 harvest was a modest one and drought in France and Spain will curb Community production growth in 1986, and perhaps provide a temporary respite, these events cannot disguise the fact that the yield trend is upwards. It is growing at around 2½ per cent per annum. Some believe the arrival of hybrid wheats will give yields an upward boost but even without this, the continuing adoption by more farmers of techniques now used by the high performers would be enough to keep the trend rising for several years. If yields rise then we would be faced with the position shown in Figure 2.

Two important issues arise from this graph. First, the position today appears to differ markedly from that of 3 or 4 years ago and second, "stock dynamics", as I shall call them, are such that we could be about to experience stock problems of an altogether new order. What has changed in recent years is that, whilst production 3 or 4 years ago was lower — even though expanding — there was scope to displace imports and export outlets could be found. Stocks rose somewhat but not too much. Today there is little room for further import displacement and new outlets are hard to come by and ever more expensive. Has the Community therefore reached the point when more production will simply find its way into intervention stores? If so, then more production from better yields would have a highly geared impact on stock levels; for example, 5 per cent more production would be equivalent to 50 per cent on stocks. In subsequent years the effects would be cumulative hence the frequently quoted Commission figure of stocks reaching 80 million tonnes by the early 1990s if no countervailing steps are taken. The projections in Figure 2 assume a smooth pattern of production growth when we know there are bound to be significant year to year fluctuations. Stock levels would thus move erratically in the event but the exercise at least serves to warn of a potential massive stock build-up by the 1990s.

To avoid such a situation, the crunch question concerns the scale of adjustment needed to contain stocks and expenditure. If yields continue to grow at 2½ per cent per annum then, by the mid 1990s, the cereals area would need to be cut by nearly 20 per cent. If yield growth were to slow down to, say 1½ per cent per annum then the area cut would be around 10 per cent. But any land taken out of cereals would surely be lower yielding and therefore, forgoing undue optimism, we will assume the 20 per cent figure, that is a 2 per cent cut per annum in the cereals area.

How such an adjustment might be achieved at the Community level would be a topic large enough to occupy the whole of this Conference. I intend to do no more than mention the market (or price) and the command (or quantitative) approaches and acknowledge that several versions and combinations of the two are frequently canvassed. Clearly a strict quantitative approach would spread the adjustment fairly evenly (unless there were exceptions) across the member states and amongst producers whilst with a market solution the impact would be on marginal cereals producers and marginal cereals areas, wherever they might be. At the same time however, the market approach would encourage consumption and reduce support costs. But whatever the means adopted we will take it as given that cereals production would be reduced and that this country would share in the adjustment process. In practice of course the market approach could well lead to a proportionately smaller adjustment here than elsewhere.

Accepting that a wide range of possible adjustments could be required, a cut of 20 per cent implies about 70 000 hectares each year for a decade. Oilseed and protein crops could expand but it seems likely that areas of other cash crops — potatoes, sugar beet, horticulture — will continue to decline. The area of tillage land could thus fall significantly unless other crops are found to be economic.

Milk

I have gone on enough about cereals and now turn to milk. In spite of quotas the production excess, according to Commission figures, is equivalent to about 14 per cent of consumption. Figure 3 illustrates recent and prospective trends. Stocks of butter now stand at 1 million tonnes and 1 million tonnes of skimmed milk powder are in store. Quotas are to be cut by 3 per cent by April 1988 but so long as there continues to be an annual excess then more stockbuilding seems inescapable. Whilst the Commission has just unveiled proposals designed to reduce the scale of the problem, somehow or other, production will surely have to be cut back further in the coming years.

Figure 1

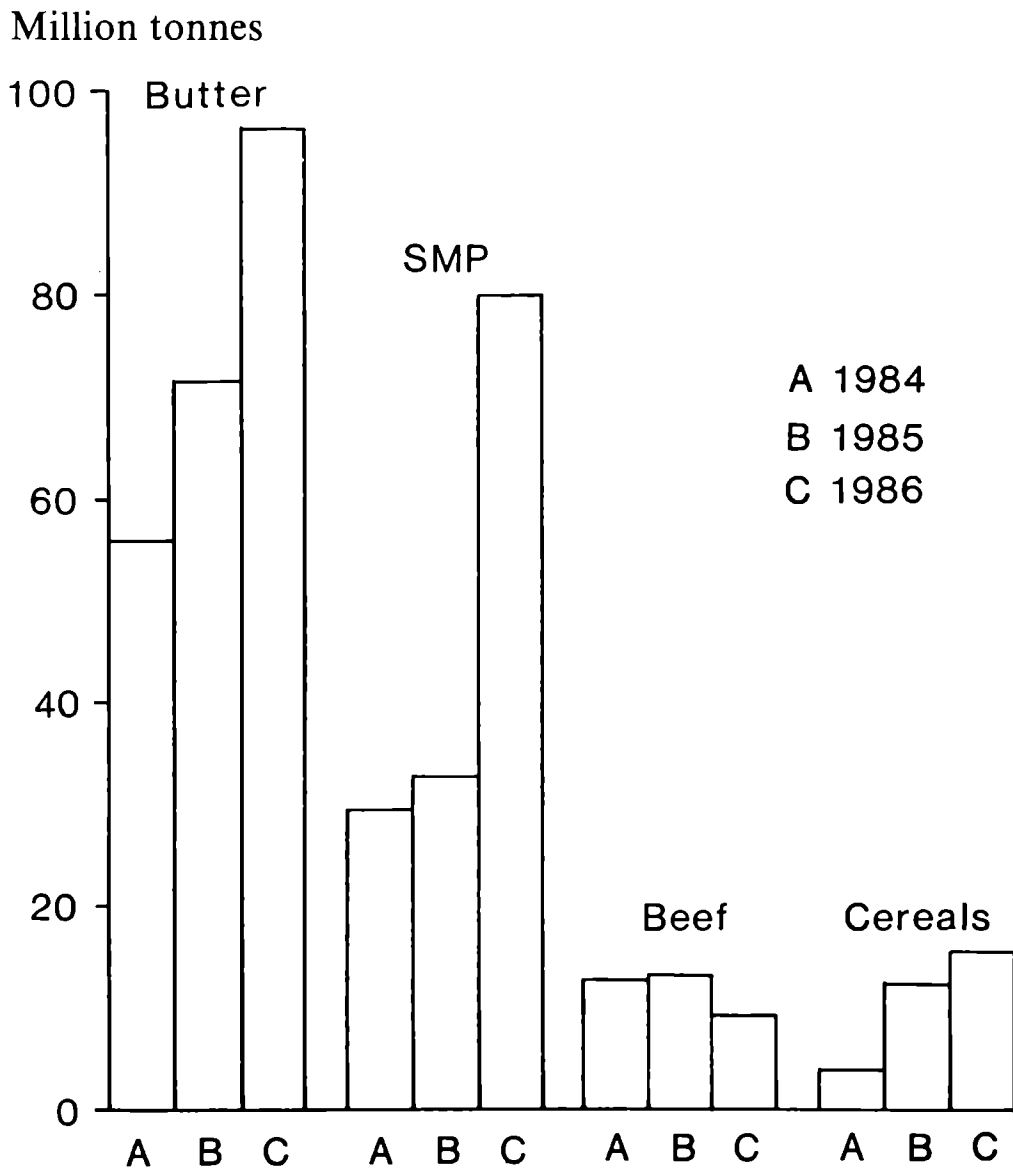


Figure 2

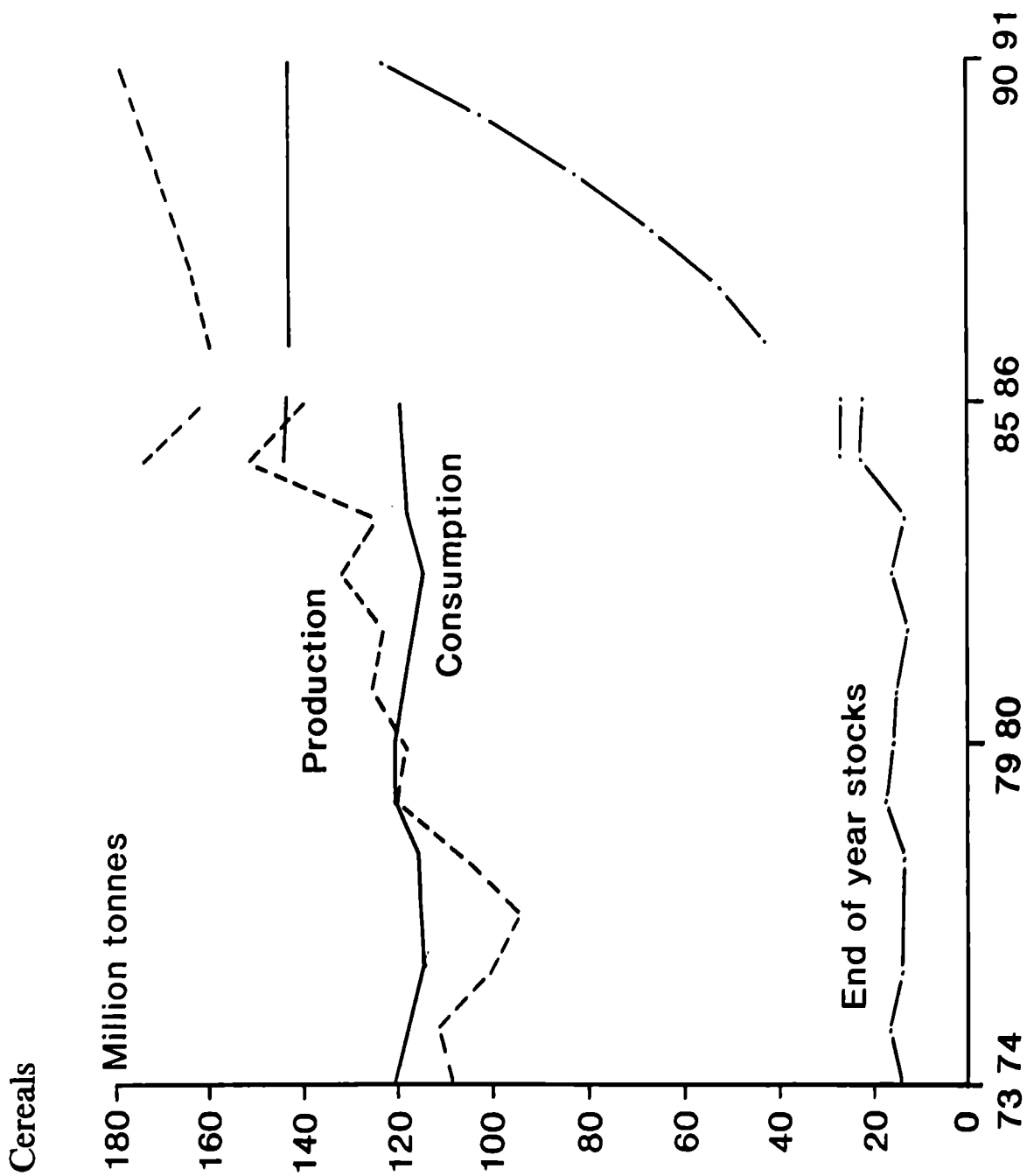
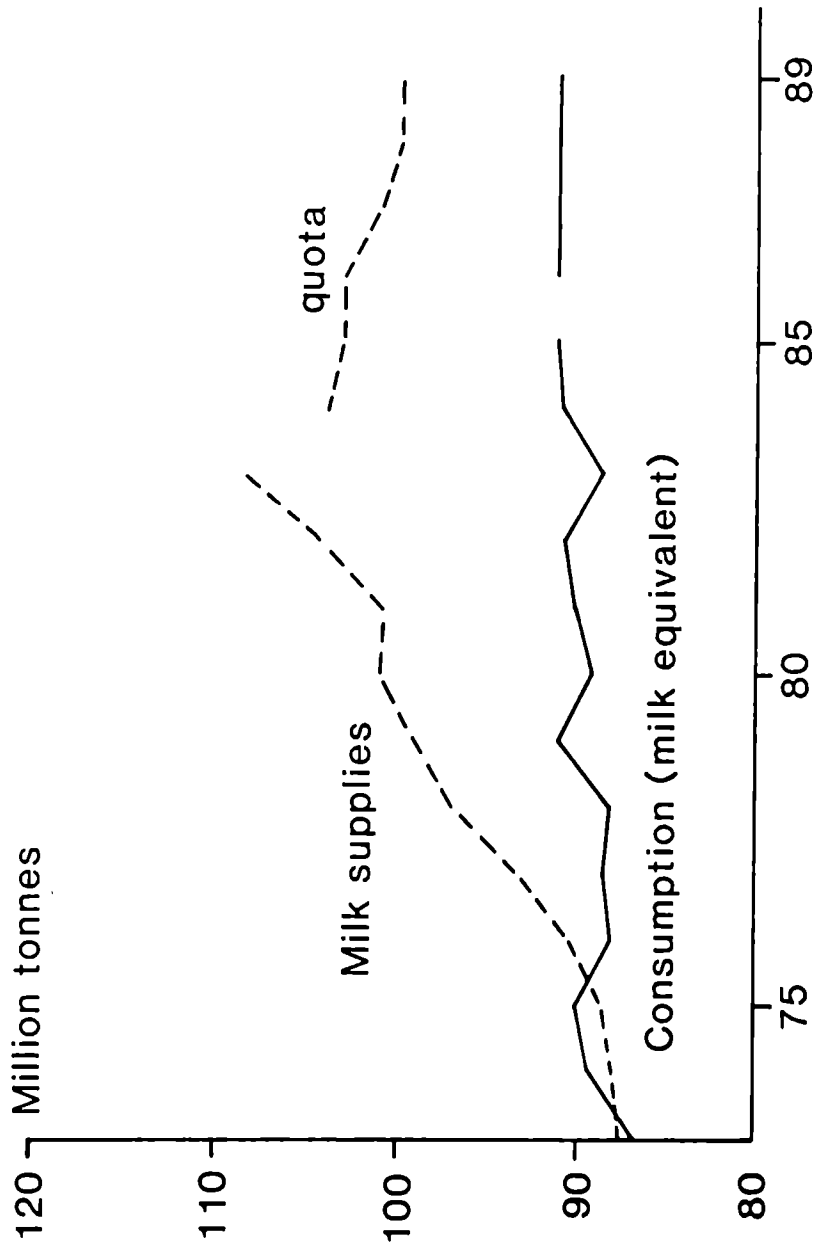


Figure 3



In addition to cuts in quota, and scope exists for another 6 per cent over the next decade, the number of dairy cows would decline to reflect any yield growth. If yields in the UK improve by 1½ per cent per annum (and enforced culling would help ensure this) then just over ½ million dairy cows would need to go over the timescale of the adjustment, so releasing about ½ million hectares of grassland at present stocking rates. If, however, yields did not improve then the scale of the dairy herd change would be about halved.

Beef and Sheep

Community beef stocks are currently about 700 000 tonnes, equivalent to about 10 per cent of Community consumption. Exports have been substantial but costly: beef being now the third most expensive item for FEOGA after milk and cereals. Proposals have been made by the Commission to change (and reduce) support arrangements but no decisions have been taken thus far. Present indications, however, are that production of beef is likely to ease back in the next couple of years reflecting the decline in the dairy herd, from which so much beef is derived. Further cuts in the dairy herd, whilst boosting temporarily cow beef production, would further reduce the Community's beef production capacity. Whether these developments will bring the beef market into adequate balance is conjectural but the signals point to only limited scope for replacement of dairying by beef if the latter is not to remain a problem commodity.

In the case of sheep, production here continues to expand. Production in 1985 exceeded 300 thousand tonnes compared with 276 thousand tonnes in 1982 and in June the sheepflock was 3 per cent larger than in 1985 pointing confidently to further production growth. Doubtless this trend will continue for a time until the saturation point is reached. Much will depend on developments in our continental export markets but the further spreading of sheep across our pastures seems probable and for this exercise, at any rate, I will assume this is so.

Land Use Prospects

Summarising the speculations so far points to a cut in the area of tillage land of about 700 000 hectares and the possible availability of about 500 000 hectares of grassland from the dairy sector. Allowance needs to be made for the steady loss of land to other uses such as roads, houses, recreation and forestry. If the recent pace of transfers were to continue — which implies no radical changes arising from the adjustments I have discussed — then about 200 000 hectares of agricultural land, tillage, pasture and rough grazing could be transferred over the next 10 years. If so, and subject to all the qualifications, around 1 million ha of land could be looking for a change of use — not immediately, but progressively over a decade.

Any changes that occur would depend on the decisions of the producers themselves. Some would surely turn to beef and sheep. On the better arable land some might produce 'novel' crops — linseed and proteins — whilst on grassland fine wool sheep and goats, for example, might eventually have potential. But in the short-term it is surely realistic to bank on only small areas being used in this way. There is really so much development work still to be done. Therefore if beef and traditional sheep expand on old cereals and dairy land, yet within an overall limited market, expansion in one area could mean contraction in another. Whether these products prove to be secure options in the longer-term only time will tell.

The treatment of these various possibilities has been cursory but it will be evident that one quickly runs out of new uses for land released from cereals and milk. I have not of course considered the forestry option since that is the subject of the rest of this conference. The items mentioned here, I fear, whittled down the central figure of 1 m ha by very little — perhaps to around ¾ million hectare. What then might be the economic impact of an adjustment on this scale spread over a number of years.

Economic and Farm Structure Implications

The initial changes would obviously be seen in the arable and dairying areas. As for dairying, quota cuts — and the current 3 per cent cut is to be achieved through compensation to outgoers — will mean fewer dairy farms, with those remaining producing as efficiently as they can under the prices set. But for the rest, traditional dairy land, beef and sheep seem the natural successors but with a question mark over their long-term prospects. Grassland farms, devoid of milk quota would doubtless see their earning capacity reduced and also their value.

In the arable areas the method chosen and the speed of bringing about a cut in the cereals area would be crucial. But some continuation of recent pressures seems inevitable. It is difficult to envisage much change of use on the best land but economically marginal fields and marginal cereals farms, are widely dispersed. For these the land might revert — in the absence of other options — to grassland. Indeed probably much of it was put down to cereals over the past decade, given that since 1975 another 300 000 hectares of cereals have been planted. Again in the face of such pressures we must be talking about reduced earning capacity of some land meaning weaker land values.

But the analysis cannot be confined only to these areas. Some knock-on effect to traditional grassland farms and indeed to the less favoured areas would seem inevitable. The latter are already heavily supported through special subsidies but any fall in land values in arable and dairying areas would surely, in time, have an impact on the land market as a whole.

Perhaps, however, I am not so much making predictions as merely describing what is currently occurring. Asset markets possess the remarkable ability to reflect expectations and already we have seen land prices fall by some 30 per cent from their peak in early 1984. Sentiment, of course, remains bearish and if these various prognoses have some validity then this would have to be expected.

Lower land prices can only occur if there is a change in the supply/demand position. The market is a thin one, normally only about 1½ to 2 per cent is turned over each year. An increase in land placed on the market coupled with tentativeness on the part of potential buyers can thus have a large proportionate impact on the price of land transacted. Whilst highly relevant to the subject matter of this conference, lower land prices could also signal some speed-up in the pace of structural change in the industry.

In other words we would see more large farms, fewer small to medium sized farms yet still a predominant number of very small, often part-time, units. We cannot say whether this would happen but smaller farms coming on the market do often tend to be absorbed by their larger brethren. The latter presumably possess sound balance sheets and can envisage improvements in economic efficiency from their growth. For decades now such changes have been occurring, it is just that for a time we could see them speed up a bit. If so they might favour, albeit in a small way, the forestry option.

Before coming to my concluding observations, a few words on employment and rural economic activity seem necessary. Most of what I have said has treated the prospective changes as if they would occur at the aggregate level with shifts of hundreds of thousands of hectares, of cows and so forth. In the event it would not be like that although it might appear so to those like myself who pore over published census results. We have in the United Kingdom some 240 000 farm holdings plus 40-50 000 minor holdings which comprise small parcels of land or paddocks which even together have little agricultural significance but do add variety and interest to our countryside. Future land use patterns will be determined by commercial farmers, responding to new prices and policies, and every circumstance, and every set of decisions, and the timing will differ from others, all of which makes our task at this conference so problematical. We can only examine the trends and search for the most probable reactions amongst which would surely be ones affecting employment in the industry.

Economic pressures of the kind discussed would place before farmers the need to maintain cash flow and secure balance sheets if the businesses are to be perpetuated. Watching investment would be high on the list and already we are seeing a downturn in purchases of capital items. Another is to keep an eye on day to day inputs and we saw how feed bills were slashed after milk quotas in 1984. And then there is the labour bill. For years numbers of regular workers have been declining although the absolute fall now (about 4500 a year) is much less than in the 1960s. But if you believe the next decade will bring with it significant output cuts for major products then inevitably the farm labour force and numbers of ancillary sectors could start to fall more rapidly than in recent years. Much of this would no doubt be by "natural wastage", using today's jargon, but if structural change were more rapid than agriculture would obviously find itself employing fewer people and our dispersed rural economy would have to rely less on agriculture both as an employer and generator of employment.

I am quite unqualified to make judgements about the social desirability of all this (economists, I should add, value highly at such times this job demarcation) and it is, anyway, all very speculative. But these prospects you will, I am sure, wish to weigh as you examine the scope for forestry and the role it might play in sustaining a working population, particularly in those rural areas well away from urban areas.

Concluding Remarks

If production changes are to occur in the coming years then they would be initiated at the Community level with the impact felt in all member states. Our own farmers would therefore not be alone in searching for the "right" mix and level of output to sustain cash flow and hence their businesses. They would, however, continue to be in a competitive situation so that the higher their technical and economic efficiency the greater would be our agriculture's share of whatever new levels of Community output were required. That goal does not become irrelevant simply because we are envisaging curbs on production growth — indeed one could argue that it would become even more crucial.

At the farm level, which is where the decisions to curb production growth would be taken — unless dictated from above through a comprehensive network of quotas that would turn agriculture into a mini command economy — there would be the search for new land uses, but most responses would include a close watch on costs and in many cases more extensive farming of the land. Although one has heard dire warnings about large areas becoming unused this is surely a quite improbable prospect. I say this simply because there are some 240 000 separate decision centres and for many of these some land could well find itself less intensively used; in other words any impact would be widely dispersed. The consequences for land prices with a knock-on effect to the price of poorer grade land could of course create opportunities for new users which could include farmers, recreational organisations and indeed foresters.

We cannot, however, be certain when or on what scale these changes would occur. Agriculture remains, in spite of the complexity of the support system, an entrepreneurial and capitalistic industry striving to be ever more competitive to ensure the perpetuation of farm business. Because of this our agriculture has not only held but fractionally expanded

its share of Community output and it seems likely that farmers will, if at all possible, continue along this road. It is therefore probably a matter of ensuring that as wide a range of options as possible — including forestry — is put before them. They would then make the decisions and I think I would gamble that they would make the right ones.

Forestry: Always on the Land Left to Cain?*

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Abstract

The land use implications for four future options for the Common Agricultural Policy have been modelled. They involve:

- a. continuing present level of support;
- b. quotas on cereals and beef;
- c. price pressure;
- d. free trade.

The impact of such policies in producing land notionally surplus to requirements is assessed and its regional distribution is described. Some implications for the future location of forestry and woodland are then brought out.

The Genesis of the Reading Model

The study described in the paper was commissioned by the Department of the Environment, and the Development Commission. It looks at England and Wales only. The brief was nonetheless a wide one to examine the Countryside Implications of Possible Changes in the CAP and report in 6 months. The results are thus, inevitably, best seen as exploratory rather than definitive. Nonetheless we hope they move thinking about bringing forestry down off the hills along some distance.

The work built upon two established and tested systems for its model base. It is worth emphasising this in times of research retrenchment and talk of practical and "immediate" research. To be based soundly the latter requires that fundamental work has been properly done. In this case the pre-existence of years of painstaking work on both the Newcastle CAP model (Buckwell *et al.*, 1982; Harvey and Thomson, 1985; Thomason, 1985) and the Institute of Terrestrial Ecology's (ITE) Merlewood Land Classification was essential to the generation of quick, robust results. (Bunce *et al.*, 1981, Benefield and Bunce, 1982; Bunce and Smith, 1978).

The Study Team were based around the Centre for Agricultural Strategy (CAS) at Reading and directed by Professor Colin Spedding and Professor David Harvey. Full credit must be given to the Team as a whole (Annex 1) and, in the context of this paper, particularly to Mr D Edwards of Reading's Department of Land Management and Mr A Thompson who gave invaluable help with data analysis. Regrettably any errors and follies must remain my own responsibility.

Setting the Scenarios

The range of proposed solutions for the CAP is wide. (Bell, 1985, 1985a and 1985b give some of the land use perspectives which have informed this paper). Not unexpectedly, the proposed solutions tend to speak volumes about the perception of the problem. For the new libertarian right it is withdrawal from the CAP in favour of "a freely-competitive agriculture without internal subsidies or protection from outside competition, thus permitting consumers and the economy as a whole to reap the benefits of international comparative advantage — in short, a free market in agricultural products or, at least, the closest feasible approximation to it". This is the firm message of the critique by Howarth (1985) which I have described elsewhere as pithy and trenchant (Bell, forthcoming). One may not agree with Howarth's thesis, but you should read it. He would permit the continued payment of £120 million specifically to support the Less Favoured Areas (LFAs), as it "is not a lot to pay for maintaining the population and infrastructure of these areas in Wales, the Pennines, the Highlands and Islands". Our work is thus a little more Free Trade even than that, for the extreme option strips away Hill Livestock Compensatory Allowances with the rest of the aids.

*Acknowledgement is due to Mr Jeremy Wall of the European Commission's Forestry Group for suggesting the title.

With skilled proponents like Howarth and Sir Richard Body the decision to examine a Free Trade option requires little further justification. It is firmly on the political agenda. The work of stimulating critics like John Bowers and Paul Cheshire moreover, places great emphasis on the reduction of CAP support as a means of bringing farming back into line with the environment:

“The single most important change in agricultural policy from the viewpoint of conservation, and the starting point for the formulation of a more rational and socially acceptable agricultural policy, would be a reduction in the level of agricultural protection. This would entail, and indeed within the EEC would be achieved by, a fall in agricultural prices and hence incomes relative to those of industry. Decreased prosperity in agriculture would lead to decreased land prices and consequently to decreased intensity of exploitation of land and lower capital investment in agriculture. It is this intensity of exploitation, necessitated by high land values, which above all damages the environment and brings agriculture in conflict with other users of the countryside”. (Bowers and Cheshire, 1983.)

It is the same high land prices which keep out forestry in the present market place.

In a later reconsidered view Cheshire argues a little differently, and speaks of a need for “a social valuation” of agriculture including “the existence of a ‘rural’ way of life and farming community across Europe” (1985).

John Bowers has also clarified matters. He has written that although one might “identify some point in the past, a ‘golden age’, when these environmentally safe techniques (product mixes) were in use” if technology has moved on to develop new approaches “then replicating the price structure prevailing at that time will not take us back to environmental safety” (1984). Thus whilst I cast neither of them in the role, the crude farm impoverishment thesis has its disciples. For economists of a monetarist/libertarian stamp the argument that not spending money on the CAP actually *buys* conservation public goods has an understandable appeal. For like-minded politicians the fact that saving money may buy green-tinted votes has an equally understandable appeal. Thus, the Free Trade scenario sets the outer limits of the study on one hand.

On the other hand, none of us could envisage a CAP future with generally enhanced price or intervention support. The exigencies of various elections in European farming constituencies may lead to the UK’s partners fending off the inevitable; but a continuation of “Current Trends” for 5 years seems to set the alternative boundary to the removal of all support.

No pithy title is ever fully adequate and so — for the avoidance of doubt — it should be said in regard to “trends” that this specification of the Newcastle model envisages a further 5 years at the levels of 1984/85 aid and support. Thus prices are falling in real terms, but are outstripped by technological and structural change.

The Community may not be Buddhist enough to always bend with the wind, but one can at least expect it to find a middle way. Arguably more realistic scenarios were therefore modelled. Although time was short it was important to distinguish two quite different approaches to controlling surpluses: -quantitative restrictions and price pressure.

The former, Quota Scenario involves controls on cereals restricting production at the level of EEC self-sufficiency; prices remain at 1984 levels. The predictable shift towards beef would require quotas on that too. It is important to the land use questions that beef price remains constant, as one theoretical use for land would be sheep — but at constant prices there is no demand for further sheepmeat in such quantity.

Rather than straightforward price reductions we anticipate that the Commission would look to co-responsibility levies to fund the removal of surpluses. To the cereal producer, and his bank manager, it will still feel like Price Pressure and that is what the Scenario is termed. Again, to envisage a 15 per cent levy on cereal production is to perceive a good deal of land farmed at the economic margin shifting into beef. A 5 per cent levy on beef is therefore the corollary.

How the Model Works

Over the last decade or so my colleagues at ITE — notably Dr Bob Bunce and Mr Colin Barr — have set out to answer one of the fundamental cadastral problems. How do we produce an accurate and robust impression of what is happening in British land use, without prohibitively expensive widespread surveys?

They went back to basics in a project beginning in 1975 which sought to distinguish different areas of Britain according to their fundamental environmental parameters. ‘Environmental’ in this sense does not imply any meaning. Some 288 relatively unchanging attributes relating to such factors as climate, altitude, topography, geology and existence of some human artefacts such as roads were map read and fed into the computer. Multivariate analysis then divided them into the 2, then 4, then 8 etc areas most unlike each other. This dichotomous process was terminated at 32 classes when that was felt to be as many as could be usefully handled.

The central 1 km² at 15 x 15 km intervals (1228 squares) was map-read in this way, and thus allocated to its “Land Class” whilst providing the data for sub-division. The analysis identified which of the attributes were the key indicators to assign any other grid square more rapidly. To improve knowledge of the distribution and proportionate spread of the Land Classes a further 4826 squares were then allocated to their Classes; giving a total of 6040 squares for Great Britain. Examples of the distribution of Classes are given in Figures 1 and 2.

Figure 1

LAND CLASS TEN

TOPOGRAPHY

Mean max altitude (m)	.....	113
Mean min altitude (m)	.....	77
Altitude class	0- 76m	36
(mean	77- 198m	57
percentage	199- 488m	6
area)	489-1189m	—
Slope	(°)	2

CLIMATE

Mean min temp January	(°)	0.5
Mean max temp July	(°)	20.3
Mean soil deficit	(mm)	9.6
Mean annual rainfall	(mm)	7.1
Mean snowfall	(days)	31.5
Duration bright sunshine	(hrs)	5.2

SOILS

Mean pH	.....	5.7
Mean loss on ignition (%)	.....	8.2
Percentage of total area		
Brown earths	.....	22.5
Rendzinas	.....	—
Gleys	.....	52.5
Gleyed brown earths	.....	12.5
Brown podsollic soils	.....	2.5
Rankers	.....	—
Calcareous brown earths	.....	—
Peaty podsols	.....	—
Podsols	.....	5.0
Peaty gleys	.....	5.0
Peats	.....	—

LAND USE

Percentage of total area		
Wheat	.....	15.0
Barley	.....	13.1
Other Crops	.....	5.8
Horticulture	.....	0.9
Leys	.....	19.0
Permanent grass	.....	15.2
Rough pasture	.....	—
Bracken	.....	1.2
Rushes	.....	—
Moorland	.....	4.3
Peatland	.....	—
Mountain grass	.....	—
Woodland	.....	11.3
Cliffs/sand/mud	.....	—
Built-up	.....	9.8

NATIVE SPECIES

Percentage cover of major species		
Perennial rye grass	.....	14.7
Ling heather	.....	2.8
Common bent	.....	2.4
Purple moor grass	.....	—
Yorkshire fog	.....	3.5
White clover	.....	3.9
Cocksfoot	.....	0.9
Matgrass	.....	—
Bracken	.....	0.8
Created dogstail	.....	1.3
Italian rye grass	.....	1.4
Timothy	.....	2.0
Deer grass	.....	—
Sheeps fescue	.....	—
Creeping bent	.....	1.6

LANDSCAPE

Complete hedges	
Hedges and gaps	
Hedgerow trees	
Vernacular (local)	
Slate roofs	
Tile roofs	
Farmhouses	
Barn/Shippon (Vernacular)	



Figure 2

LAND CLASS SEVENTEEN

TOPOGRAPHY

Mean max altitude (m)	.....	406
Mean min altitude (m)	.....	276
Altitude class	0- 76m	—
(mean	77- 198m	4
percentage	199- 488m	88
area)	489-1189m	8
Slope	(^o)	8

CLIMATE

Mean min temp January	(^o)	1.6
Mean max temp July	(^o)	20.8
Mean soil deficit	(mm)	4.6
Mean annual rainfall	(mm)	14.8
Mean snowfall	(days)	28.7
Duration bright sunshine	(hrs)	5.2

SOILS

Mean pH	.....	4.9
Mean loss on ignition (%)	.....	19.7
Percentage of total area		
Brown earths	.....	52.5
Rendzinas	.....	—
Gleys	.....	5.0
Gleyed brown earths	.....	2.5
Brown podsollic soils	.....	15.0
Rankers	.....	2.5
Calcareous brown earths	.....	—
Peaty podsols	.....	2.5
Podsols	.....	12.5
Peaty gleys	.....	7.5
Peats	.....	—

LAND USE

Percentage of total area		
Wheat	.....	0.5
Barley	.....	0.8
Other Crops	.....	3.2
Horticulture	.....	—
Leys	.....	21.5
Permanent grass	.....	35.0
Rough pasture	.....	9.5
Bracken	.....	1.8
Rushes	.....	3.1
Moorland	.....	4.2
Peatland	.....	—
Mountain grass	.....	2.0
Woodland	.....	15.2
Cliffs/sand/mud	.....	—
Built-up	.....	2.8

NATIVE SPECIES

Percentage cover of major species		
Perennial rye grass	.....	14.5
Ling heather	.....	2.3
Common bent	.....	15.1
Purple moor grass	.....	1.1
Yorkshire fog	.....	4.1
White clover	.....	3.5
Cocksfoot	.....	3.9
Matgrass	.....	2.5
Bracken	.....	2.0
Created dogstail	.....	7.8
Italian rye grass	.....	—
Timothy	.....	0.8
Deer grass	.....	—
Sheeps fescue	.....	1.8
Creeping bent	.....	0.8

LANDSCAPE

Barbed wire fences
Sand/gravel bottom streams



Eight random squares from each of the 32 classes (256 squares) were visited in 1978 and 1984, and a detailed field survey carried out. Some early results of this work have been published as an interesting report on Landscape Change. (Barr *et al.*, 1986). The sward composition, stock present, boundaries, crops and all tree cover were only some of the data collected. The method had worked insofar as the limited sample produced figures comparable with June Returns and other independent sources. For an earlier study of Land Availability for Wood Energy Production, Richard Tranter of CAS has allocated appropriate Gross Margins to each separable parcel of land. This exercise was updated to 1984 values, as the ITE framework was to prove a key element of what we came to call the Reading Model. It provided a unique method of allocating agricultural production to its regional location. Whilst we know what the total national production — and its general area distribution — was in 1984, the next question was what would it be under various assumptions?

The parameters of output for the study were provided by figures from the well know model of the Common Agricultural Policy (CAP) constructed at Newcastle University. One of the principal architects, David Harvey, is now Professor of Agricultural Economics at Reading and provided the crucial link to a beast capable of appraising the international linkages and elasticities of production within the CAP.

The Newcastle model was run for the 4 scenarios, and generated figures for how much output Britain could reasonably expect to produce under the stated assumptions. These figures are given as Table 1 to 4 as they provide a vital element in the modelling process. Informed individuals will doubtless have their own views of what might happen under the scenarios discussed. One value of good modelling is, of course, that assumptions are stated clearly and this helps quantify vaguer thought. There are elements of the predicted national outputs which may be initially surprising — sheepmeat output does not increase despite price pressures or quotas on beef — because the elasticity of consumption for sheepmeat is seen as limiting.

In circumstances where popular belief is that restraining cereals and beef will lead to sheep swarming across the lowlands, this tends to indicate that non-agricultural uses such as forestry will have their place. It should hardly need saying but it also illustrates that a model is a formal tool to aid expert consideration, not a substitute for it.

Table 1 *Current trends scenario*

Product	% change in output	% change in price
Wheat	+31.2	n/a
Barley	+11.3	n/a
Total cereals	+22.0	n/a
Beef and veal	nc	n/a
Sheepmeat	+10.4	n/a
Total livestock (excluding milk)	+ 3.0	n/a
Milk and products	nc	n/a
Total	n/a	n/a

Table 2 *Free trade scenario*

Product	% change in output	% change in price
Wheat	+15.9	-15.0
Barley	+10.5	-32.0
Total cereals	+ 4.5	-22.0
Beef and veal	-43.0	-41.0
Sheepmeat	-54.0	-57.0
Total livestock (excluding milk)	-20.0	-40.0
Milk and products	-20.0	-32.0
Total	n/a	-32.0

Table 3 *Price pressure scenario*

Product	% change in output	% change in price
Wheat	-10.3	-15.0
Barley	-10.5	-15.0
Total cereals	-10.3	-15.0
Beef and veal	- 6.0	-15.0
Sheepmeat	nc	nc
Total livestock (excluding milk)	- 6.7	- 2.1
Milk and products	nc	nc
Total	n/a	- 4.8

Table 4 *Quotas scenario*

Product	% change in output	% change in price
Wheat	-39.0	nc
Barley	-18.0	nc
Total cereals	+ 4.5	nc
Beef and veal	-43.0	nc
Sheepmeat	-54.0	nc
Total livestock (excluding milk)	-20.0	nc
Milk and products	-20.0	nc
Total	n/a	nc

Running the Model

The ITE records distinguish 72 land uses within sampled areas. Some such as woods, roads and open water could be discarded — except for telling the model to exclude these from the agricultural area. On the farmland there were allocated as appropriate, 15 arable crops, each with three yield levels relevant to different parts of the country. Eighty livestock activities were included; that is four enterprises, with five yield levels on four different grass/herbage groups. Although labour costs and variable costs such as seed, fertiliser, sprays and so forth were calculated separately controlling the sheer size of the model meant consolidating these into two: fertiliser cost and other variable cost.

Put in straightforward terms the Reading Model's task was to maximise agriculture's overall gross margin within the land available to it; and to do this given the range of different assumptions used in the scenarios. Naturally, sensible restrictions had to be imposed on the allocations. For example only a limited amount of present grassland could reasonably support arable crops. Similarly, sugar beet and potato cropping had to be specifically blocked as options and limited by quotas and the availability of factories to take the produce.

Optimised 1984 Output

The driving force in the model was therefore an economic one, and indeed necessarily a gross margin return — not whole farm economics. Anyone dealing on a day to day basis with our fascinating national land use pattern, will need no telling that this is something of a simplification. It may be one of the crucial elements in the forestry/land equation. Some land is constrained well below its theoretical capacity; urban fringes are probably the classic example in this disastrously destructive country. Some land is intentionally held to be 'underfarmed', and we value it the more for it. The National Trust, Royal Society for the Protection of Birds and many private owners use their land in conservation-sensitive ways. On top of all this, there is simply sub-optimal use for a host of personal, timeliness, capital investment, management and similar reasons. As Lazenby and Doyle's expert assessment concluded unequivocally. "Despite cost advantages, grass resources in the UK are considerably under-used" (CAS, 1981.) What, however, is the hectare equivalent of this underuse?

In order to make a fair comparison, it could not be right to look at the optimum pattern of future land use after, say, quotas without first finding out where the model would choose to locate today's production on the available land. This 'optimisation' run produces what may be one of the most important figures to emerge, in the context of the forestry debate. Some 900 000 hectares of England and Wales were notionally unnecessary in 1984 to produce that year's output whilst maximising gross margin. At the same time overall gross margin was only increased by some 1.7 per cent after discarding all that land — and its occupiers. We will consider some implications of this finding in the final section. In a situation where some people are forecasting the 'inevitable' availability of land for wood plantations in a future of declined CAP support it gives pause for thought to ask rather why the land is not coming forward now. For there would seem to be no immediately discernible reason why price pressure alone will shake land out into forestry on a large scale, rather than into further 'underfarming'; unless it be via a collapse of the land market in areas less desirable to adventitious potential purchasers with money from other areas of the British economy.

The Model Results

The focus of this paper is on the possible generation of land for other uses; how much and where. The benefit of using the grid squares basis for modelling thus shows up particularly. By assessing what combination of squares, representing what Land Classes and thereby what special mix of land uses fall within given boundaries, it is possible to generate results for any large-scale areas desired. Margins of statistical error exclude areas which are too small. In the study we considered individual national park areas. Such results should be regarded with due caution. The principal working tool was the standard region (illustrated in Figure 3); but work was undertaken specifically to recode the model to generate results on the basis of three different, potentially important designations.

- Less Favoured Areas (LFA) sub-divided into the original Severely Disadvantaged Area, and the February 1984 extension.
- The areas designated as Rural Development Areas (RDA) by the Development Commission in England in consequence of a suite of factors representing social disadvantage.
- National Parks as the principal environmental designation, and likely to be of policy importance in restricting what land should shift into forestry.

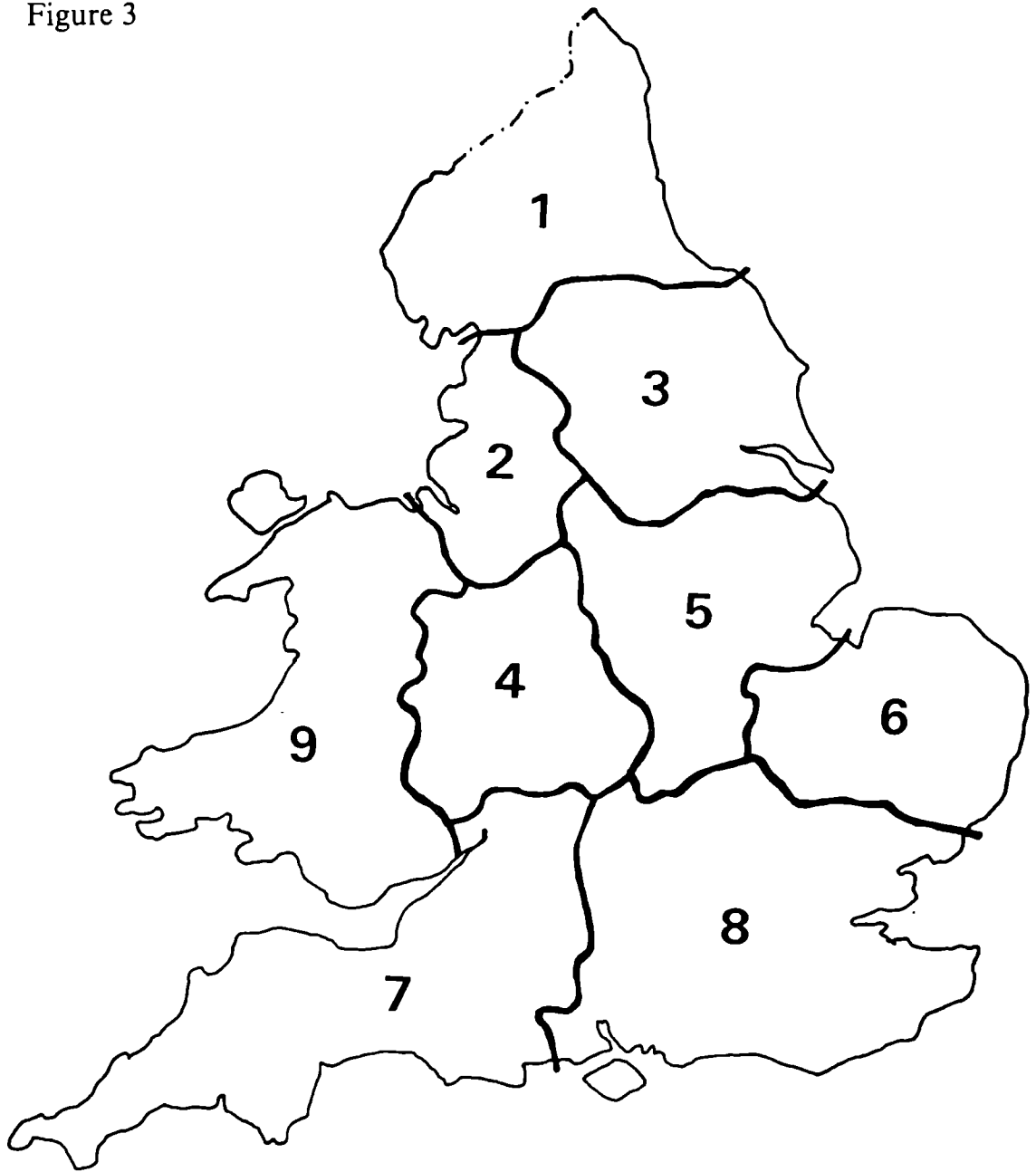
The initial set of Figures (4 to 8) illustrate five main crop and stock uses, and the proportion of Low Gross Margin (LGM) land sub-divided by regions. An additional scenario is included which was examined briefly; that involving a tax on fertiliser. Each of the changed scenarios is compared with the "base line" of the optimisation run described above; in the graphs it is shortened to Best 84, a somewhat pithier description. All cases are presented for the reader's information and use. It may be most appropriate however to concentrate on the Price and Quota Scenarios as most likely options.

At the time of writing these figures are being submitted to government. By the time of the conference many aspects of them will, doubtless, have been widely discussed. In our context today certain commodity points may, nonetheless, merit a little repetition.

- Under Free Trade assumptions the overall cereals acreage increases as the prices of wheat and barley are closer to world prices, than in beef or milk for example. Thus the regions with greater emphasis on those latter commodities find themselves under greater pressure.
- As the transferability of quotas is assumed then fundamentally good land in East Anglia, for example, (Block 6) can 'steal' quota from less blessed regions like the South-West (Block 7) to increase its dairy area, or from Yorkshire/Humberside (Block 3) to increase its beef.
- Dairying is the example of top quality grass exploitation. The low cost grasslands of the South-West (Block 7) under price pressure continue to support dairying, beef and sheep at reasonable levels and the area of Low Gross Margin land actually declines compared to optimising land use at today's prices.

Focusing on the most relevant figure — that of low gross margin land — immediately calls attention to the East Midlands as representative of the land marginal between cereals and stock, but perhaps without overwhelming advantages in either. There are many factors — such as good farm structure and differential indebtedness — which may mean that such land does not in fact immediately fall out of production if price support declines, or quotas are imposed; and more than it is going out of production now despite showing up as land 'unnecessary' on an optimal view of 1984 production levels. Only limited categories of low productivity grassland actually go negative on gross margin predictions under price pressure. The relationship with overall farm costs will be most important; but the general lesson seems instructive and indicative — not least as it chimes in with commonsense. The hills are supported by Compensatory Allowances, the very best land will remain in agriculture, the pressure is likely to be on the land not

Figure 3

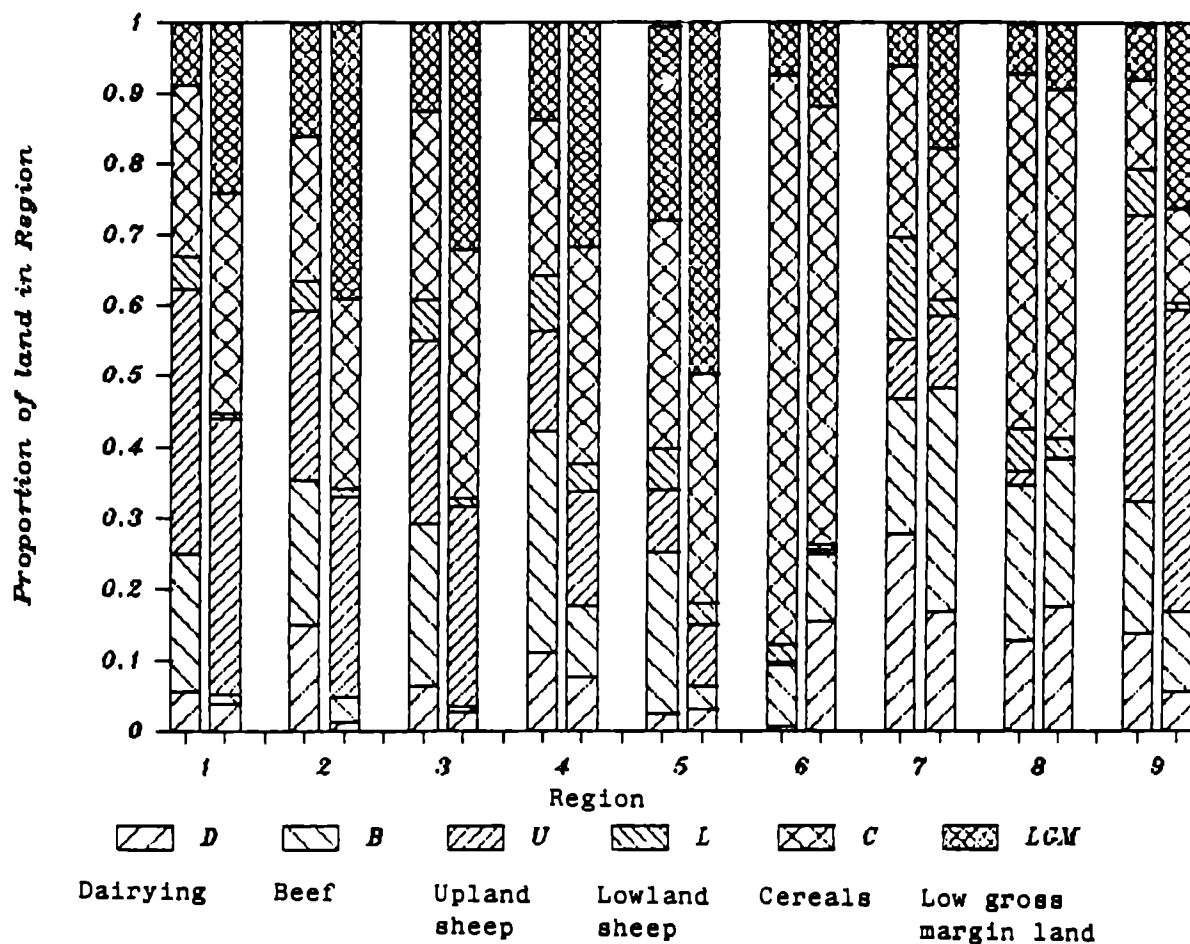


COUNTY GROUPS

- | | |
|-----------------------------|----------------|
| 1. North | 6. East Anglia |
| 2. North West | 7. South West |
| 3. Yorkshire and Humberside | 8. South East |
| 4. West Midlands | 9. Wales |
| 5. East Midlands | |

Figure 4

Regional land distribution between farming systems: Best_84 versus Free_Trade_scenario



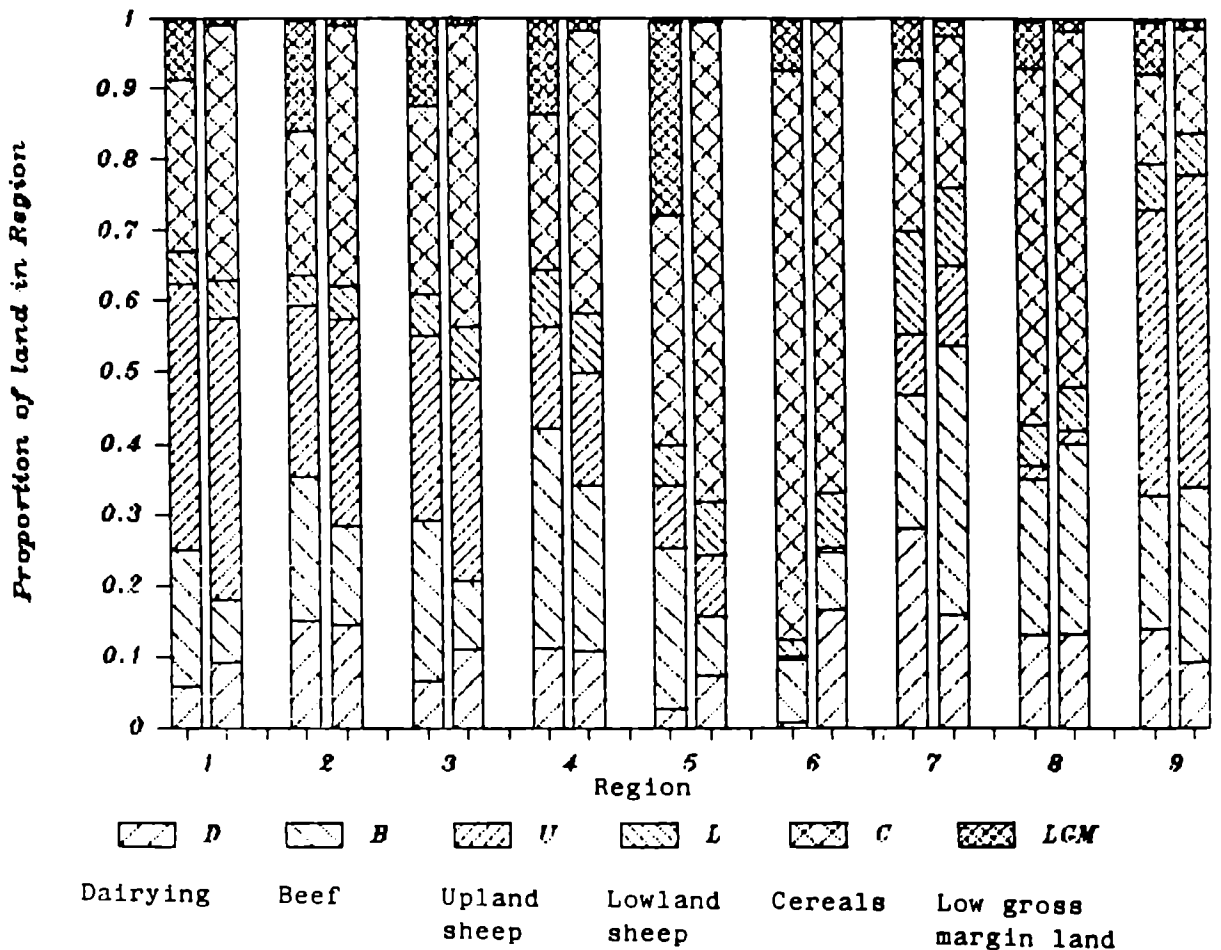
1-North
2-North West
3-Yorks & Humberside

4-West Midlands
5-East Midlands
6-East Anglia

7-South West
8-South East
9-Wales

Figure 5

Regional land distribution between farming systems: Best 84 versus
Current trends scenario



1-North

2-North West

3-Yorks & Humberside

4-West Midlands

5-East Midlands

6-East Anglia

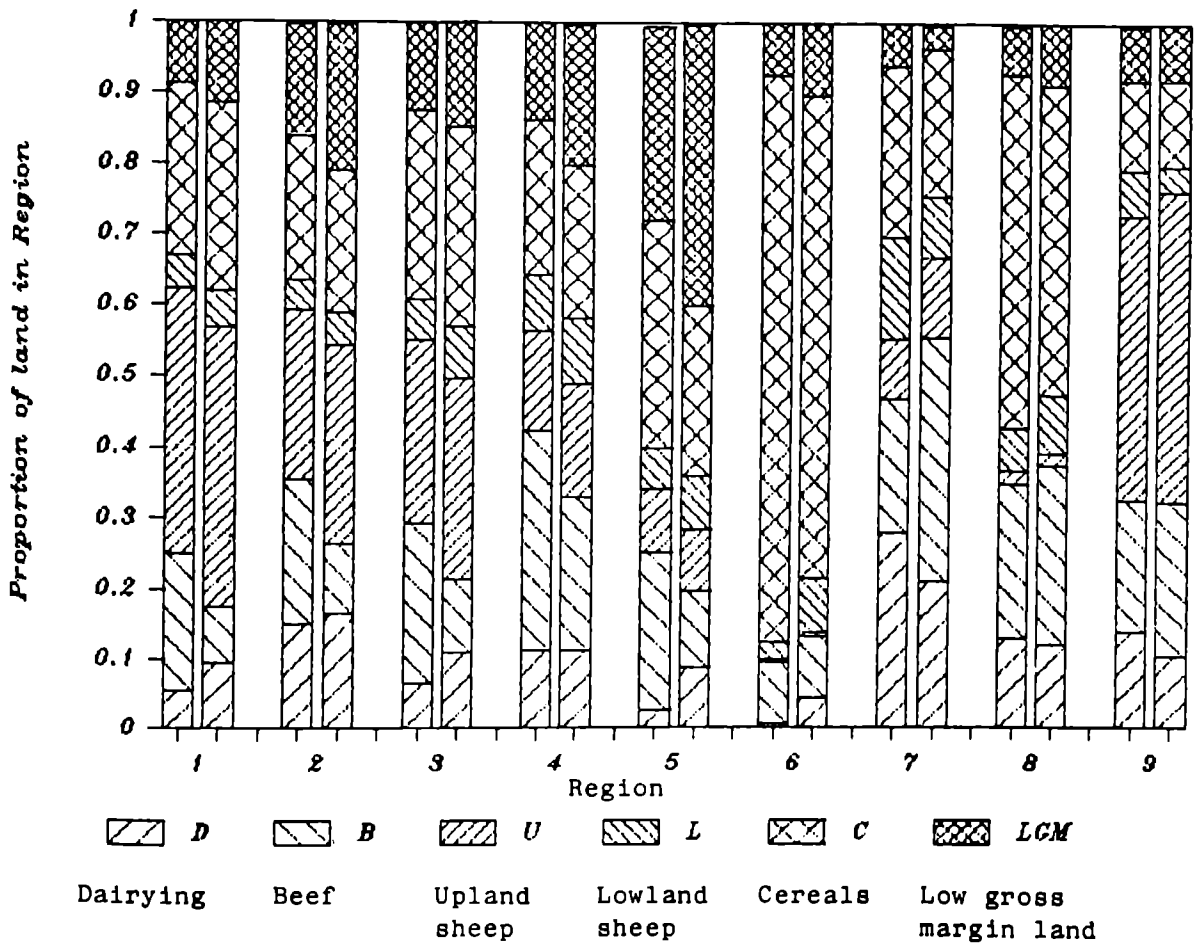
7-South West

8-South East

9-Wales

Figure 6

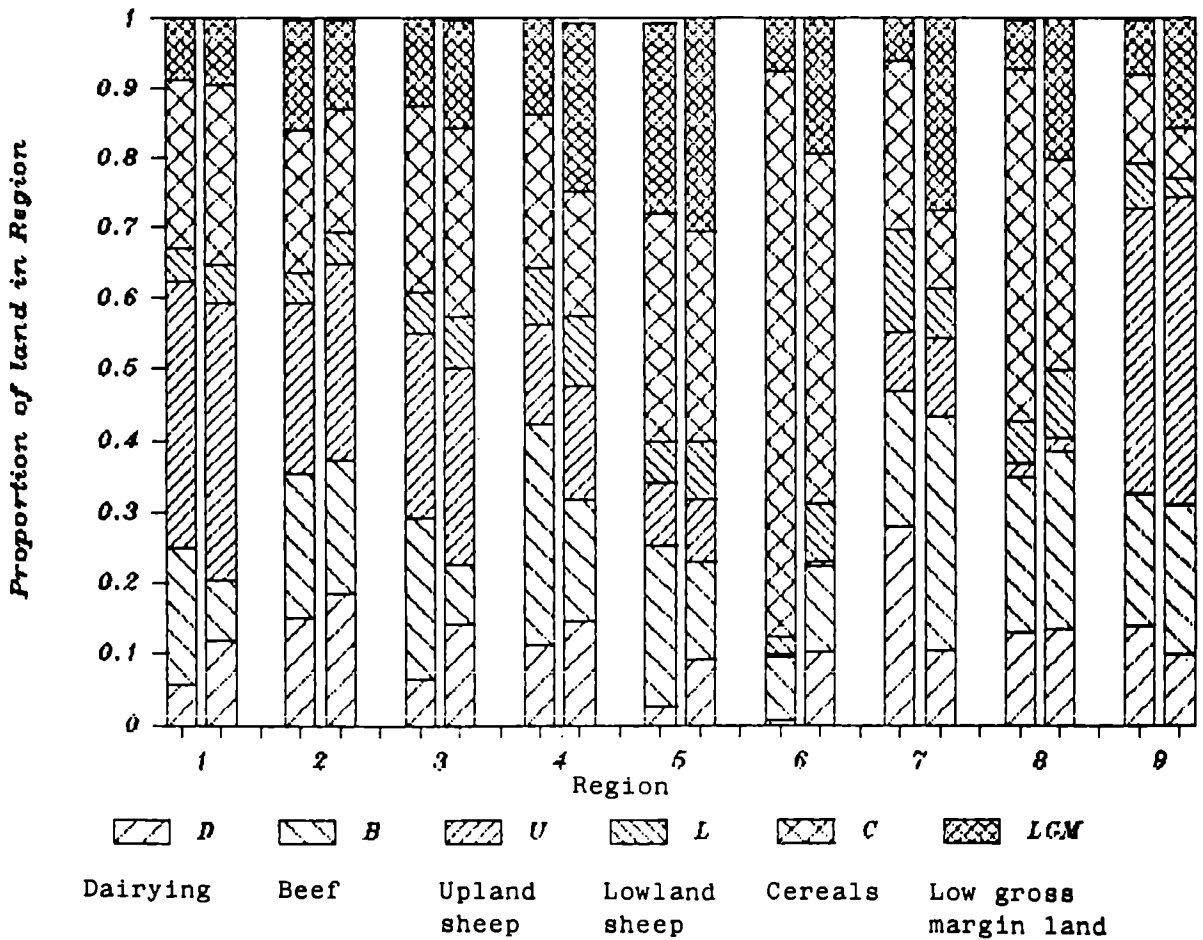
Regional land distribution between farming systems: Best 84 versus Prices scenario



1-North
 2-North West
 3-Yorks & Humberside
 4-West Midlands
 5-East Midlands
 6-East Anglia
 7-South West
 8-South East
 9-Wales

Figure 7

Regional land distribution between farming systems: Best 84 versus Quotas scenario



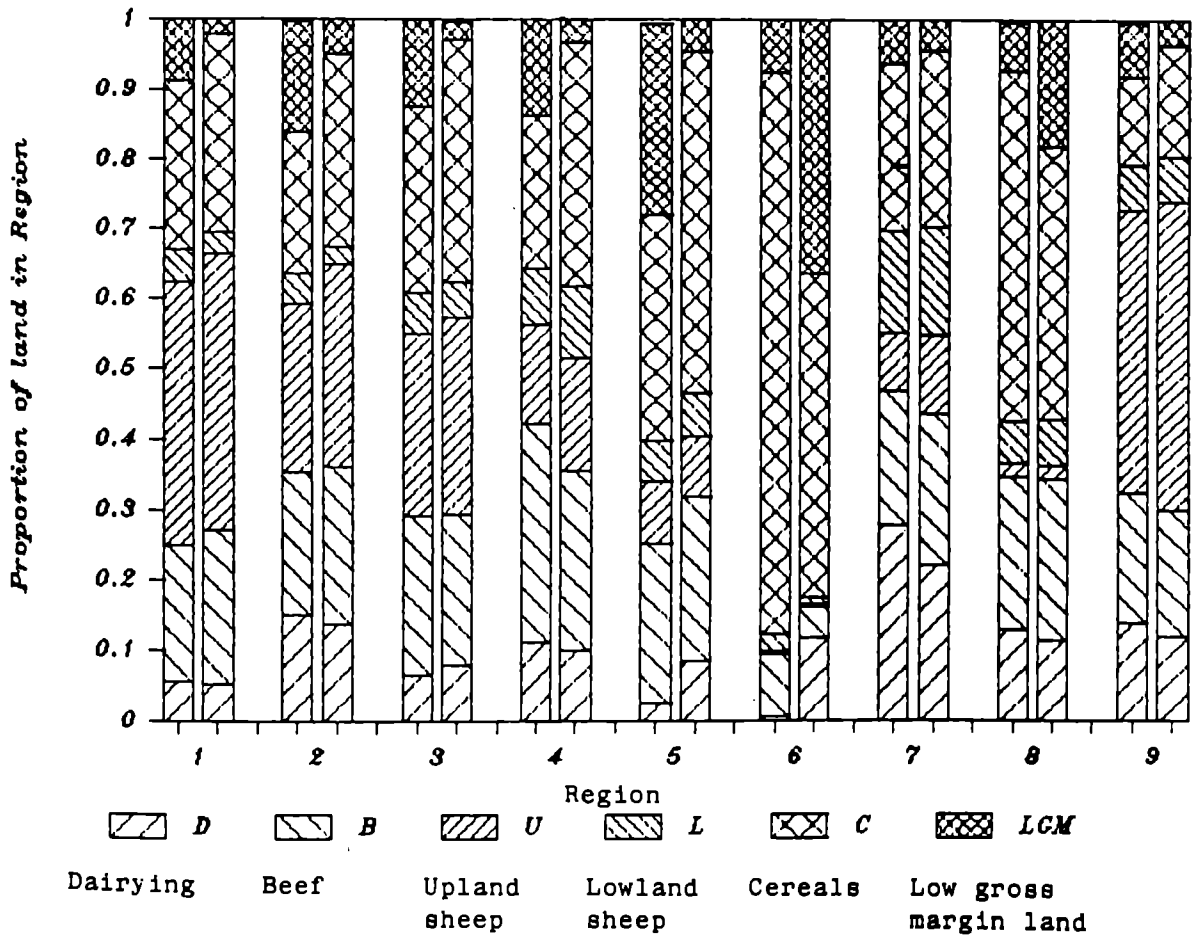
1-North
2-North West
3-Yorks & Humberside

4-West Midlands
5-East Midlands
6-East Anglia

7-South West
8-South East
9-Wales

Figure 8

Regional land distribution between farming systems: Best 84 versus a Fertiliser Tax



1-North
2-North West
3-Yorks & Humberside

4-West Midlands
5-East Midlands
6-East Anglia

7-South West
8-South East
9-Wales

especially suited to either stock or arable cropping, and which does not have the benefit of especial conservation status such as to attract a PRETTI:

- P Payment
- R Reflecting
- E Environmental Sensitivity
- T Traditional Farming
- T Toleration of Recreation or
- I Integrated Development.

We chose to call such residual land Low Gross Margin because it was the Team's considered view, after taking a range of helpful expert opinions at seminars, that most of this land would not become abandoned, derelict or automatically go out of agriculture. A range of policy instruments and initiatives are bound to intervene. For example, even if we leave aside the extreme case of Free Trade, on Quota assumptions the model requires some 128 000 hectares of land less in the National Parks than is being used at present. What it particularly does not need is often the cropped or beef grazing areas. Other places can do it better. Hill sheep land has no alternatives and remains carrying its flock (the support may be more important in maintaining the flockmasters). It is difficult, however, to foresee a position whereby foresters would be allowed to plant up the valley bottoms, in-bye and ffridd of National Parks. Just as under Free Trade assumptions most of the North Yorkshire Moors go under cereals, one suspects policy elements would intrude. A little judicious commonsense is called for.

Some Considerations in the Development of Policy

The figures for low gross margin land thrown up by the Reading study may well have become received wisdom by the time this paper is read although the submitted study tends to use proportions to avoid attachment to indicative levels. In round figures they are:

- 2.2 million hectares under the Free Trade Scenario
- 1.9 million hectares under a Quota Scenario
- 1.3 million hectares under a Price Restraint Scenario.

The details are set out in Figures 9-11.

These may have replaced the generalised allusions to "a county the size of Devon" or similar going out of farming which appear regularly in popular commentaries. It may well prove better however to regard this LGM land as the "hectare equivalent of the potential reduction in intensity which could occur over the whole land base".

To be a little controversial let us look at it from what may be the most pessimistic side from a forestry view point. Put aside dreams of 2 million plus hectares waiting to be planted. Consider the Price Restraint Scenario and recollect that the true comparison is with the 0.9 million hectares notionally surplus *at present*. We are then only talking of some 400 000 hectares net. Let us try the roughest of back-of-the-envelope calculations, albeit doubtless with double-Assume:

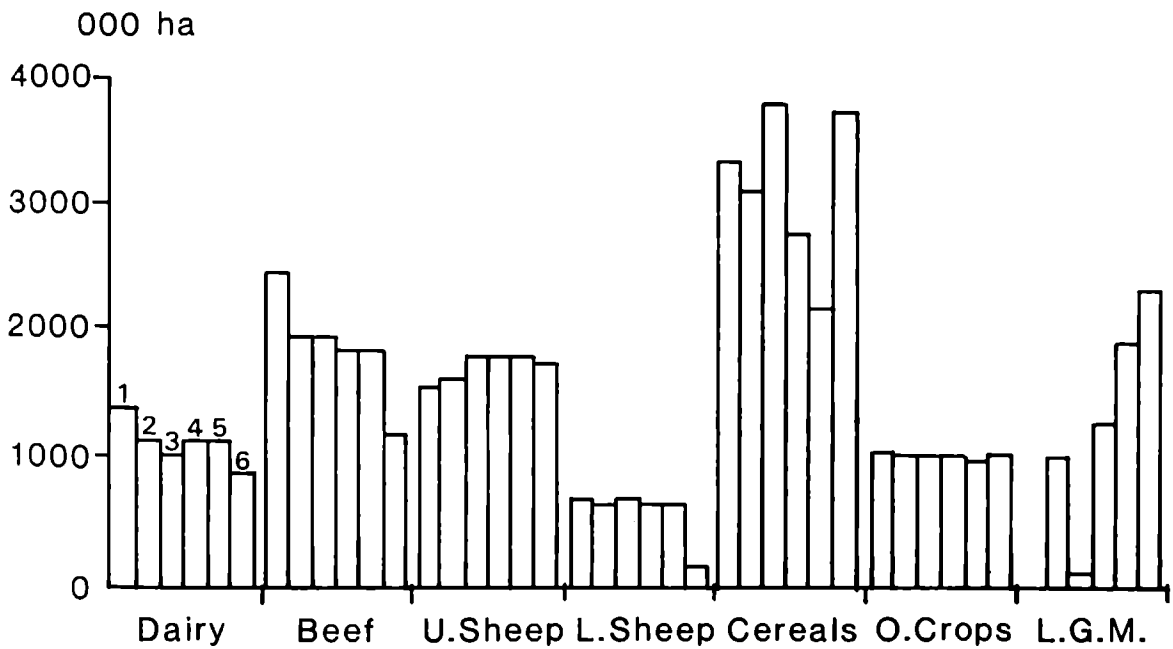
	ha
— An easier line is taken on low density development, science parks, recreational provision etc. The land could still be used in a national emergency; therefore urbanisation at 20 000 hectares p/a for 5 years	100 000
— Cheaper land means a far easier acquisition programme for conservation, lower returns mean cheaper management agreements; conservation take up	75 000
— Cheaper land and marketing by agents brings affluent outside money in to buy a good house with land; home fields are turned into parks, outlying fields share-farmed. 500 people buying 200 hectares, or 1,000 people buying 100 hectares is still	100 000
— EEC "extensification" contracts, short-term set aside, land left idle seeking planning consent, alternative crops such as oilseeds, protein, maize, fine wool, deer, vines or herbs, farmers in tourism and leisure keeping land attractive and walkable for visitors could soon mop up	100 000
	375 000 ha

Forestry can have all the Remaining

One way of putting it is that if forestry wants land "spare" then a quota option would seem advantageous. Rather more broadly it might be put that one needs to consider the mechanisms whereby land would be translated from agriculture into other uses. Under a quota scenario it is not too difficult.

Figure 9

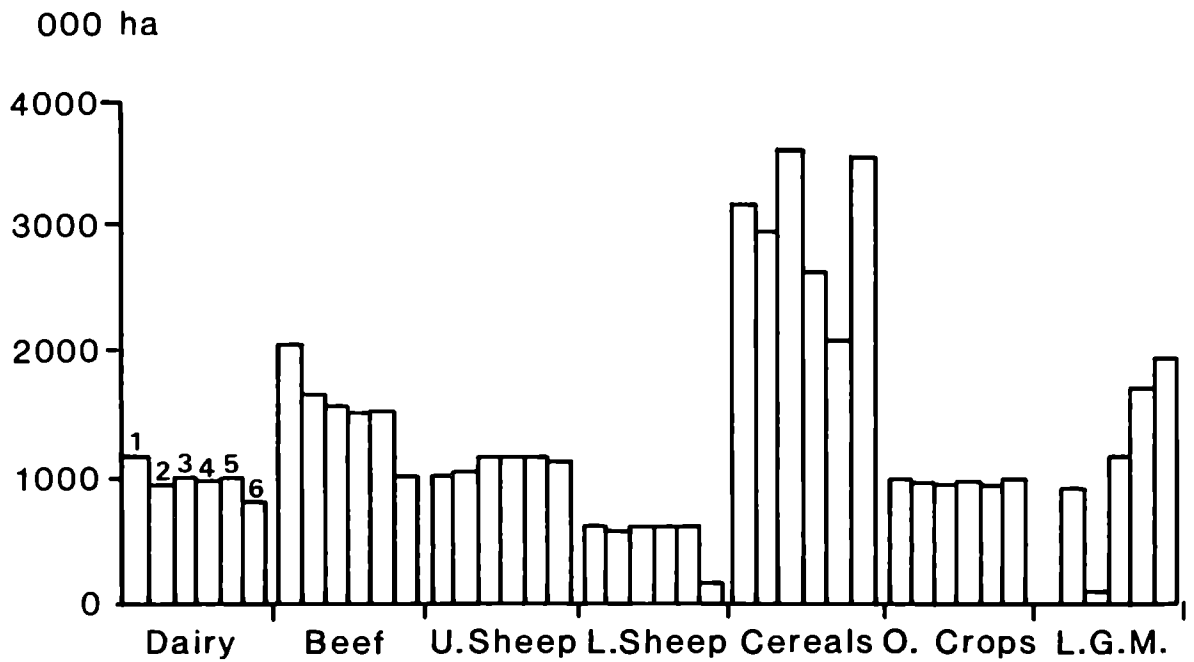
Aggregate Land — Use Results for England and Wales



- 1 Actual 84
- 2 Best 84
- 3 Current Trends
- 4 Prices
- 5 Quotas
- 6 Free Trade

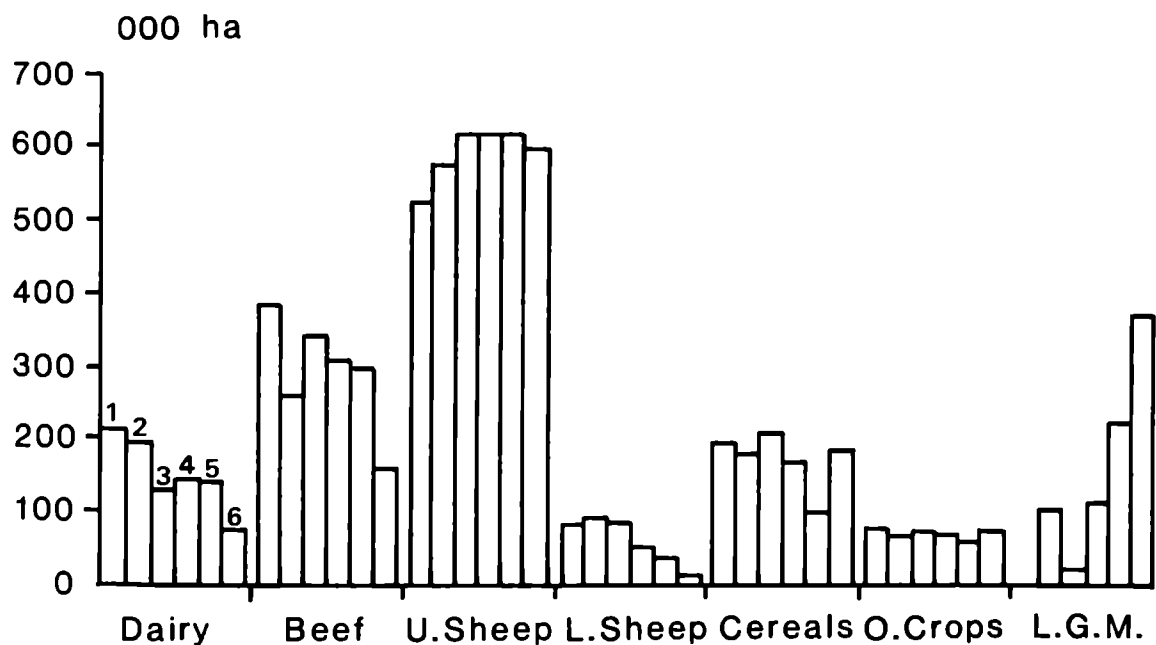
Figure 10

Aggregate Land — Use Results for England



- 1 Actual 84
- 2 Best 84
- 3 Current Trends
- 4 Prices
- 5 Quotas
- 6 Free Trade

Aggregate Land — Use Results for England



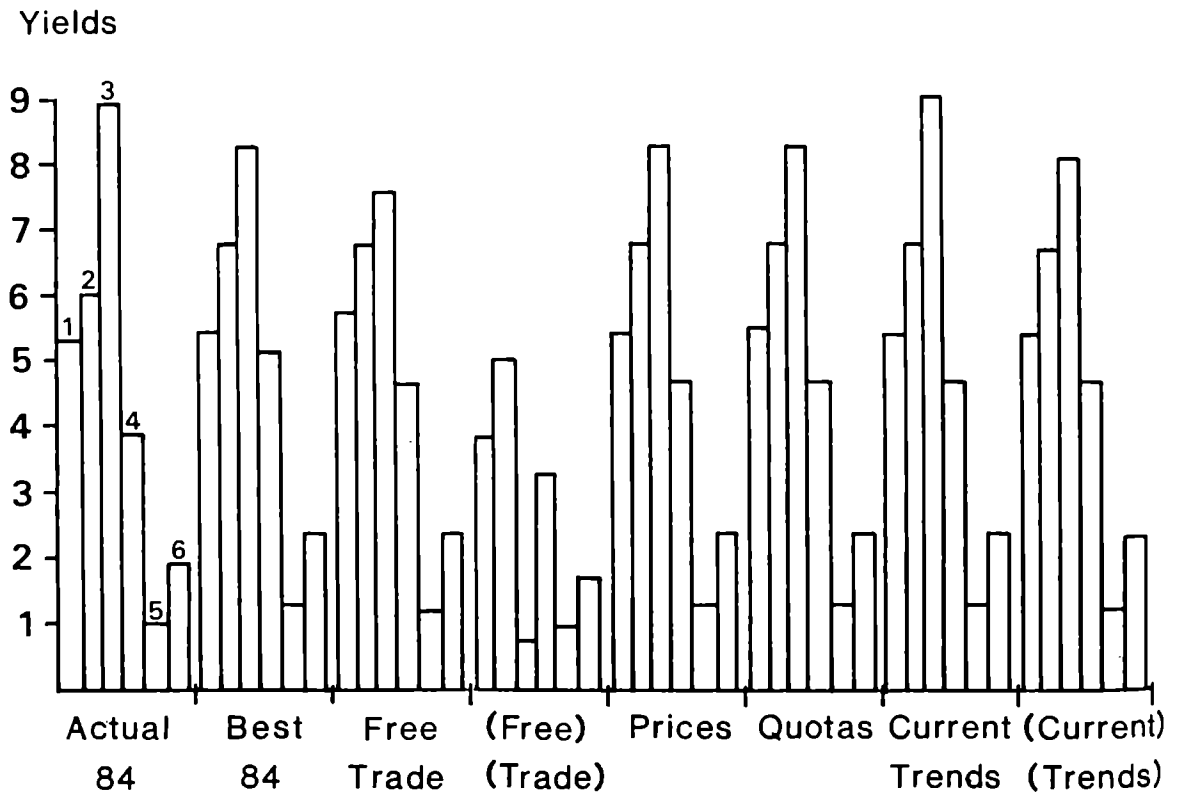
- 1 Actual 84
- 2 Best 84
- 3 Current Trends
- 4 Prices
- 5 Quotas
- 6 Free Trade

The situation would leave land which could not legally produce for commercial sale potatoes, sugar beet, milk, cereals or beef. Some of that land will assuredly look towards forestry.

Nonetheless it is far from certain that the market alone will deal with the allocation questions (whatever “market” means when both farming and forestry operate within policy determined frameworks of finance and fiscal policy. Figure 12 sets out the results of ‘forcing’ the model to use all the land in the two boundary-setting cases of Current Trends and Free Trade. The bracketed titles show the differential yields when National Gross Margin is optimised employing that land. Unless forestry can convince more people that it offers conservation advantages on the one hand, and rural employment advantages on the other, then two politically germane trends of thought are against it. Extensive farming may have more friends.

Changes in Intensity of Production

Figure 12



- 1 Barley tonnes per ha
- 2 Wheat tonnes per ha
- 3 Lowland Sheep per ha
- 4 Upland Sheep per ha
- 5 Beef Lsu per ha
- 6 Dairy Cows per ha

An Approach to Forestry Location

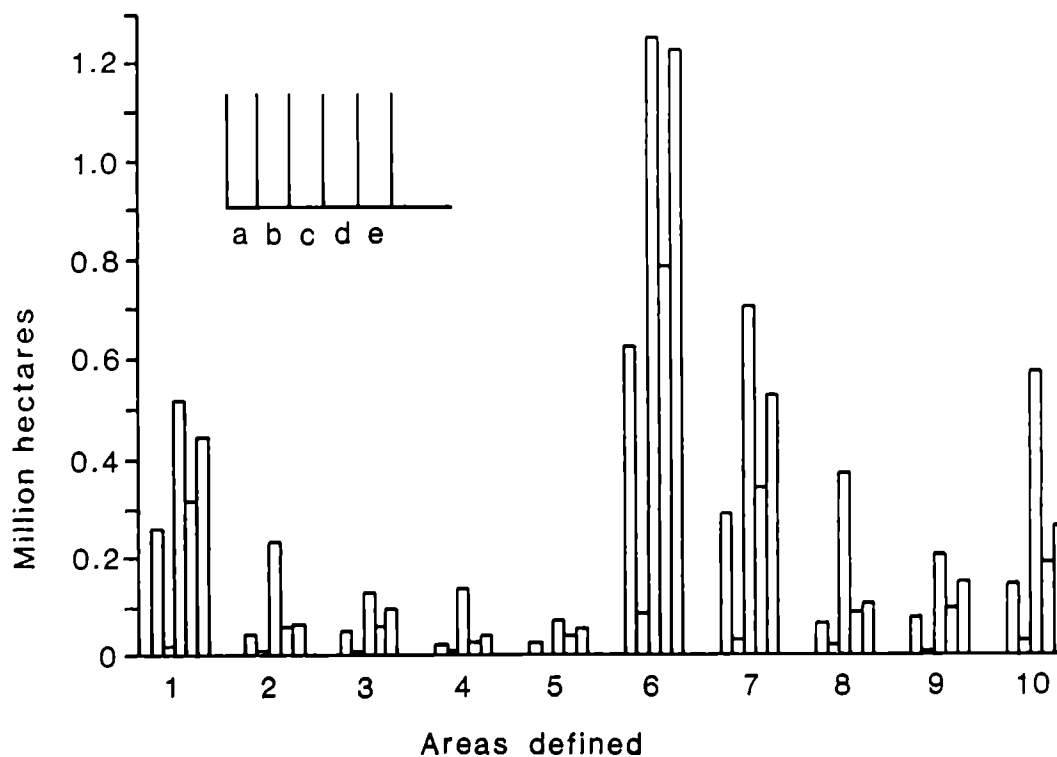
To this unabashed pragmatist with a vision of a working, lived in countryside which includes its precious places and room for wildlife then the Reading study suggests a mixed bag of policy initiatives. Whilst we do not want all the forest in one place, and need to retain policies aimed at the whole countryside, we are increasingly in a position to consider focussing the rural development efforts. Some main elements in a future policy package might then be:

- A continuation and refinement of 'amenity' tree planting grants such as the present Broadleaved Woodland Grant Scheme, and Countryside Commission assistance.
- A continuation and refinement of commercial aid arrangements such as the Forestry Grant Scheme including taxation elements; market forces can then pick out the normal commercial sites subject to conservation and related restraints.
- Enhanced usage of EEC funds both to relieve the national exchequer and to assist in the management of existing woods. Some woodland can then come about using the opportunities of pre-pension and related surplus reduction schemes.
- Drawing on the Reading Model and related work to introduce a new element which targets certain marginal lowland areas for particular integrated aid. This might involve combined work by the sponsors of this Conference, the EEC and the Development Commission in England/ Development Board for Rural Wales to plan, attract and assist wood based industries and outlets to those areas where pure agriculture (and farming employment) are particularly likely to come under pressure. Conservation, public recreation and amenity, as well as commercial sporting reasons, might argue for a concentration of planting efforts in the often accessible farmed lowlands and margins of England and Wales. We should presumably be planning now to begin the marketing and training build-up, by improved utilisation of existing woods thus giving yeomen and tenants alike a reason to start knowing a little more about farming trees. The specific use may be agro-forestry, wood energy, coppice or standard commercial rotation — that it outside this author's brief, at present; but a range of uses, regionally based, would seem to offer attraction in utilising different types and ages of timber. Forestry Enterprise areas perhaps.

Figure 13 sets out the LGM land in various combinations of disadvantaged area. If we focus on blocks 1 and 7 at present we see defined Rural Development Areas, already suffering economic handicap, faring especially badly. And over ½ million hectares, it might appear, under a Quota Scenario which could be spared readily from agriculture. With imagination and vigour we must be able to use forestry as a tool to help those areas thrive better. There can be few finer challenges for countryside policy over the next quinquennium; to use our land to produce what we need, avoid dereliction, enhance amenity and recreation, but perhaps above all, do it in the identifiable places where it helps retain rural population and enhances the opportunities of disadvantaged localities. If our study contributes to that we will be well pleased.

Figure 13

**Low gross margin land in the RDAs and LFAs:
comparing policy scenarios**



- a Best
- b Current trends
- c Free trade
- d Prices
- e Quotas

The combination of Less Favoured and Rural Development areas shown are:

1. RDA land only — not including land also designated RDA.
2. Original LFA land only — not including land also designated RDA.
3. Extended LFA land only — not including land also designated RDA.
4. Land defined as both RDA and original LFA.
5. Land defined as both RDA and extended LFA.
6. Land falling outside either definition.
7. All land in RDAs.
8. All land in original LFA.
9. All land in extended LFA.
10. All land in the LFAs combined.

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ANNEX 1

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Thanks are also due to the many members of Colleges of Agriculture, University Departments, Farm Advisory Services, rural organisations and elsewhere who devoted busy time willingly and unstintingly to help us all by sharing their expertise and steering us on the right lines.

Last, but not least, I wish to acknowledge the contribution of the Department of the Environment/Development Commission who sponsored and guided the research, and kindly permitted me to draw up their early paper based on the results.

Land Use Changes up to the Year 2000

D A H Brown

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Abstract

Land use changes in Britain up to the year 2000 have been examined on the basis of reducing the farmed area to match production to the level of demand for agricultural produce. This results in a surplus of up to some 2.6 million hectares of agricultural land by the end of the century. The extent and intensity of future agricultural land use has been shown to be influenced by soils and climate, business performance and land values. National and regional changes in land use are likely to be complex, with a concentration of change in lowland areas, especially in England.

Introduction

The economic well-being of farming in Britain has an important bearing on rural land use and changes in its financial position can bring about fundamental changes in a relatively short time. It is only 50 years since large tracts of land were virtually derelict as a consequence of the agricultural depression of the 1930s. Stimulated by the agricultural support policies of successive post-war governments and, from 1973, by the Common Agricultural Policy, British farmers have achieved a rapid expansion of production. This has transformed shortages of food supplies into surpluses for virtually all the major agricultural commodities that are produced in Britain. Increased production has been achieved partly by greater intensity of land use, which has involved the drainage of marshland and river valley areas, the removal of hedges and the grubbing up of unproductive woodland.

Faced with surpluses of agricultural commodities, there is now the need to bring production more into line with demand. Inevitably this will have land use implications, whether it is through taking land out of production or by farming the land less intensively. The purpose of this paper is to examine the possible land use changes that could occur over the remaining part of this century.

Future Agricultural Area

In examining possibilities for the future agricultural land area, differentiation is made between upland and lowland areas. Upland areas, defined as Less Favoured Areas (LFAs), receive special support measures which are different from those purely for agriculture or forestry, being concerned with the maintenance of remote communities and their associated ways of life. Present agricultural support policies based on livestock headage payments are resulting in conflict with wildlife and landscape conservation bodies, as they lead to more intensive land use, and loss of wildlife habitat and landscape value.

In terms of the total agricultural areas, LFAs are important in contributing 79 per cent in Scotland, 73 per cent in Wales and 17 per cent in England. However, in terms of agricultural production, their contribution is perhaps only 10-15 per cent of the total, and beef is the only commodity that is produced there which is currently in surplus. The main brunt of any land use changes required to alleviate surplus production in Britain is likely to be concentrated in lowland areas assuming present upland policies continue.

Examination of the future area of agricultural land required for production can be made with a number of assumptions. The projections shown in this paper assume continuation of existing policy measures and reduction of the farming area to that simply required for production necessary to meet the level of demand. Future production estimates have been based on underlying productivity trends but allowing for known technological advances 'in the pipeline'. The future level of demand has been estimated on the basis of underlying trends but allowing for changing patterns of consumer preference and consumption.

The consolidated projections shown in Table 1, indicate that by the year 2000 some 2.4 to 2.9 million hectares of agricultural land could be surplus to needs.

Table 1 Consolidated projection for year 2000 of surplus areas of major crops

Crop	Lower estimate (000 ha)	Upper estimate (000 ha)
Cereals	900	1 100
Forage	1 400	1 555
Potatoes	30	70
Sugar beet	15	30
Oilseed rape	(40)	—
Horticulture	75	105
Total	2 380	2 860

() denotes increased area of demand

Factors Affecting the Future Extent and Intensity of Agricultural Land Use

Future agricultural land use will be influenced by a large number of factors, not least of which will be European political considerations. On technical grounds food needs can be met from a much smaller area than at present, but wider rural considerations will not allow a purely 'technical' solution to the surplus problem. It is beyond the scope of this paper to examine all the possible 'scenarios' which could prevail. Instead, three of the key factors likely to influence the future extent and intensity of agricultural land use have been selected for consideration.

Soils and climate

The interaction of soils and climate largely determines the inherent productivity of land and its ultimate use. Within England and Wales it has been estimated that up to 2.9 million hectares of current agricultural land in lowland areas could be marginal for intensive agricultural production, on the basis of soils and climatic factors. A further area of some 70 000 hectares could be in this category in Scotland.

It is inevitable that it will be necessary to take land out of existing agricultural production. While surplus land could occur in any part of Britain, in the medium to long-term economic pressures will concentrate the change of use in those areas which are marginal for intensive agricultural production.

Profitability and business finance

Government financial assistance to farmers will be modified to control surpluses. There will be a reduction in commodity price support and it is likely that there will be greater emphasis on income support measures for particular areas and groups of farmers.

Financial considerations influence farmers' attitudes to choice and intensity of system. Farming profits are expected to continue their decline and are unlikely to return to relatively high past levels. The prospect is for a long-term decline in profit per unit area of land irrespective of land quality. This could lead to a proliferation of non-farming activities as a means of sustaining incomes.

Other farmers may choose to operate their farms on a part-time basis, and cropping and stocking intensities will tend to be lowered. There will also be an increasing trend to fewer and larger holdings as a means of maintaining income for the remaining full-time farmers.

Farmers have increasingly raised the level of their borrowing to finance their businesses. The rapid decline in profitability has put them under greater pressure than expected, and it is inevitable that some farmers will be unable to avoid having to sell their farms. Others with high borrowings may be able to continue by either selling off part of their farms or non-farming assets, or selling off farm assets and operating a lower intensity farming system.

Land values

The expectation is that the value of land will decline dramatically in real terms over the next 3 to 5 years. The probability is that the downward trend will be exaggerated and will be followed by a recovery, but to a lower value than has been the historical pattern of the last 5 years.

Lower values combined with the projected lower demand for agricultural land will provide opportunities for alternative farming methods or other non-agricultural uses for the land.

Land capability and locational factors will influence land value and any change of use. It is expected that agricultural use of marginal land will become more extensive with:-

- some farms in lowland areas on low quality land being operated on an extensive grassland system with much lower stocking rates for livestock than at present;

- the poorest areas of some farms effectively not being managed for agriculture.

Alternative uses of existing agricultural land will include:-

- forestry and on-farm woodland;
- urban encroachment;
- tourism and sport;
- wildlife conservation.

National and Regional Changes in Agricultural Land Use

The general trend to fewer and larger holdings can be expected throughout Great Britain.

England

England has the highest proportion of British lowland and is expected to experience the greatest extent of agricultural land use change. On the highest quality land, intensive arable farming will continue with field-scale vegetables being concentrated on the very best soils, or in sandy areas provided with irrigation facilities. On poorer quality soils there will be a trend from cereals to grassland.

On low grade soils in remote areas, farming has poor financial prospects. There is the likelihood of more extensive grassland farming and increased tourism, sporting, recreational and amenity uses for such areas. On better soils in remote areas, there will be declining areas of potato and vegetable production, mainly because of increased competition and declining margins, and the possibility of fewer dairy cows if full economic costs are applied for milk transport.

There will be pressure for increased afforestation in less accessible and wetter areas. In rural areas accessible to urban conurbations, land will be increasingly used for 'hobby' farming, leisure and amenity.

Scotland

The LFAs are the dominant feature of Scottish agriculture. Declining incomes will result in a further fall in the number of holdings and a reduction in livestock numbers and stocking intensities. The rate and extent of agricultural decline will be largely influenced by the level of income support payment by Government.

The trends in lowland areas are likely to be similar to those in England, except that Scotland is relatively disadvantaged in respect of climate and communications. Existing intense pressure for extension of the Highlands and Islands restricts the opportunities for alternative land use with the declining importance of agriculture.

Wales

The effects on farmers within the LFAs is likely to be similar to that in Scotland.

Southern coastal lowland areas will be under increasing pressure from urban encroachment. The remoteness of western production areas from centres of population, resulting in higher costs than elsewhere, will cause a decline in the agricultural importance of these areas.

Tourism, amenity and forestry uses of existing agricultural land are likely to become increasingly important.

Conclusion

Over the past 40 years farmers have responded positively to the incentives and encouragement provided to them, with the result that they have more than achieved production targets. The detrimental consequence is that the UK and Europe as a whole are faced with a financially and politically difficult problem of how to cut back on ever increasing and unwanted production without adversely affecting rural communities.

It is inevitable that sooner or later measures will be needed to curb agricultural production, and bring this more into line with the level of demand. Income support measures could help alleviate the socially disruptive effects of these cut-backs. Nevertheless, it is unavoidable that a proportion of existing land used for farming will need to find an alternative use. The consequence of the necessary restructuring of British farming should be treated as an opportunity to create the countryside best suited to meet the needs of the 21st century.

Land Availability for Future Afforestation

D Taylor
John Clegg and Co

Abstract

The interface between farming and forestry, traditionally in the uplands, may be about to enter a period of change, and the implications are considered. The features of the current afforestation programme are noted, and lower land prices or increased productivity identified as prerequisites for the planting of better quality land, which might then develop in parts of Wales, the West country, Northern England and Scotland. However, whilst most land is physically plantable there are limitations on the suitability of better quality farmland for forestry, for example in the Cotswolds, on the heavy midland clays, and in the extensive 'clay with flint over chalk' belt of Southern and Eastern England. It is also unlikely that landowners and farmers will contemplate planting without the right incentive framework, whilst Government may, or may not, see this as a worthwhile cause.

I praise the Lord that I should have been spared to address a conference of this sort. For in my professional career, forestry and agriculture have been competing forces in the delicate land use balance. They have traditionally competed on the margins of agriculture, in the Uplands. Where there has been competition in the lowlands, agriculture has been winning, on and off, for 1,000 years. It is therefore something of a cultural shock to us all to suddenly find that the pendulum has swung, for the first time in this saga of deforestation, back in the other direction. However, the reaction of foresters to planting some of the land which seems likely to come out of agriculture may also come as something of a shock to farmers. So in discussing the future availability of land for forestry, the proportion of the 150 000 hectares per annum of productive farmland that has to be recycled, we must first of all examine our cultural attitudes. We foresters must redefine forestry to ourselves and, indeed, to everyone else, including it seems the Institute of Terrestrial Ecology.

First, some facts and figures. The total area of productive woodland in the UK is just over 2 million hectares. The present rate of afforestation, that is transfer of land from agriculture to forestry, is around 25 000 hectares per annum. This has a negligible effect upon agricultural production as it is exclusively in the marginal hill country to which it has been exiled by the Ministry of Agriculture. The current planting programme, whether financed by the state or the private sector, is largely limited by the availability of capital to buy land, the chief factor being price. If land were cheaper the planting programme would be greater, as evidence the rush into the highly debatable afforestation of cheap land in Caithness over the past few years. I should say that the state's involvement in afforestation, since the Forestry Act 1981, has been small. It is difficult to see the circumstances in which the state would want to increase its investment programme, although it is, of course, a possibility after an election and with a change of government.

So, at current prices of land, the amount of private money for afforestation will buy us between 20 000 and 30 000 hectares of new forest a year. To go on from this, if we are expecting conventionally financed forestry to expand into the gaps left by farm surpluses, there has to be one of two forms of stimulus. Either the price of land must fall to an average well below the current average price of planting land, which is probably overstated at £300 per acre (£740 per hectare) or there must be a distinct increase in the productive capacity of the land, to make the whole investment more attractive. So if we consider conventional methods of financing forestry, land availability means the availability of suitable land at the right price.

We are stepping out, perhaps at rather a clip. What is suitable land for forestry? It all depends on what you mean by forestry. I keep using the word conventional, for by any past yardstick forestry has become synonymous with large-scale afforestation of the uplands. This activity has had several justifications over the past 65 years, but the current one concerns itself with the economic benefits which accrue, in import substitution, in rural employment and, indeed, in financial returns. Objectives have purposely been left rather woolly, but it is deemed prudent to continue to afforest upland Britain at roughly the annual rate achieved over the past 25 years, that is, around 30 000 hectares per annum to achieve levels of production in accord with predictions of demand, a level of 25 per cent self-sufficiency. A great many commentators would go on to say that a higher rate of investment is not economically prudent, but that's another story. If we stick to a conventional definition of forestry, and to conventional methods of financing, then it is clear that increased land availability on the scale proposed over the next decade may well stimulate a higher demand for land, but it will either have to be cheaper land, or more productive land, or both. And we would, of course, need not just a cultural re-examination of forestry, but a cultural revolution before conventional forestry made much of an impact on the size of land surpluses coming forward.

Let's leave market forces for the moment and go back to first principles. Where will trees grow in the UK? The answer is more or less everywhere. The only limits to the development of forest in Britain are altitude and exposure. A crop of trees of one sort or another can be created anywhere; indeed — this is a point I want to come back to — if we do nothing more than exclude grazing animals and fires over a long period, forest vegetation will develop naturally on most British sites. If we take a broader definition of forestry, there are no technical problems to turning all our surplus farmland to woodland. In terms of availability we have surely never had it so good.

But we can't help touching here on the question of motivation. All this land is up for grabs but to describe it as available for forestry is like saying that all level fields are available for cricket pitches. At one level it is true but as a statement it has its limitations. We must return to a consideration of market forces. Falling demands on agricultural land will surely first be felt close to the existing margins of profitability, in the hills. We can expect forestry to want to come down the hill into permanent pastures, green improved foothills, the so-called in by land, and to do so with some enthusiasm. The need to stop planting at the mountain fence has denied foresters the use of highly productive, fertile, sheltered and accessible land adjoining their power base. At the right price we can expect much of this grazing land to be absorbed into existing forests in the stock rearing areas in Wales, the West Country, northern England and Scotland. This can be financed by conventional sources as an attractive case can be made for forestry on relatively low lying, high rainfall mineral soils in existing forestry areas. These are likely to be some of the most productive forest sites in the whole newly available estate.

Traditional afforestation relies upon the transfer of land from a landowner without the resources to develop it to the investor with resources but without land. I suggest that the impetus of this process in hill areas will continue and this pattern will prevail as the existing forest tries to expand its margins. So this category of land, subject to the requirements of water authorities, the Nature Conservancy Council, the Countryside Commission, the local planning officer, the National Park planning officer, the RSPB, the Ministry of Defence, common rights and Uncle Tom Cobley and all, can truly be said to be available to forestry as we now understand it. Most important, however, the whole position will certainly be distorted by further artificial subsidy which seems highly likely to be introduced to support the Government's stated policy to maintain a healthy hill farming sector.

Coming further down the hill, it is important to realise that what has been productive and densely cropped farmland for the past few decades does not necessarily have any enormous appeal to the foresters. Because we are used to performing on marginal uplands, you may have the idea that foresters will turn cartwheels in the air when offered relatively salubrious farmland to play with. Have no illusions.

Difficult sites for agriculture are nearly always also difficult sites for foresters. Let us look at a few obvious examples of Grade III land likely to come out of production, on a fairly broad scale. Admittedly these will probably move into grass, but there will clearly be new opportunities for tree planters of one sort or another. Close to my heart, the Cotswolds. An unfortunate soil reaction, a tendency to seasonal drought, a vigorous and frightful competing vegetation. A low productivity at high cost. All other restraints apart, and there are very obvious amenity problems, not an area to attract the commercial forester.

Next, heavy, cold clays which sweep up from the Vale of Severn into the Vale of Trent. Difficult to work, heavy competition from weed species, low productivity.

Third, clay with flints over chalk. A huge expanse of southern and eastern England. Forest sites likely to be of shallow soils, with an alkaline soil reaction, tending to seasonal drought and very low productivity. Unattractive to the conventional forester who would far rather plant derelict hill land in Wales, where trees grow really well. So unless the value of Grade III land of the types mentioned falls to under £200 per acre (£480 per hectare), I do not believe there will be much call from existing forestry investors for planting of this sort. This totally ignores all other restraints, such as the planning requirements of FGS or BWGS, which are all embracing in southern England. *Given a free hand to maximise his economic return*, the investor would not readily choose many of the likely sites which will become available. If he is required to grow poor quality hardwoods, for amenity reasons, then he will need either a non-timber producing motivation, or an artificial financial stimulus, or a padded cell. And, of course, what is true for the city-based non-landowning forestry investor applies equally to those already owning and farming the land.

These have been subjected to a massive campaign to encourage them to plant trees. Those of you who read the Farmers Weekly will be aware of the great tide of enthusiasm which has been generated over the past year or two, but which now shows signs of ebbing quite fast. Planting of unrewarding sites has little enough to offer the average owner occupier farmer. He may have the benefit of huge grants, he may even have some element of tax saving, but at a time of falling farm incomes, any forestry represents a further drain on his resources. There is no "income" to be had from small-scale woodlands unless it is from sporting rents or war games. Admittedly there has been an encouraging response to the BWGS, but one cannot help wondering if the necessary resources of money and enthusiasm to continue to establish and manage hardwoods (or indeed softwoods under the FGS) is really there. Such has been the enthusiasm for planting in intensively farmed lowlands that one can't help reflecting that reality is going to come round soon. The basic problem is the grant system. Landowners are not going to make their own land available for forestry without a system of incentives that suits them. The fallibility of the "once and for all" planting grant to the landowner with limited

resources is demonstrated by experience in the Irish Republic. Under their EEC funded "West of Shannon" grant package, farmers could have 85 per cent of the cost of afforestation. In the first 5 years of its life, farmers actually planted something under 50 hectares. All the rest of the investment funds that came into the West came from investors outside farming. I mention this as it profoundly affects the way in which landowners will react to changing patterns of farming over the next decade. Session 3 will deal with this in more detail. If we want an ordered change in the patterns of land use, then we must have a radical rethink of how the incentives are awarded. And unless we do, the availability of land for forestry will be limited.

I began by saying that we must re-examine what we mean by forestry if we are to define land which will be available for growing trees. Thus far I have concentrated on the easy bits, where traditional definitions centred on timber production apply. Environmental pressures over recent years have already begun to moderate this rather simplistic approach. We have our Broadleaved Woodland Grant Scheme, which supports the creation of woodlands where timber production is not an objective. And we have proposals for even more advantageous grant-aid schemes, where the landowner actually gets paid for owning a wood. This pre-supposes that any government will feel like giving away the money it saves from agricultural economies to produce non-economic woods which it does not own. It may, but again it may not. There are good reasons for both policies. If our objective is to produce a woodland of pleasant appearance and conservation value, but with little or no timber value (like much of what is classified as forest in France or Italy), then we can manage land very inexpensively to achieve this aim without formal planting at all. It may take a little longer but it will happen. There may be a case for a small maintenance grant to landowners for leaving land undisturbed. For this form of afforestation there could be quite a lot of available land. Why spend money?

To take a more constructive view, we will hear about new concepts of tree growing, especially the growing demand for fuel wood. This requires easily accessible land close to centres of population, very much available over the next decade. Fossil fuels surely can't remain in the doldrums for ever, and a little forward planning looks prudent — I think this is the right objective. We will, hopefully, have some good lowland areas upon which to operate the growing of good quality hardwoods with continued or even increased grant aid and land will surely be available for this in small packages, as for managed small woods, coppices and thickets.

To sum up, a few points:

First, that it is technically possible to grow a crop of trees, of one sort or another, on all the land which will come out of agriculture.

Second, conventional economic forestry, with objectives to produce a timber crop, will tend to extend its existing margins onto land now under "permanent pasture" which will become more marginal because of changes to the agricultural economy. The effects of this will, no doubt, be obscured by artificial subsidies to hill farms and by environmentalist pressure.

Third, the type of land coming out of agricultural production will in many cases not be all that suitable for conventional economic forestry either for technical reasons, or because of restrictions placed upon management. This being so, a hitherto unknown form of forestry, without an economic objective, but heavily subsidised, may well be necessary if ordered changes in land use are to occur.

Fourth, the price of low grade agricultural land must fall very rapidly.

Finally, none of us seem able to grasp the scale of the problem. We expect there will be land available for forestry in an unprecedented way, at least for some decades, but for conventionally financed forestry there will, I feel sure, be continuing shortages of desirable land. I believe that much less pressure on farmland will lead to less intensive farming, tending to dereliction in some areas with some low grade agricultural land being abandoned to ranched sheep or nature, or both.

One thing is clear. On the scale proposed, there is likely to be much more land available for forestry than there is forestry available for the land, unless a very positive and probably very expensive and relatively unrewarding policy of subsidies is introduced. We face an interesting future.

Discussion

- Q:** *Mr D Goss (David Goss and Associates)* — What scope is there for increasing the area of fruit trees, such as chestnut, walnut and cherry, which also produce valuable timber? Are these fruits already in surplus?
- A:** *Mr C W Capstick* — There is not much scope as these trees require long-term investment, eg you have to plan 20-40 years ahead for growing nuts, and there is too much European competition.
- A:** *Mr D Brown* — This question goes beyond Europe; fruit is traded internationally now and other countries would take up any deficits before we can.

Comment: Dr Newman

We currently import nuts worth £20 million per year, and chestnut can yield after only 3 years using grafted stock. However, neither walnut nor chestnut is native, and there could also be problems with grey squirrels.

- Q:** *Mr J Campbell (Economic Forestry Group)* — We see a stream of maps of the UK illustrating LFAs, SSSIs, National Parks, and ESAs. Have we done any work in identifying the 'Forestry Enterprise Areas' required to maximise the potential of the forestry industry which is now developing in the UK?
- A:** *Dr M Bell* — This idea has been floated as a starting point for developing forest industry in the right places. We need to look at ways of broadening the base of forest industries, at existing marketing infrastructure, and at identifying the available areas.
- A:** *Mr D W G Taylor* — Foresters have done some studies like this. There is a need to plan ahead; think of the millions of pounds which have gone into forestry in Wales and the industry which has followed it. We also need to examine how the population think about forestry, because this affects where land is available for planting.

Comment from the floor:

If there are as many constraints on forestry generally as in Wales any large scale programme will not be achievable.

- A:** *Mr D W G Taylor* — Perhaps some constraints would need to be relaxed to some extent.
- Q:** *Dr M Bell* — Does Mr Taylor want to plant areas such as Borrowdale and Patterdale?
- A:** *Mr D W G Taylor* — No, there will be large areas of upland available outside national parks, etc.

Comment: Dr M Bell

There will not be large areas available for planting in hill areas because farming in LFAs will probably continue to be supported. Forestry in hill areas is a job loser compared with hill farming.

Comment: Mr D L U Scott (Chairman)

There is a need to resolve the conflict caused by the fact that it is the hill land where farming is supported which the foresters would like to plant, not the unsupported lowland areas where farmers may go out of business.

Comment: Mr D Brown

The choices of voters will affect these questions; we have to ask why we are supporting the socio-economic structure in the hills and what is the cost.

Comment: Mr G Hatfield (Forestry Commission)

A report by Aberdeen University says that there is little loss of agricultural employment due to forestry, and the employment that forestry creates is additional to that provided by agriculture.

Comment: Mr R J Stirling-Aird (Savills)

Lowland agriculture is in fact supported, by intervention buying.

Comment: Mr D L U Scott (Chairman)

The point is that farmers in LFAs receive additional support whether their land is good or bad, over and above other support.

Q: *Mr R J Stirling-Aird (Savills)* — Mr Brown stated that 65 per cent of borrowing is in the hands of 10 per cent of farmers; how much land do these farmers have, and where?

A: *Mr D Brown* — We do not know the answer to that, because the lenders, ie the clearing banks, do not know. We do not even know the geographical distribution.

Q: *Mr K Royston (Timber Growers UK)* — Malcolm Bell excluded Scotland from his hypothesis. To enable a comparison with David Brown's assessment does he suggest that there are no marginal agricultural areas suitable for forestry in Scotland?

A: *Dr M Bell* — The brief from the DOE for this study stopped at the border, so we have not looked at identifying such areas in Scotland.

A: *Mr D Brown* — There are about 70 000 hectares in lowland Scotland in a similar category to the 'coffin shaped' area of lowland England which may be marginal for agriculture and suitable for forestry. However, they are more scattered and do not form discrete blocks.

How These Changes Will Affect the Farmer

G Sturdy

Vice Chairman, NFU Parliamentary Committee

Abstract

Agricultural productivity growth means that demand can be met from a smaller land area, with perhaps of the order of 100 000 hectares of land transferred annually over the next decade. It is in the national interest to use this as an opportunity to switch substantial areas into alternative land use patterns. The NFU believes productivity constraints through price control alone would have a devastating effect on agriculture, and that Governments have a central role in land use and agricultural policy decisions which they should use actively. Milk quotas are a good example, limits on fertiliser use another possibility. Alternative uses are reviewed, including import substitution, exotic crops, organic farming, biomass/short rotation coppice, forestry, and non-agricultural options (eg on farm recreation and tourism, conservation).

The Issue

The future use of farmland in a period of over-capacity in food production.

The rapid growth in agricultural productivity leading to surplus production in the EC means that in future it will be possible to produce all the required output of basic agricultural commodities from a decreasing area of land. It is impossible to predict precisely how much land in the UK could be released from agricultural production in future years given the many uncertainties over prices and policies. It is possible, however, to project past trends forward and then, having modified these by an assessment of some probable developments, to achieve broad indications of the annual reduction in agricultural areas necessary to prevent output rising further.

The results of this sort of calculation show that, on the basis of the present pattern of crop and livestock production, the equivalent of over 100 000 hectares of land of average productivity could be transferred to other uses each year over the next decade.

The Opportunity

The opportunity exists to switch substantial areas of land away from food production and into alternative land use patterns. It is surely in the national interest that this spare land resource is used gainfully rather than pushed into low output farming systems or disuse.

This paper outlines some aspects of current NFU thinking on the question of alternative land use options. How these options might be achieved depends upon the interplay of economic and social forces on farmers' decision making. Economic forces may stem from a variety of sources: patterns of world food trade; international currency movements; policy decisions at Brussels or Westminster and changes in UK consumer preference and spending power. There is also an individual element. Farmers change their aspirations, acquisitiveness gives way to caution, enthusiasm to resignation.

Among the social forces that influence farmers' decisions I have in mind such things as socio-structural policy; the movements in and out of the industry of new technology, entrepreneurial spirit and big business acumen, as well as possible restrictions that are introduced in the name of conservation or non-commercial consideration.

Public Policy

The economic management of the agricultural sector is a fact of political life in every developed country.

The recent agricultural debate has revolved around the need to reduce expenditure on the CAP. This expenditure has been principally caused by high levels of production in relation to profitable internal markets.

The simplistic solution put forward by some commentators has been to severely cut agricultural support prices. The resulting price pressure would certainly reduce output in the long-term. Farmers would respond to the prospect of lower prices by reducing input. There may well be an effect of cheaper food prices for the consumer and the burden on taxpayers as represented by the CAP would be reduced. On the other hand, the damage to the rural economy would be considerable as would the effects on employment within the ancillary industries. Low input/low output may suit some farmers but will not generally produce sufficient revenue to cover "fixed" costs. Bankruptcies would be widespread.

Price pressure alone will, in our view, have a devastating effect on agriculture. The urban and disinterested consumer may see certain short-term benefits from a policy of price pressure - cheaper food and saving on taxation. Adjustments to the agricultural economy would inevitably follow. Land prices would tumble and so on but the opportunity for a

positive change under the guidance of economic planning would be lost. Either society makes an active decision to reinvest resources in a different agricultural future or an increasingly urban and cosmopolitan society will decide to abandon its rural heritage. I do not believe any of us here want to see that happen.

Post war and pre-common market agricultural experience was such that the benefits of economic management and the Pavlovian responses to economic stimuli are thoroughly ingrained in the farming psyche. Since 1973 the conditioning has been frustrated, the messages confused, but the ingrained need to respond to economic promise remains. The difficulty is that farmers can only assess how to maximise their profits within the context of price levels they cannot influence. An individual farmer, unlike a big business man, can see no perceptible impact on price levels by any change he makes to the level of his own output. For this reason economists making judgements about the response of farmers acting as rational decision makers need to temper their approach by an appreciation of the farmers' micro-cosmic view.

The initial enthusiasm for price pressure being the panacea for the European budgetary problems, has thankfully been reduced. An element of price pressure plus an element of supply management seems to be the way the authorities will respond. Hopefully we are coming back to an era where public policy decisions on land use will be made actively rather than being left to happen via market forces.

Governments have a central role in decision making over land use and agricultural policy.

Milk quotas are a good example of supply management and although their introduction was a shock and the detailed implementation badly thought out: quotas work. It is not so easy to devise a scheme for managing the supply of cereals. The Union has put forward a scheme for an annual licence coupled with compulsory "set-aside" for wheat. Farmers would not be allowed to grow wheat without a licence for the precise acreage. A condition of that licence would be that a clearly defined proportion of their land should be fallowed. The virtue of this scheme is that it limits the knock-on effects onto other over-supplied commodities (beef?). It will reduce CAP expenditure and will allow time for farmers to develop alternative enterprises. At the moment the scheme is only on the starting blocks but hopefully by the time the conference is held the Agricultural Ministers will have decided whether to support the introduction of a "set-aside" policy and then the real debate begins — in Europe.

Another possible supply management technique is limiting the use of nitrogen fertiliser. Farmers increased use of nitrogen has been paralleled by the increase in cereal yields. There is also an element of environmental concern especially in Europe over watercourses. Limiting nitrogen use is seen as a simple way of solving two problems in one go. On the other hand, there are mixed feelings about the practicality of such a policy. The bureaucracy would be cumbersome. How could it be administered fairly between those on fertile land and those on poor soils? Nevertheless, one cannot dismiss nitrogen limitation as impossible.

What are the Options?

If land is to be fully used there are a number of alternatives to present land use patterns. These fall broadly into three groups: agricultural, non-agricultural, and conservation.

Agricultural Options

Import Substitution

One cannot look at the options for expanding the variety of crops grown in England without remembering that we do, after all, still import some North American hard wheat, a considerable amount of New Zealand dairy produce and lamb, cereal substitutes from the Third World and USA, over one million tonnes of sugar and a wide range of horticultural products. Most of these commodities could be grown in this country under different political circumstances. It is also worth remembering that although the lamb market in the UK is contracting there is potentially a worthwhile and expanding market to be had in Europe for UK lamb. Furthermore, the Centre for Agricultural Strategy at Reading identified £430 million of imports of animal products, some of which could be produced in this country — such as silk, mink fur, leather, mohair and goats milk.

Exotic Crops

British agriculture for all its virtues can be criticised for a slightly narrow product range. The food market is becoming very international, much more varied. The effect of foreign travel and easy access to imports has made the consumer much more adventuresome. Farmers must respond to this. These commodities are not necessarily supported, we must produce for the market and be entirely market-led but the opportunities exist.

Evening primrose, blueberries, fenugreek or jojoba, etc. The mind boggles slightly at the visions such names conjure up to those of us that are used to plodding cows and ripening corn. Perhaps the sardonic scepticism reveals my own lack of enterprise and imagination but, in my opinion, a market for these products does exist. You only have to look in the bathroom cabinet or the healthfood shop or indeed many sections of the local supermarkets. The market for imported herbs is worth £50 million per annum and is growing steadily. Invariably the problem with these exotic alternatives lies in the marketing arrangements. It is easier for users to buy large consignments from abroad than deal with scattered

small and low-key home-based producers. The co-operative division of Food from Britain is very conscious of the opportunities presented by this situation. Farmers must take a more adventuresome and enterprising look at these markets but their production must be market-led.

Biomass

Some useful work has been done on biomass production from short rotation coppice willow on marginal land in Northern Ireland. Biomass has a range of end product uses but the most promising option seems, at least in the Northern Ireland experience, to suggest that coppice willow cut every 3 to 5 years and chipped, dried and burnt provides a good energy source for small rural-based industries. For instance, the energy equivalent of 5-7 tonnes of coal can be produced annually per hectare from marginal soils. The Irish study did exclude from the costings the farmers own do-it-yourself labour and does not seem very promising in terms of commercial industrial development.

Much the same can be said of the current state of knowledge of bioethanol production. In each case the product cannot compete industrially at today's or even yesterday's energy prices. But in my view the economic presentations that I have seen tend to be distorted by the illogical treatment of the taxpayers contribution. Biomass looks good with a planting grant, but ethanol looks bad compared to wheat if the price of wheat assumes today's intervention support.

Forestry

I see that there are 29 speakers after me who are going to talk about farm forestry. Perhaps I might be brief on the subject. I will just say that at home I have about 300 acres of on-farm woodland. Traditionally Scots pine planted in the last century to provide pitprops for the local clay mines: now being replaced by a more varied mixture of fir and pine trees. Per hectare I think the forestry enterprise leaves me about as much spending money as the farming does. The forestry supports a much lower level of fixed costs but in terms of direct employment it supports about the same workforce per hectare although nothing like as many people as in the off-farm ancillary industries, but then I have an established rotation — the income gap problems were experienced 100 years ago — the costings of the investment were probably never considered.

Both biomass and the forestry options call for a long-term national investment policy.

Non-Agricultural Options

The non-agricultural options have less significance for the land use question. They are, though, important in relation to farmers' income. It can be said that if farmers increase income from a new source they will accept a lower income from the old source. Capital and management attention will be transferred from food producing to the general provision of rural services to the public.

The Gretton Report published by the CLA has some useful information on the potential growth for on-farm recreation and tourism. Judging by the response that we get to advertisements for our self-catering cottage at home there is considerable growth to be had in this market but one must be wary of investing too much borrowed capital.

Planning Policies

Planning policies in the last few decades have concentrated on preserving agricultural land. It is not unimaginable that there may be some relaxation in housing densities and "land take" for a wide variety of reasons. On the other hand, since only 8 000 hectares a year are lost from agriculture it is unlikely that a relaxation of planning policy will make much impact on the 100 000 hectares a year that could be available.

Conservation Options

In an earlier paragraph I have suggested that the adoption of low input/low output farming as a result of severe price pressure would be a negative and wasteful response to the problem of agricultural surpluses. On the other hand there are two trends in today's thinking where lower output farming could be seen as a positive response — organic farming and conservation.

Organically Grown Produce

The trend towards "health food" and "naturally produced food" is here to stay. Free range eggs command a premium over the intensively produced, so, apparently, does hormone free meat. The organically grown food movement has been seen by Sir Richard Body, MP, as an alternative to the treadmill of conventional agriculture. It is an obvious response to the increasing consumer demand for "safe", healthy and unadulterated food. For some products, vegetables particularly, consumer demand for organic produce is well in excess of supply and a premium of about 35 per cent is achievable. In part, of course, this premium is necessary to balance the lower production levels that the techniques allow. Apparently at least 60 per cent of supermarket sales of organic produce is imported — again the problem is lack of market cohesion amongst producers.

The organic food movement needs to clarify its terms and definitions. If it does not, there seems to be some risk of confusion between the two contrasting schools of thought about organic production - those who are led principally by

ethics and those who are led by commercial considerations. Undoubtedly the organic movement is seen by some as a way of maintaining income and reducing output and is a viable response to the problem of surplus.

The Conservation Option

As the case for expanding farm production has become weaker, the conservation ethic has grown in influence. As Sir Derek Barber has said “the conservation bandwagon is unstoppable”. The most tangible evidence of this is the many unheralded works done by farmers to provide habitat and landscape improvement. Although farmers have always been conservationists the momentum is gaining force and can be seen in the growth of Farming and Wildlife Advisory Groups (FWAGs) in the counties. Conservation is not necessarily opposed to high output farming but in the new proposals for establishing environmentally sensitive areas there is a definite presumption towards lower output farming. Farmers will receive financial support if they opt for traditional farming methods. I must, though, sound a cautionary note about the financial implications. A reduction in net farming income is measured in hundreds of millions of pounds. What is on offer for ESAs is £6 million. Similarly the support for management agreements for SSSIs is of the order of £15 million. I do not believe that the taxpayer will be over-generous for very long in order to make farms picturesque.

Summary

Shake the kaleidoscope and the pattern changes. Farmers responses will be as varied as ever — a mixture of profit maximisation, obstinacy, sound economics and for some a determination to swim against the current. Undoubtedly we are expecting harder times. The era of expansion and buoyancy is over. For some farmers the solution lies in a more enterprising and market orientated approach to their production plans while others see the main opportunity lying in the Government’s hands. The 1947 Acts signalled a deliberate switch in national resources towards expanding food production. The time has now come for a deliberate switch in national resources towards expanding timber production.

Discussion

Q: *Dr A Mowle, (NCC)* — Mr Smith urged the greater use of schemes financed by private capital. Does Mr Sturdy find the prospect of such schemes attractive?

A: *Mr G Sturdy* — Private on farm forestry presently manages without this. It would however be a good incentive and an acceptable approach.

Q: *Mr D Goss, (David Goss and Associates)* — Is there scope for farmers to lease land to investors for forestry and to benefit from future profit sharing?

A: *Mr G Sturdy* — I agree there is scope.

A: *Mr D Taylor* — It already does happen but has long-term draw backs. The marketability can be reduced for both sides.

A: *Mr M Bell* — A range of policies is needed to deal with such complexities in the countryside. Specific circumstances produce unique alternatives.

A: *Mr D Taylor* — I am generally in favour of income support schemes. Difficulties do occur on poor quality land in producing timber.

Q: *Mr R J Stirling-Aird (Savills)* — Is there a conflict if woodland grants for farmers and those for estate owners and investors differ?

A: *From panel* — No.

Q: *Mr P Kaner*

a. Would a maintenance grant prevent the fall in price of marginal land.

b. Is a maintenance grant tied to the fact that a farmer could be growing an 'unpopular' crop such as cereals or could any woodland owner enter such a scheme?

A: *Mr G Sturdy*

a. Maintenance grants are a means of stopping land prices from dropping, yes.

b. The NFU scheme is income supported. Trees must be maintained and entry properly administered to prevent cheating.

Q: *Mr B Howell (Abbey Forestry)* — If the tax payer is providing the money for support grants, foresters could use this to produce fine quality oak. Is such a grant just a gift to farmers pockets?

A: *Mr G Sturdy* — An income support grant is likely to cost one-quarter that given to cereals. Support removal is an option but not a favourable one. All EEC agriculture is supported by Governments. The cost has got out of hand but we are unlikely to go back to non-intervention policy. EEC decision making is not good - they need to address the problem.

Comment: Mr R Williams-Ellis (Royal Forestry Society of E&W)

For 35 years forestry has struggled to be more profitable than farming. Isn't this only a fair transfer?

Q: *Mr K Royston (TGUK)* — Does the NFU envisage administration of the planting scheme by:-

1. Forestry Commission
2. MAFF
3. Countryside Commission
4. Local Planning Authority

A: *Mr G Sturdy* — This may be divided. Probably the Forestry Commission with some MAFF input also. This is a matter for discussion but is of general concern on the way material can be economically administered.

Q: *Mr A Hewitt* — Mr Howell suggested that foresters could grow timber for less than £60 per acre. Given that the NFUs figure of £60 represents their opening bid, could he tell us what the closing bid could be?

A: *Mr G Sturdy* — We are talking about how to switch large areas to an alternative product in a better way than through bankrupt farmers on derelict land. This way institutions may not step in.

Comment: Miss S Bell (CLA)

Can the NFU support be justified without responding to what the public want. Access as a result of conservation and recreation can't be set to one side.

Q: *Mr P Hardcastle (ICF)* — Has any thought been given by the NFU to more regional support in areas where trees grow best and farming profitability is low?

A: *Mr G Sturdy* — Yes, although the NFU have not studied this yet in depth.

Q: *Miss S Bell (CLA)* — Forestry policy should not be confined to mopping up surpluses. Timber production should be considered, as well as conservation and recreation.

A: *Mr G Sturdy* — Yes.

Q: *Ms E Hamilton (Wildlife Trust)* — It is assumed that agricultural productivity will be maintained and surpluses reduced by farming less land. In view of the effect of agricultural chemicals on the environment and water quality, should reduction of inputs be considered in relation to the problem of surpluses?

A: *Mr D Brown* — The time scale to implement such a policy would be difficult.

A: *Mr C Capstick* — The issue of low input is valid, and might bring some benefits but the financial consequences to farmers would be great. The EEC need to consider this broadly if Britain isn't to suffer against its competitors. Surplus is best confronted head on as are other problems.

Comment: Mr A Rowan (Forestry Commission)

The agricultural industry is under no obligation to solve its surplus problem, even through forestry. It should not be ignored that in the 1930s the forestry option was not taken up. Farmers hung on rather than sell to the forestry industry

Q: *Joyce Tait (Open University)* — The prediction that farm inputs will remain high is based on the assumption that farm incomes will be successfully maintained. If the policies being discussed were not successful in achieving this, could the present level of inputs be maintained?

A: *Mr D Brown* — Increasing financial pressure effects the use of inputs and how they are adjusted to maintain or improve outputs.

A: *Mr G Sturdy* — The organic route is attractive. Unemployment is the major problem in associated industries. A cut in inputs may also bring greater competition from imported goods. There is a need to revive the rural economy.

Q: *Mr G Jackson (Royal Agricultural Society)*

a. The matter of input/output relationships is complex. A reduction in input may not necessarily lead to reduced output. One of the Societies farms has reduced total nitrogen use over 3 years by 12 ½ per cent, we believe we can take this to 18 per cent by:

- i. precise application;
- ii. changing arable rotations;

Yields are maintained, husbandry factors are being refined.

b. The debate on the withdrawal of land from agriculture is a Community problem, not just the UKs. Could Mr Capstick give some indication of the total European land surplus in relation to food production. Bearing in mind the UK's structural and competitive advantages in agriculture, might its share of land going out of agriculture reasonably be less than in some other countries proportionately?

- A:** *Mr C Capstick* — The UK is at the forefront of efficiency improvements and the consequences. The surplus land area in Europe is not known but clearly it runs to millions of hectares. Surpluses are an EEC problem, a price policy is principally a quirk of reduction. Research tells us we have a unique structure of large farmers which should make a smaller percentage adjustment than other EEC members. The question is to be asked.
- Q:** *Mr P Swain (ADAS)* — Forestry is a long-term option. What proportion of the perceived surplus land should be 'locked up' in a 50 year plus alternative crop bearing in mind that the present problems of overproduction and trends may change within the timescale?
- A:** *Dr M Bell* — Using production figures, a model was produced for low intensity use. This showed that only 3% of the agricultural gross margin would be lost but the time scale will depend on when EEC policy is made. Three per cent is not enough to optimise land use for timber. If other positive alternatives are not found and land does not come out of agriculture, there could be a trend towards less intensive use.
- A:** *Mr C Capstick* — The question of how land is locked up would be a political decision. Two hundred and forty thousand farmers will not take a single decision. Farmers will decide when the incentives are presented.
- A:** *Mr G Sturdy* — I agree with Mr Capstick. Twenty thousand hectares per year may be achievable given Government decision and support.
- Q:** *Dr P Mitchell (Aberdeen University)* — Has any thought been given to the type of trees that will be produced and which markets will be supplied. Could there be a supply/demand geographical mis-match?
- A:** *Dr M Bell* — Different answers are obtained from different forestry experts.
- A:** *Mr D Taylor* — The Government policy is for 30 000 hectares of new planting annually. This has yet to be achieved. It must be questioned whether low-land forestry of the type we are discussing will be productive. Society must allow the product to be felled and processed.
- Q:** *Mr R Rutherford (Land Agent)* — We are talking about producing timber for the construction industry to save importing it. Can home grown timber of the right sort be produced cheaper than importing it?
- A:** *Mr G Sturdy* — There will never be a surplus of timber in this country.
- Q:** *Mr E Smith (MAFF)* — What is the likely area that will be used for planting? A previous prediction of 8 000 hectares is now 20 000 hectares per year. This should strengthen the incentives. But if the tax payer is not prepared to contribute, what is the possibility of money coming from the private sector? Will there be income support while the asset is growing?

Comment: Mr D Scott (Chairman)

A good note on which to conclude illustrating the whole question. An offering of £60 to £80 per hectare for trees or fallow is mentioned but a farmer does often have fixed costs of around £200 per hectare to meet. Should the incentives be higher still to prevent farmers going right out of production giving him a living for 20 years. Alternatively, should he turn over to the foresters completely?

Environmental Factors

D E Randall

Past President of the Landscape Institute

Abstract

We have only recently recognised the need to take the impact of land use change on the environment seriously, and standards of development still frequently leave something to be desired. The theme of the conference is consistent with our wish to perpetuate the rural blend of farms and woodland. The impact of new woods on landscape will be gradual, and on wildlife very much dependent on what is displaced. It would be wrong to rely on the SSSI system alone to protect this latter category.

The types of land particularly suited to woodland use are considered: low grade agricultural land; mining areas and quarry fringes; the urban fringe. It is difficult to reconcile those with the scale normally required for forestry operations. The potential contribution of landscaping to conifer forests deserves recognition.

Introduction to Environmental Factors

Every change of land use has an impact on the environment, but it is only recently that we have awoken to the need to take this seriously. This should involve making a careful survey of the factors involved, assessing their inter action as well as their impact on the surroundings and finally reaching a decision as to whether the change is acceptable.

You can quote everything from the building of a new 'essential' road across an SSSI to the conversion of a long neglected village pond to a housing site. One has to say that so much of the emotion that development produces springs from a belief among the public that the promoters of change have given little enough thought as to the impact. Very often there are good grounds for this fear. However this is not always justified since there is a lot of skill nowadays that can both assess the impact of change and can plan measures that will reduce that impact and — what is often forgotten — produce a new landscape which, with good management, will have considerable appeal as well as being of lasting benefit to the locality.

Now there are those who would say "oh don't be so fussy — just get on with it and nature will sort it all out!" This is just the sort of attitude to send any member of the Nature Conservancy Council into apoplexy because it shows the speaker has not heeded 40 years of patient preaching on the fragility of the world about us and of man's ability to make lasting changes that only climatic trends can rival in their magnitude.

The basic proposition of this Conference that there should be scope for an integration of farming and forestry policies in the light of changing land use patterns is surely a reflection of a wish to perpetuate a countryside blend of farmed acres and woodland. Topography and climate will moderate that blend locally but somehow everybody believes this is the look of the countryside that we would expect to see carried over into the next century. However superimposed on this popular objective is the need to ask the question "From where will our successors in 40 years time obtain their supplies of hardwood and softwood?"

I am one of those who see a falling off of imported supplies requiring a replacement from home grown sources. It is this need to provide far more home grown timber by taking steps to plan for it now that may account for what may sound like a pro-forestry viewpoint in a speaker covering an environmental slot in the proceedings.

I mention this because you cannot approach a subject with potential for change such as an increase in the afforested area of the countryside, without considering its impact on the sites and the surroundings where new plantings are to take place.

There will be a landscape impact and a wildlife impact. The first will take effect gradually and if the planting has been thought out with respect to modulations in the topography and to the local woodland character, critics should be a rare species. The second impact — the wildlife one — will depend upon what is being lost to make way for the new planting. If the land has been an area of overgrazed pasture or a discarded arable outlier, the change should be welcomed — but if it is a long established rich meadow of unimproved grassland or an ancient woodland, then surely think twice, and seek advice to see just how valuable the site may be. The designation SSSI does not mean that everything else can be dismissed and be 'up for grabs' — yet so much of our remaining ancient woodland has only the interest of the landowners — and the felling licence legislation — for its protection. In Berkshire the Nature Conservancy Council consider we have in excess of 500 ancient woodland sites displaying some 58 different stand types, yet only the best of these are considered to be worthy of SSSI status. By the term 'best' it is usual to mean a surveyor has found the largest number of woodland plant species present and the site has not been replanted with exotic tree species at a subsequent date.

I will not dwell more on the subject of ancient woods because much has been written and shown on TV to alert owners to the evidence for their easy recognition, as well as of the various details that reflect the different management regimes used by bygone owners to meet the local need for those woods.

Economic Factors

You will be aware we now have a situation in which we have rediscovered the value of small woods as landscape and wildlife habitats but at a time when their limited conventional value to their owners has never been more clear.

In a recent paper to the Chilterns Standing Conference, Mr Tilney-Bassett concluded with the comments that:-

- a. progress and improvement in forestry, landscape and conservation will only come about on an adequate scale if it is economically worthwhile to the owners of the woods;
- b. for while there are woodland owners who have no need to derive any income from them — none the less they enjoy the woods as they are, even though they are beginning to deteriorate. Other owners have no interest in them and are not prepared to halt the dereliction process;
- c. grants, etc are no more than substitutes for the basic value of a forestry enterprise which is the production of timber and its sale at a realistic and attractive price.

Land Uses and Values

So much for the difficulties of the market place, but the Conference must be bold in its examination of the factors involved in any extension of the present land under woodland and forestry. "What is the land being used for at present that it can be spared in the future for new woods?"

There is land that MAFF has classified as of low grade in agricultural productivity terms — but much of this has considerable wildlife and landscape value — sometimes meriting special protection from change — but there are upland locations where extensive mining operations in earlier times have left great disturbed areas with a bleak awesome appearance that only a die-hard mining historian would surely fight over. Secondly, there are the perimeters of quarries and gravel pits, which can so often be said to be land in search of a purpose; the trouble is that mineral operators lack real incentive to get into forestry operations — for such companies it is usually better to adopt a caring-for-wildlife image as this is more likely to win public support for the next planning consent to work a new area, for continuity of land supply is their life blood. Thirdly, there is urban fringe land — some may be in the Green Belts surrounding our cities and, therefore, the object of recreational ambition as well as uncontrollable trespass.

Except in the case of the first of these options, I see limited opportunity for meaningful change because conventional wisdom preaches that:-

- a. forestry can only succeed where large tracts of poor quality land can be set aside for a prolonged planting programme able to sustain the essential infrastructure (Kielder);
- b. forestry is such an unrewarded commercial activity that only the rich landowner can indulge in it — and only then because of the taxation situation;
- c. farming and forestry are quite different industries with such different timescales and techniques that only the large landowner can cover both aspects. This is only a reflection of the traditional situation on estates where husbandry of the woods was handled directly by the landowner and never by the tenant farmers.

Having stated the obvious answers, what supplementary issues arise?

I believe foresters should be encouraged in their efforts to devalue the emotive language about bleak conifer plantations marching in lines across the landscape — because this is in part a hackneyed description which is no longer justified where the skills of landscape design are used to influence the planting layout to fully reflect and exploit the topography. The old practices of blanket planting right out to the boundaries, and regardless of the contours and watercourses, or the striped or petticoat effect of changing species along a fixed line should by now be habits of the past. Planting has to be in lines to assist weeding, but the subtlety comes in the way the edges and local variations in the ground are used to vary the planting layout. The advice given in the Forestry Commission's booklet *Guidelines for the Management of Broadleaved Woodland* on planting to enhance the landscape could apply equally to softwood operations. If softwoods are all that the soil and climate of a site can support, then these have to form the bulk of the planting — but wherever sheltered pockets occur these need to be planted with whatever broadleaf species are realistic. In order that such an exercise in the uplands is properly prepared I do believe that every upland County Council in conjunction with the various interested parties should be given the chance to identify those areas of least wildlife value and greatest potential for enhancement of the present landscape by well designed afforestation. This is a landscape profession led exercise which the various County Planning Officers should welcome as an opportunity for them to demonstrate that the two professions of planning and landscape design have much to gain by working together to achieve an objective that can be seen as a future requirement. Central Government always gives an impression of

having to work within a 4 year time span and so it must be others like the many bodies represented at this conference who, acknowledging the future need, can give a lead in showing how it can be implemented at local level.

Right across lowland England there are long established woodland areas that are largely based on a historic combination of soil quality and sport. Local timber using industries have been sustained by the availability of sources of local material. In the present climate there must surely be no further encroachment into these forested areas. But the same must surely be said for the thousands of smaller woodland areas in as many ownerships — yet conversions to horse grazing paddocks or excavation for minerals are still taking place and few compensating acres of new planting appear to be in prospect. 'Restoration to agriculture' is still a popular objective for the rehabilitation of most sand and gravel workings — yet one suspects few will even be successful for more than grazing. The techniques for 'restoration to forestry' have been painstakingly developed by officers of the Forestry Commission but only applied on plateau gravel sites whereas if more valley bottom sites were to be prepared for new woods it would be a better prospect than indifferent grazing.

Whether one is considering methods or incentives for sustaining existing woods or planting new ones there is always this apparent need to sustain a vital resource that market forces cannot fulfil. (Appendix 3 of the NFU policy document *Farming trees* is a useful reference as to what is done in other EEC countries.) Probably no development in recent years has been more enterprising in this aspect than the emergence of the charity the Woodland Trust. All over the country many prized but threatened woods of great landscape and wildlife value have passed into the hands of a body that every member of the public can support by annual personal contribution. Could it lead one day to every Parish Council in the country being able to boast that their woods had an assured future and were being actively managed by a co-operative of all the local landowners under the auspices of the Woodland Trust?

So much for the uplands — what of the lowlands with their mixture of modest farmers with odd small woods and the larger, sometimes institutional estates with in hand woodlands in all stages of management?

I will leave to other speakers the grant-aid gymnastics; the planting permutations and the taxation torments - instead let me repeat the general theme that on landscape and wildlife grounds wherever soil and climate permit broadleaf species to be successfully established, then they should provide the greater part of any planting mix together with sympathetically planted edges fenced against stock. The Forestry Commission's Broadleaved Woodland Grant Scheme has incentives to encourage this, and the various Amenity Tree Planting Programmes run by local authorities in conjunction with the Countryside Commission offer every inducement to do the same.

It is one thing to make recommendations as to what should be done but another to feel confident that every farmer is convinced of the need or the advantages of doing so. I am also aware that not every training college with courses for young farmers and land agents is convinced of the need to give these people a realistic attitude towards conservation generally. I have been told that not every principal in these colleges is even convinced of the need to ensure his teaching staff are free of died-in-the-wool attitudes. Like all those farmers who so stoutly support FWAG because they see the growing interest in countryside matters among an increasingly alert non-farming public, I do not believe this is a passing fashion. Unlike previous generations we have a clearer picture of the long-term effects of exaggerated development policies on the environment of our planet.

The Implications for Birds of Farm Woodland Expansion

J H Andrews

Royal Society for the Protection of Birds

Abstract

Reduction of UK woodland cover, beginning in prehistory, reduced bird abundance and modified their distribution. Historic requirements for diverse timber and wood products ensured sufficient woodland variety to maintain bird diversity but modern forestry systems tend to be less satisfactory. At present, farm woods are mostly small and isolated: this limits their ornithological value more than lack of management does. New plantings will be beneficial if based on tree species capable of supporting our avifauna, managed to produce structural diversity, incorporating non-crop trees and shrubs and located in areas without existing conservation value. Further research is required on some bird species' needs and on the conservation merits of non-native trees. Costs and benefits of modifying commercial systems to accommodate conservation should be evaluated.

Man's Effect on UK Woodland Bird Communities

For several thousand years after the post-glacial recolonisation by trees of what are now the British Isles, man's effect on our forests was probably little more significant than that of any of the other large forest animals — especially wild boar and deer. The real impact began when he became a farmer. Foliage was cut as fodder and the forest was felled to create areas for cultivation and grazing, which in turn prevented regrowth. But even while he was actively destroying the wildwood man was still dependent on it, particularly for fuel and building materials. So it is quite likely that, in areas of southern Britain which were relatively densely settled even before the Roman colonisation, there were woodlands which had been spared from clearance specifically to provide a sustained supply of needed materials. By the time of the Norman Conquest most of the wild wood had disappeared, having been cleared or brought into management.

What effects did this have on the birdlife? Clearly, the reduction in the area of forest affected the abundance of birds. However, the territorial requirements of most woodland species are small and the great majority will have been able to find enough habitat to maintain their populations at a reduced level, though the presence of a given species in any one site will now have depended on whether management created the right structure and tree species composition. Birds of prey such as goshawk, buzzard and honey buzzard will have suffered most from the reduction of site size which diminished total prey availability or, in more recent centuries, because of persecution resulting from real or imagined conflict with human interests: the giant gamebird capercaillie was made extinct, probably by site fragmentation plus disturbance and hunting pressure. The present population is the result of reintroduction.

Management of the woods will have altered their structure and composition — potentially a greater hazard to most wildlife than reduction of area. Fortunately, requirements for wood products were both varied and constant. The difficulties and costs of long distance transport meant that in any one district, and often in one site, management was aimed at maintaining a variety of trees and underwood of different species, forms and ages. This enabled a diversity of plants and animals to maintain widespread distributions.

Today, woodlands richest overall for wildlife are those classed as ancient and semi-natural, meaning that they occupy sites which have probably always held trees and that management has retained most of the naturally occurring species of trees and shrubs, at varying ages, with no alien planting. In such woods, the greatest variety of wildlife remains, and conservation should take precedence over commercial exploitation, though the two may co-exist provided sympathetic management systems are followed. Some farm woodlands fall into this class, but many are secondary.

Secondary woodlands normally hold a reduced assemblage of wildlife. Many plants and invertebrates have limited mobility. Unable to cross the expanses of unsuitable habitat that separate one wood, or one part of a wood, from another they cannot colonise new plantations even if they offer ideal conditions. However, birds have no such problems: if the site's tree species composition and structure is suitable and the food resource is adequate, a good avifauna will develop.

Recent forestry practice has tended away from diversity within a wood or at least within a parish, towards even-aged plantation systems of one or two tree species only. These are not without their attractions for some birds, the appropriate species arriving to exploit different stages in the growth of the wood and then moving away when it becomes unsuitable. However, many bird species have evolved to exploit features of particular tree species. For example, the beak of the coal tit is better suited to feeding amongst conifer needles than is that of the blue tit. Lack of

diversity in tree species therefore restricts the variety of wildlife. At the same time, the non-native species used in much new planting have not shown themselves to be able to offer such suitable food resources as derived from native trees. Thus the defoliating caterpillars of oak are the optimal food resource on which many species feed their young. Finally, rotation length is a significant factor because some species exploit invertebrates associated with over-mature or dead timber, while many require as nest sites the holes and cavities only developed in mature trees.

Existing Farm Woodlands

Farm woodlands are usually small. In a recent survey undertaken in East Sussex, 40 per cent of the woodlands studied were in the category of 0.25-1 hectare and only 5 per cent were over 10 hectares. Nationally, the average size of farm woodland has been estimated at 6 hectares for England and Wales and 10 hectares for Scotland, with 1 in 5 farms having woodlands. In 1985 MAFF estimated the total resource at approximately 279 000 hectares and its Environmental Topics Survey estimated a ratio of broadleaves to conifers of 4:1 on farms. However, most of the recent plantings have been of pure conifers or exotic broadleaves such as poplar.

Whilst many farmers realise the benefits of trees and woods in the landscape the resource is largely unmanaged. Most farm woodlands are not considered economically important and have been neglected or have been partially felled without regard to means of replanting and regeneration. Coppice is often over grown, high forest is left unthinned and more open woodland is invaded by self-sown scrub. In many circumstances the neglect can produce ideal conditions for a wide range of birds but unmanaged areas are susceptible to considerable damage to their economic value. In present circumstances they are less likely to be removed but threats include dereliction caused by grazing and sheltering stock, the tipping of rubbish, stubble burning or pesticide damage (especially along woodland edges) and invasion by exotic shrub species planted for game cover.

Breeding densities in our modified, if not actively managed, woodlands can vary from 700 to 1800 pairs/km². The average species richness for larger woodlands (c 40 hectares) has been estimated at 37-38 species (Fuller, 1982). In most farm woodlands the figure would be lower and largely made up of 10 ubiquitous species. A study of woodlands of less than 10 hectares in England and Wales found that wren, dunnock, robin, blackbird, song thrush, mistle thrush, willow warbler, blue tit, great tit and chaffinch occurred in over 90 per cent of the sites. Woodpigeon, blackcap, long-tailed tit, coal tit, treecreeper and bullfinch occurred in 80 per cent to 90 per cent of all sites.

The most widespread species are probably the most tolerant of a wide range of habitats; indeed 9 of the 10 most ubiquitous species (excluding willow warbler) have adapted to farmland hedgerows.

Some birds have requirements so narrowly specialised as to exclude them from any woodlands which do not offer the right nesting or feeding opportunities. Hole-nesting species such as the nuthatch and redstart fall into this category as do the whitethroat and tree pipit which favour open woodland and scrub.

In principle, new farm woodland is to be welcomed as increasing the populations of woodland birds. Indeed, in its response to the Forestry Commission's Broadleaves Policy Review, the RSPB argued for a doubling of the area of broadleaved woodland. However, it made clear at the same time that the benefits this might bring to bird conservation would depend on the species composition, size and management of new plantings and on the choice of location.

Size, Species Composition and Management of New Plantings

The bird communities of woodland vary both geographically and as a consequence of management. Within England and Wales, areas to the east of the country hold higher number of species than areas to the west. Over Britain as a whole there is also a decline in species number from south to north. Such regional differences in the bird communities of woodlands are primarily due to climate rather than woodland type or management factors.

Within this regional framework the woodland bird community is influenced by three major factors — woodland tree composition, woodland structure and woodland area which are in turn determined by management.

At the broadest generalisation — the split between coniferous and broadleaved woodland — differences in both bird species diversity and density can be detected. Some species, such as the crossbill and siskin, are largely confined to coniferous woodland whilst others, like the nuthatch and blackcap, are broadleaved species. Generally a far greater diversity of species and density of birds is associated with broadleaved woodlands, though the low diversity found in our modern conifer forests is partly the result of management and age.

Different species of tree vary in the communities of invertebrates that are associated with them. Native trees which have been abundant throughout recent geological history have most insect species associated with them: recent introductions fewer (Southwood, 1961). The growth characteristics of different tree and shrub species can also be important. For example, the dead lower limbs of closed canopy oaks support wood-boring insects exploited by certain birds.

The more diverse the population of fruiting trees and shrubs within a woodland the more diverse the wintering community of birds (Ulfstrand, 1975). For example, beech mast can be a very important food supply for birds like the brambling or great tit and birch and alder seed for the siskin and redpoll. Fruiting shrubs provide essential energy supplies for many species especially the thrushes and tits.

Evergreen cover too can be important for winter survival, and possibly as an influence on spring microclimate and hence the date of commencement of breeding. Holly, ivy and yew have a contribution to make but alien conifers in mixtures also have some merits. However, the proportion of planting and the choice of species are important considerations.

In summary, use of tree species by birds indicates that:-

- a. broadleaves are preferable to conifers;
- b. native species of trees and shrubs are preferable to introductions;
- c. a mixed and diverse range of tree and shrub species is preferable to a monoculture. In this context, both conifers and non-natives may have a contribution to make.

Within the limits imposed by soils, climate and geographical location, woodland structure is the outcome of management, or lack of it, including the choice of tree species. Tree size, form and age influence the bird community directly by providing arboreal habitat and indirectly by modifying the understorey. Broadly, the more diverse the structure of canopy and understorey, including shrub and herb layers, the more diverse the bird community. Individual bird species are probably more influenced by certain structural features within a wood than by the overall habitat or by structural complexity per se, but the more structurally complex woodland will offer opportunities for a wider range of species.

For example, the presence of lower cover may be necessary for species like the blackcap and garden warbler to find suitable nest sites. Low field and shrub cover also provides protection during cold spells and refuge from predators. Other birds are morphologically adapted to feeding in certain areas of the canopy. The blue tit, for example, is able to feed on the slimmest outer twigs of trees and shrubs because it is light and agile whilst the heavier great tit makes more use of the larger branches of trees, shrubs and the woodland floor. The greater complexity of structure the greater the chance of the range of niches required being available.

In the breeding season, birds must find reasonably secure sites in which to locate the nest and rear helpless young. Some seek concealment, hiding the nest amongst foliage or beneath herbage on the woodland floor. Others, like rooks, find protection in accessibility. Many species seek the best of both worlds by using holes and cavities — tits, flycatchers, redstart, tree sparrow, starling, stock dove, jackdaw, nuthatch, treecreeper, woodpeckers, owls and others. But few are able to excavate their own sites so most rely on natural holes or take over those created by woodpeckers. In natural woodland such sites are abundant but management removes over mature or dead timber and modern optimal harvesting strategies may require felling well before maturity. This means that nest sites for many species are at a premium and the numbers and variety of breeding birds are much reduced.

Another important factor in the structure of a woodland is the presence of breaks in the tree canopy created by glades or other habitat such as ponds. Glades can be extremely important for woodland edge species, like the goldfinch, yellowhammer, tree pipit and linnet.

In summary, structural diversity is desirable, in particular:-

- a. a range of age classes of trees, including mature, over mature and standing dead timber. Live old trees with snags and cavities are most valuable;
- b. as complete a cover in the field and shrub layers as possible;
- c. a patchwork of small open areas (eg areas created by felling and restocking) within the woodland;
- d. management of rides or permanent glades to enhance the field and shrub layers.

The last factor is woodland size and proximity to similar sites. A correlation between area and number of bird species has been described for British woodlands (Hooper and Moore, 1975) — small, isolated sites tending to be species-poor. There is also evidence (Opdam, Rijdsdijk and Hustings, 1985) that some species, notably nuthatch and marsh tit, do not colonise apparently suitable small sites if they are isolated though they can exist in similar small sites which are not isolated. Small size and isolation are characteristic of many farm woodlands whose avifauna has been shown to be restricted (Fuller, 1982). This tends to suggest that ideally sites should be large, or close to others. Yet factors such as density of the surrounding hedgerow network or presence of other woodlands in the vicinity may be more important than area per se, especially for birds which forage outside woodland. Further, those species which utilise the woodland edge may be better served by several small sites than one large one and this will increase the ration of edge to area.

In summary, when planning size and shape of new planting:

- a. new planting which adjoins existing farm woodland, is, on present knowledge, more likely to achieve additional bird conservation benefits than is isolated planting;
- b. isolation effects can be reduced by the maintenance of corridor habitat such as hedges;
- c. for most species, larger woodlands are preferable.

The location of new planting

In recent years, the expansion of forestry in upland Britain has been a cause of bitter criticism by wildlife and landscape conservation bodies alike. Assessed from the ornithological standpoint, no species of bird has yet been threatened on a national scale by commercial forestry, but some have experienced regional declines and there are grounds for concern that further expansion in certain critical areas poses a serious threat. Of the 16 characteristic moorland breeding species, 10 can be considered to be largely or wholly dependent on this habitat and the populations for several including golden eagle, hen harrier, merlin, greenshank, golden plover, dunlin, short-eared owl and raven are of international importance. The Directive on the Conservation of Wild Birds (79/409/EEC) obliges the UK Government to take measures to protect the habitats of most of these species. Areas such as the ffridd in Wales also hold important bird populations.

Lack of precise information on distribution or habitat requirements of the species concerned has presented a major obstacle to evaluating the compromises. Latterly, considerable progress has been made in surveying distribution, and some with extending our knowledge of habitat requirements and of the effects of forestry: part of this work is being funded by the Forestry Commission. However, information by itself does not make decisions and, though it is outside the scope of this paper, it is worth noting that conservation bodies remain dissatisfied with the absence of formal mechanisms by which they can make their views known on new planting to some independent or at least representationally balanced arbiter.

New planting on the enclosed uplands and in the lowlands could run into some similar problems. Conservation bodies may be expected to be concerned if it results in the replacement of woodlands which they regard as of existing wildlife or landscape value or if it takes place on the areas of semi-natural habitat still existing on farms, because these retain wildlife interest and are often important in the survival of non-woodland species. For instance, recent work by a number of individuals suggests that an important factor in the decline of barn owls has been the loss of winter foraging areas, particularly rough grassland with high populations of small mammals.

Obviously, new forestry planting on land not hitherto in agricultural use would do nothing to reduce farm surpluses so it is assumed that planting would be concentrated on existing pasture or arable. However, despite the impact which agricultural intensification has had on farmland bird communities during the last 40 years, there are still variations in the level of interest and some areas retain bird populations of national importance. For example, the UK curlew population is now concentrated in the hedgerows of south Devon and forestry planting in this area could be the last straw for a beleaguered species. Similarly, there are strongholds of lapwing, barn owl, snipe and grey partridge amongst others whose protection would be seen as a bird conservation priority.

In summary, the location of new planting is likely to be a matter of interest to bird conservation organisations and, based on the upland experience, conflict may arise unless acceptable mechanisms exist for consultation and decision-making.

Research Needs

Present knowledge of distribution and numbers is broadly adequate to identify those woodland bird species which are most in need of conservation attention because of rarity, declining numbers or restriction of range due to lack of suitable habitat. New planting would bring greatest conservation benefits if it were so designed as to accommodate these species. Leaving aside questions of cost and political will, this would depend on adequate knowledge of the requirements of the species. A number are, or have recently been, the subject of ecological research by conservation organisations. For instance, RSPB work includes pied flycatcher in sessile oakwoods, nightingale in coppice, greater spotted woodpecker in broadleaved high forest, woodlark in lowland conifer clear fells (funded by the Forestry Commission) and black grouse in upland conifer restocks. There remain a number of species which require study as possible beneficiaries of new planting, and factors such as isolation effects also require some further investigation.

At the same time, it would seem sensible to approach the situation by considering the costs and benefits of modifying the most economically advantageous management systems. Again, the RSPB has undertaken some work in this vein, for instance by examining the bird communities of felling coupes in upland conifer plantations in order to establish what size attracts the greatest diversity of breeding birds. It has also assessed the contribution made by broadleaved amenity planting within conifers, in order to see whether the best bird conservation benefit is achieved by grouping the planting in one place or spreading it throughout the site. If foresters will produce models of the most economically attractive farm plantings, the costs and benefits of modification for conservation can be assessed.

The use of alien tree species is a continuing subject of imperfectly informed criticism by conservation bodies and no more competent defence by forestry interests. A visitor from another planet might assume that the two sides actually enjoy the game since little attempt seems to have been made to draw it to a conclusion by objective evaluation of the trees' influence on soils, water quality, plant communities, invertebrates and animals including birds. Work on the species most suitable for economic planting should commence.

Conclusion

The creation of new woodland on farms in the UK could bring undoubted benefits to bird conservation provided that sites of existing interest are avoided. The extent of the benefit depends on site size, tree species composition and management. It may be astute for all the interested parties to agree a joint programme of studies so that these decisions are made on a basis of established fact, and the political goals pursued in concert.

Acknowledgements

I am grateful to N Smart, formerly of RSPB, for material incorporated in this paper.

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Discussion

- Q:** *Mr P Swain (ADAS)* — What is the most appropriate management for remnant semi-natural woodland that has little economic justification, such as in the Welsh Uplands? Should the woodland be fenced to permit natural regeneration or more positively managed, when looked at from an environmental point of view?
- A:** *Mr J Andrews* — These woods are valuable because of their present condition, shown by the bird populations, ground flora and bryophytes. In these woods sufficient seedlings survive in remote locations. Fencing leads to changed conditions and is costly. The interest is kept by maintaining diversity. Additional financial support may be needed.
- A:** *Mr D Randall* — The owner needs to define his management objectives. Cattle can cause extensive damage in unfenced woods.
- Q:** *Dr P Mayhew (British Association for Shooting and Conservation)* — John Andrews mentioned that some conifers were better than others for birds. On what does he base this comment — insect communities, tree structure?
- A:** *Mr J Andrews* — Not enough is known about bird species at present.
- Q:** *Mr P Downing (Dartington Institute)* — Given that afforestation of farmland will take place following the individual decision of farmers, and that afforestation in any one local area will be incremental as a result, at what stage will conservation interests become alarmed at the change: 5 per cent? 10 per cent? 20 per cent?
- A:** *Mr D Randall* — Communication between the different interests will be needed. There is no limit to broadleaved planting, but avoid conifers!
- A:** *Mr J Andrews* — Farm Forestry on unproductive areas does nothing to reduce production levels. Areas vary in their requirements. For example, barn owl decline in West Suffolk can be attributed to loss of rough pasture, whereas birds are abundant in east Suffolk.
- A:** *Dr C T Lukehurst (Brighton Polytechnic)* — There is a need to face up to the opposition to forestry. The local population may object to both conifer and broadleaved planting.

Comment: Mr J Fletcher (Forestry Commission)

People do not like change.

Q: *Mr O Brandon (Dartington Institute)* — If broadleaf afforestation is likely to proceed on marginal agricultural land of relatively high conservation value, what are the conservation trade-offs that make it more or less acceptable?

A: *Mr J Andrews* — The problem here is that much of the remaining marginal land is relatively undisturbed.

Q: *Mr K Royston (TGUK)* — Does Mr Randall think there should be a County Forestry Plan, similar to a minerals plan?

A: *Mr D Randall* — This might help by pointing out the need to avoid conspicuous views, SSSIs etc. Areas could be identified that were suitable for forestry, on landscape grounds.

Q: *Mr B Howell (Abbey Forestry)* — Does Mr Randall think that Landscape Architects are adequately trained for this work, being mainly urban based?

A: *Mr D Randall* — Training has improved in the last 10 years and now covers the rural landscape.

SESSION II: FORESTRY OPTIONS

The Interaction of Farming and Forestry in the Uplands

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Abstract

The prospective change of the Common Agricultural Policy provides a markedly different background to future afforestation from that of the changes in hill farming between 1955 and 1975 which allowed the previous major expansion of forestry. A case is made for more intensive silviculture than that developed on exposed, low fertility moorland in the past quarter century. The aim should be to create farm woodlands that are diverse in species and capable of yielding very early returns, this being made possible by the farmer's low opportunity cost labour. The possibility is seen of developing forest employment (direct or by contract) for farmers who would, on their own land, also diversify into forestry production.

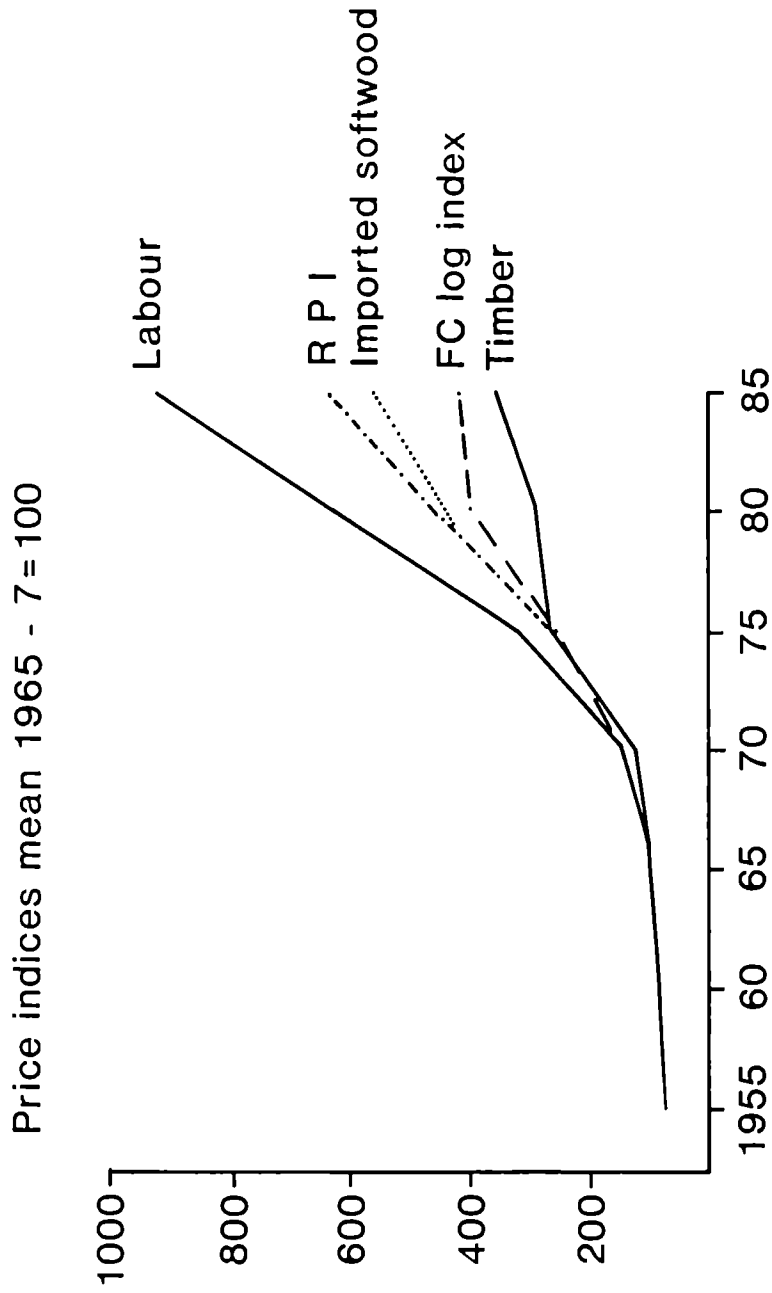
There is some tendency to regard the current and impending changes of land use, between farming and forestry in the hills and uplands, simply as an extension of the changes that occurred in the 1960s and 70s. It is important to determine whether or not that proposition is true, if society is to produce an acceptable policy in this respect and is to provide appropriate support for desirable developments and resistance to undesirable ones.

During the early 1960s much of hill farming was emerging from a period of management characterised by very low inputs, very low outputs and very large subsidies into a phase of slightly more intensive regimes: typically it was changing from a mean productivity of 65 per cent lambing at marking to about 90 per cent lambing. As part of that change a large area was transferred from grazing to forestry, generally in units larger than 250 hectares and sometimes much larger than that. In some instances the farmer financed the improvements (fencing, reseeded, new livestock) by selling part of the farm; in others the sale was not the financial means to the changed husbandry but was merely a result of it. In recorded examples (eg Mutch and Hutchison, 1980) the change of animal management on hill farms in Scotland both produced a substantial increase in total yield and released 25 per cent of the original farm area for afforestation. In some instances the whole farm was sold for afforestation, perhaps because the farmer was slow to alter his management, or his farm was unsuited to more intensive working, or he wanted to retire and found the forestry buyer made the highest offer for the purchase of the land. In the period 1955 to 1975 an area of approximately a quarter million hectares of hill and upland farms were transferred to afforestation.

Almost entirely the afforestation was a programme of large-scale forestry by the Forestry Commission and the principal forestry companies. This produced farm and forest neighbours but there was virtually no 'integration' of land use, although this word was often used. Few people engaged in both farming and forestry. As neighbours, there was interaction. Farmers benefited from new roads in the hills. Many found fence maintenance much more costly when the farm was bounded with a forest than with another sheep farm. They became anxious about the forest harbouring foxes and crows, although in practice there seems to be real cause for anxiety only where communications are bad and where good neighbourliness is lacking.

While hill farmers were generally increasing the inputs of capital, forest management after 1960 was forced into progressively lower capital inputs and lower labour inputs, with afforestation moving higher up the hill on cheaper land which, after ploughing and fertilising, was planted typically with pure Sitka spruce. The silvicultural regime which has developed now involves re-spacing (ie pre-commercial thinning to waste), acceptance of no marketable thinning yield until around year 30 or no thinning of the crop at all, and final felling at a rotation age as short as 35 years in the areas most severely exposed to wind throw. The Forestry Commission and the forestry companies have been forced into this management position principally because timber prices have increased more slowly than the general index of retail prices and, more importantly, much more slowly than forestry labour wages; the forest manager has been struggling constantly to economise in labour inputs, in effect, to simplify his silviculture and to avoid diversity. (See Figure 1).

Figure 1



Few farmers took any part in the afforestation of the last quarter century. The reasons have been sought by survey (Sidwell, 1986). The usual farm tenancy system, with the woods held by the landlord, produced no tradition of farm-forestry to carry forward into the increasing owner-occupier condition; for the past 60 years the principal incentive to invest in afforestation has been by reclaiming income tax, but few farmers are high taxpayers. Farmers saw agricultural investment as more urgent than afforestation investment on their land and the grant-aided schemes for farm improvement made virtually no provision for tree planting of any kind and none whatever for commercial timber growing.

This position now appears to be changing markedly and there is an expectation that as much as one million hectares in the UK (and 6 million hectares in the European Community) may be taken from food production. A large proportion of those areas might become forest, creating a high degree of environmental change.

A central issue for the future relations of farming and forestry is whether the changes in the Common Agricultural Policy (CAP) which bring land out of farming for food are "left to the market" or are the subject of positive planning. A simple reduction in produce prices, achieved by reducing the threshold of intervention buying, broadly would leave in production the lowest cost producers and would penalise the marginal farmers, with their markets less protected. In forestry terms this CAP strategy would be likely to release large blocks of land for afforestation, as farmers sold out to forestry companies either whole farms or substantial parts of them. This indeed is what appears to be happening already as farmers anticipate the change of the CAP and offer land for sale. Commercially this strategy is attractive to the forestry companies and high income tax-payers who are afforestation investors, though it appears to present a bleak prospect for the less-favoured farming areas and for the rural economy as a whole.

The problems of the hill farmers are easily exacerbated if lowland farmers turn from cereal production to grass and develop breeding sheep enterprises, because the flocks may be up to 20 times more productive per unit area (Table 1).

Table 1 *Comparative indicators of traditional hill sheep and lowland sheep production in the UK*

	Traditional hill sheep	Lowland sheep	Ratio
Stocking rate: ewes per hectare	1	12	1:12
Weaning per cent	80	170	
Weaned lamb weight kg	24	36	
Output per ewe kg per annum	19	61	
Output per ha kg per annum	19	734	1:39
Dry matter ingested per ewe kg per annum	500	727	
Dry matter ingested per hectare kg per annum	500	8 724	1:17.5
Effective conversion (output/100 kg dry matter ingested)	3.8	8.5	

In the rural economy we now face the prospect of a large total area of land being taken out of farming as part of the operation of the CAP, and the highest bidder for that land in open market sales being an agent for afforestation investors. Without deliberate intervention to produce a different result, it seems very unlikely that the CAP change will be in the lowland arable areas where the main problem is perceived in the form of over-production of cereals, but it will be felt in the marginal farming areas of Scotland, Wales and the north of England, on hill farms and upland farms. Given an abundance of land on offer, the forestry companies will probably not attempt to purchase land which presents any problem in respect of planting clearance (or the issue of a planting licence, should those be introduced) and, on those grounds alone and apart from the production advantages, the main focus of new afforestation is likely to move down the hill; nature conservationists have already indicated they are more relaxed about afforestation of upland farms than of moorlands.

In a future afforestation programme, even on different sites, the same basic wage: product price relationship will continue to influence the silviculture of the forestry companies as on the poorer land over the last 25 years. There appears to be little, if any, incentive in the interests of their primary investors to cause an abandonment of either Sitka spruce monoculture or large-scale planting in favour of more complex designs: the species is cheap to raise in the nursery, easy to plant and to establish, productive on a wide range of conditions and, above all, the system is standard and well-proven. Nor is there apparent a strong preference for silvicultural complexity among the buyers of established plantations, as a guide to the market 10 or 15 years hence for the present tax-driven afforestation. It is difficult to envisage the forestry companies, on their own account or for the financial benefit of their clients under present fiscal regulations, changing from the silvicultural system, based principally on Sitka spruce, which has served and is serving them so well, and unquestionably Sitka spruce grows better on upland farmland than on less fertile, more exposed hills.

If society does not consider it appropriate that the upland farming sector should be further weakened by full farm sales and complete replanting the present financial terms would have to be changed: a new silvicultural pattern will not evolve naturally.

In sharp contrast, the transfer of land to forestry may be achieved by the farmer himself. For farmers who already have a forest enterprise, the advantage lies in their capacity to convert relatively unproductive land and relatively unproductive time into a woodland asset which can produce cash either intermittently as lump sums for special purposes or as a sustained flow of income: the trick, in economic parlance, is to take advantage of farm resources with low opportunity costs. That is the essence of the production potential of trees and woodlands on the farm. (For instance see Case Study 8 in Mutch and Hutchison, 1980.)

Economically the farmer with low opportunity cost resources is in an entirely different position from the forest management company and its investment clients, which is why he should not necessarily adopt their technology. The farmer probably requires high output per unit area and typically he wants as early an income as possible. Most farmers are able to provide high inputs of labour for intensive silviculture (pruning, thinning etc) aiming at more specialist markets than extensive forestry. Farm forestry should diversify rather than simplify.

Few upland and hill farmers pay income tax at high rates and the benefit from Schedule D tax assessment is minimal or illusory. Using their own labour they should be able to establish woodland for little more than the planting grants presently available (or even for less) and, in view of their need to achieve income very early in the rotation (and certainly well within their own lifetime) they will benefit from retaining the woodlands in Schedule B tax assessment.

The central problem of forestry as a farm enterprise is the time interval between planting and harvest for a timber crop. Admittedly, for the farmer who sustains a programme of planting and tending, the problem exists only for the first occasion and once the gap has been bridged, the system will then provide a regular yield; nevertheless this is a major disincentive to embarking on a farm-forestry project.

For politicians and administrators looking at CAP changes, the principal concern should be how best to bridge the gap between planting and first production, and how to replace the farming income that is foregone by the retiral of land from food cropping and the change to wood cropping. On fertile land, and with innovative and imaginative management, the gap may be quite short. On infertile land and with uncreative management, the income gap will be as long as it is in traditional forestry.

There appears to be little point in the farmer following the same technology as the Forestry Commission and the forestry companies; he would always suffer the disadvantage of small volume production in a competitive, low-profit market where the premiums for quality are evidently very small. Rather he should aim for specialist and local markets which the large growers, saddled with overheads and expensive employed labour, have never been able to serve. For most of these markets the species for the various habitats and the appropriate cultural methods are known, though some have been little used in the recent past.

Diversity of product should be the farmer's aim as a means of bridging the income gap, but there should be caution in any expectations of farmers planting pure or nearly pure broadleaves in the hills and uplands even though these are viewed with favour by those interested in the environment. This would be very costly indeed and would require extremely large grants to persuade the farmer to comply. The real management skill is to design the tree crop so that a succession of interim yields can sustain income until the farmer may enjoy the high value of the final crop which may indeed include broadleaves.

In this respect there is special interest in the possibility of farmers making use of the mixed production system known as silvo-pastoralism, that is to say, widely spaced trees with grass between. This system was formerly used in the UK to grow poplars for matches over cereal crops and grass, and it is being used now in New Zealand to grow Radiata pine at wide spacing over intensive grass (Percival and Hawke, 1985). Something of this kind may be feasible in our different conditions, though this is not certain and a rigorous research investigation of the system is being made. A major attraction for the farmer is that he might be able to continue to receive an income (albeit a declining one) from grazing while the trees are growing, thus bridging the income gap.

The same problem was addressed by the Agricultural Structures Directive from the European Community in 1985. For farm-woodlands there were three provisions of special interest:-

- a. a farmer, receiving a Less Favoured Area Hill Livestock Compensatory Allowance, might plant trees on land used by that livestock and could continue to receive his allowance for non-existent animals for 15 years from the time of tree planting;
- b. substantial grants were suggested for tree planting and for the improvement of existing woodland and also for the adaptation of farm machinery to forestry work;
- c. CAP payments might be made to people who became part-time, or spare-time, farmers.

This Structures Directive was not fully ratified by the Government but there is a strong case for measures to be introduced which might achieve similar results for the UK. It is quite clear from the recent experience in Ireland that the offer of very high planting grants alone is unlikely to succeed in inducing upland farmers to stop farming and to grow

trees instead. Farmers are concerned at their prospective loss of income over several years after tree planting rather than the capital cost of the planting itself.

It may be, however, that the third of the provisions in the Structures Directive would be especially useful in the uplands in this country: the provision for CAP payments to be made to part-time, or spare-time, farmers. Most attention has been given to the contribution that a new forestry enterprise might make to the farm income. It may be more useful to look at the other possibility: the provision of a forestry job for a person who would become a part-time farmer on his own land.

For guidance in this there are some excellent examples in the Forestry Commission itself, the forest workers' holdings. Under the Forestry Act of 1919 the Commission was given powers to establish and lease small holdings of land to full-time forest employees. Initially the holdings were intended to encourage farm workers who had been made redundant to take up employment with the Commission, and even now many of the tenants have previously been in farm work before coming to forestry. Experience of managing the holdings scheme has been mixed; to some forest managers they have seemed an unnecessary complication when it would have been easier to plant the land, or rent or sell it to a farmer rather than to an employee. Nevertheless many of the holdings are well-managed small farms in spite of the imposition of rigorous tenancy conditions: the tenancy is not an annual one and therefore the tenant does not have security of tenure under the Agricultural Holdings Act, and the tenant must work full-time in the forest, though he is allowed to take some days off without pay each year for essential farm work.

An account has been published by the East of Scotland College of Agriculture (Case 13 in Mutch and Hutchison, 1980) of a successful holding of 54 hectares. This was on land typical of upland farms in South Scotland, an elevation of 220 m. The farm carried the equivalent of six ewes to a hectare (Greyface x Blue-headed Leicesters, served by Suffolk tups) and the flock lambed at 144 per cent. In spite of the intensity and obvious seriousness of the farming, both the farmer and his son were full-time employees of the Forestry Commission and took off fewer days than allowed for the essential stock work.

It is essential, in making provision for the change of land use in the context of current CAP changes, that the economically active rural population and the structure of the rural economy should be maintained. That is a socio-political constraint that must be met.

In that context it seems that a satisfactory move (no doubt one of several) would be one which allowed the upland farmer both to change part of his farm to wood production and to provide him with part-time forestry employment (or long-term forestry contracts) on nearby Forestry Commission or forestry company property. This would not be the short-term lowest-cost solution to the CAP problem, which would probably be outright sale for blanket afforestation, but it would have the merit of keeping the farm family on the land, still farming and providing resident forest employees.

The immediate requirement would be training in forest operations for the farmer, a planting grant payment linked to an extended Hill Livestock Compensatory Allowance similar to that in the Structures Directive and some formal assurance of initial employment in the Forestry Commission or a forestry company.

Such a scheme would benefit by application as a package planned for a district where a substantial transfer of land from upland farming was imminent, rather than being introduced casually. With the introduction of planting licences the introduction of a district scheme should be relatively simple. Given the projected expansion of afforestation and the expected doubling of timber production from existing plantations before the year 2000, the creation of the new jobs to employ part-time farmers should not be at all difficult.

The creation of a group of forestry employees and contractors who were also farming and were themselves timber growers would have the merits of making the upland land use change with care for the health of the regional rural economy, of bridging the income gap for the individual farmer between his planting investment and receipt of the earliest income and, for the Exchequer and European Community, of creating a rural economy which would be in the long-term less dependent on price support or direct subsidy than those of the present and the recent past. The objective appears to be attainable technically and financially, and would appear to meet society's requirements in the maintenance of the rural economy in upland Britain.

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Optimum Allocation of Land Between the Farming and Forestry Enterprises

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Abstract

It is probable that the majority of new forest planting in Great Britain will take place in the hills and uplands. In many of these areas agriculture already contributes significantly to economic activity and to the maintenance of the rural population, but it is from agricultural land that areas of new planting are likely to come. Further afforestation and the possible intensification of agriculture, will inevitably bring about environmental change. There is an urgent need to develop objective methods of investigating and predicting the consequences of land use allocation on forestry production, agricultural production and the environment.

One method, designed to examine the consequences of decision making on a farm or large estate using a land allocation procedure based on vegetation and soil type is presented. The procedure produces a range of potential solutions in physical and economic terms. The method offers the opportunity of deriving an objective basis for reaching optimum land use decisions.

Introduction

In recent years, it has been argued that Great Britain should become less dependent upon imported timber supplies by increasing home timber production from existing and new areas of forest. The ways of achieving this have been discussed elsewhere (Forestry Commission, 1977; Centre for Agricultural Strategy, 1980) but in all cases the majority of the area of new forest has been presumed to come from land which is presently in agriculture and specifically from agriculture in the hills and uplands.

It might be assumed that the removal of land from agriculture will be at the expense of agricultural output and some might applaud this, in view of the current surpluses of agricultural produce in the EEC but there are reasons to believe that, to an extent, land for afforestation may be released from farming without seriously reducing agricultural output (Mutch and Hutchison, 1980). This has positive implications for the rural economy, the rural population and for environmental and conservation interests but these must depend on some objective method of assessing land use options.

Existing Farming

Hill and upland farms, as classified by the Department of Agriculture and Fisheries for Scotland, are represented by livestock rearing and fattening (mostly sheep) and livestock rearing and fattening (cattle and sheep) farms as classified by the Ministry of Agriculture Fisheries and Food in England and Wales.

Hill Sheep Farms

The land resources of hill sheep farms are primarily the indigenous plant communities described in the agricultural statistics as rough grazings. Hill sheep are traditionally pure-breeds, set stocked in a free range grazing system in which they obtain the large part of their nutrient intake from grazed pasture the whole year round. Beef cow numbers on these farms are traditionally limited by the small area of sown and cultivated grassland from which their winter food may be made.

Upland Farms

The land resources of upland farms include a much larger proportion of enclosed sown grassland. The extent and the role of indigenous pasture in farming systems in the uplands varies greatly. Levels of sown pasture production are poorer than in the lowlands. Apart from the effect of higher altitudes and shorter and colder growing seasons, much upland pasture is renewed less frequently. Drainage is often poor. Management is more difficult, partly because topography constrains the integration of fodder conservation and grazing much more than in the lowlands. The sheep in the uplands are often crossbreeds derived from one or other of the hill breeds. Beef suckler cow production is generally more important in upland farming than in hill farming.

Output

The gross output of hill and upland farming amounts to some 7.5 per cent of the total gross output of agriculture in Great Britain. However, the significance of hill and upland farming to the rural areas in which it is the dominant land use is clearly indicated by Jones (1978) who calculated that it contributes around 26 per cent and 35 per cent of the gross

output of agriculture in Scotland and Wales respectively. Hill and upland farms contribute nearly one-half of the sheep and wool production and one quarter of the total value of the cattle produced in Great Britain.

The Future

Hill and upland farms therefore contribute significantly to the output of certain agricultural products and in the marginal areas their contribution to economic and social infrastructures is important and perhaps even vital.

An expanding forest has been a part of the rural scene in the hills for several decades and it seems that this will continue. Increasingly, however, environmental considerations and conservation and tourism interests must be taken into account.

Conservation Requirements

One of the main aims of those interested in the countryside is the retention of as large a proportion as possible of the large core of semi-natural vegetation which characterises the hills of Great Britain. The desire is to retain these mosaics in their present state of utilisation and low fertility. They are the basis of the open country landscape which is so highly prized and provide the habitats and resources for the characteristic wildlife of hill country.

Livestock farming is important in the maintenance of these mosaics of semi-natural vegetation, but environmental concern is expressed about the replacement of indigenous vegetation by reseeding and about the visual intrusions of associated works such as fences and tracks into the hill landscape. New afforestation is also seen as a threat to the retention of the open country landscape and conservation of the hills and uplands.

The Dilemma

The dilemma for the future is the balance which has to be struck between on the one hand economic and social objectives, based on the production enterprises of agriculture and forestry and environmental objectives on the other. There is no certain way of predicting how future policies will develop. It might, however, be reasonable to assume that neither the 'free trade' lobby which would allow the free play of market forces to determine the future, nor the 'planning control' lobby which would impose a complete rural planning system to achieve 'appropriate' balances between the community interest and the private interests of landowners, farmers, foresters and rural developers, will prevail, in the medium-term future at least.

The range of land use options for particular areas of the hill and upland sector can be narrowed by attempting to classify, within the context of existing and likely future policies, the potential for agriculture remaining a dominant activity (Eadie, 1985).

Upland Farms

In the upland sector it is highly probable that agricultural objectives will remain dominant. Many of these farms are small businesses. Their contribution to the rural economy and to the population of the rural area is considerable. They currently provide some 5/6 of the total hill and upland output. They are good subjects for the developing technologies in pasture production and utilisation, and sheep and beef production. They do not contribute to products which are in surplus, and whilst farm amalgamation will most likely continue, these farms are also capable of a significant degree of intensification. The objectives of intensification are to minimise unit costs of production, improve profitability, increase the current contribution to the rural economy and to maintain population.

A failure to sustain these farms as economic units would lead to rapid and obvious dereliction, the environmental implications of which would be undesirable in terms of landscape and amenity values, and from which little would be gained in conservation terms. There is little scope for plantation forestry on these farms, though there may be potential for the development of systems of agroforestry on the permanent pastures associated with them.

Remote Hill Farms

In the higher and more remote hills agricultural production as a major objective will doubtless continue to decline. Its role in sustaining a population to manage the countryside for conservation and landscape objectives may become more explicitly important than it is now. Continued agricultural production may, however, remain the best way of ensuring that countryside management objectives are secured at least cost to the community. This orientation could be maintained without any real fear of a significant conversion of rough grazings to sown pasture in the future. But if these farms are to retain enough people for the management purposes suggested and at acceptable income levels, the headage payment system will require to be adjustable to take account of the modified objective.

There is undoubtedly potential for commercial afforestation on these farms but only at the lower altitudes and on the better soils. In the past these farm types have been the subject of the kind of large-scale afforestation that has frequently met with public disapproval. A balance needs to be struck between production and economic objectives on the one hand and the broad consent of those with a more general interest in the land. Scope should exist for the retention of economically viable livestock rearing units which also maintain the semi-natural and natural vegetation which is so highly valued.

Less Remote Hill Farms

The future role of the better hill farms in the less remote places is potentially much more controversial. It is in this sector that the potential conflict between production oriented, population-sustaining agriculture and forestry enterprises on the one hand, and landscape and conservation objectives on the other, is greatest.

The economic viability of agriculture can be improved in these areas. Evidence from the Hill Farming Research Organisation (HFRO) (Armstrong, Eadie and Maxwell, 1986), from ADAS (Thompson, 1978) and from commercial farms (Armstrong and McCreath, 1985) has shown that considerable potential exists for improving agricultural output and productivity from farms of this type. Intensification may be based simply on the enclosure and controlled grazing management of the better indigenous hill vegetation. Reseeding is reduced to a minimum and improved productivity is, significantly, based upon improvement of the performance from the individual ewe in addition to increasing stock numbers.

Hill sheep management of this sort allows the release of land from within existing farms for afforestation, while offering the opportunity to maintain levels of output on a reduced farm area. The viability of the farm unit and thus the potential for development of the land remaining in agriculture must be an important criterion in the allocation of land to forestry. The potential to use roads constructed to meet forestry requirements and to take advantage, where possible, of fences erected around forest blocks may well reduce the cost of development of the farm unit.

Forestry potential is high on most of the land types represented on these farms. The smaller blocks of forestry that will result from a within farm allocation must also be assessed for viability, though it is possible that other, neighbouring forests also can be taken into account.

There is, however, a clear potential for conflict between agricultural and forestry objectives and, even if these can be mutually accommodated, between the farm/forest enterprise that may result, and environmental, conservation and landscape objectives.

Optimum Allocations

It is on these less remote hill farms that the need for optimum solutions is most pressing. An optimum solution must ensure:-

- a. a viable farm unit, with potential for development;
- b. a viable forest unit, which may take account of other local forests;
- c. the retention of semi-natural and natural vegetation resources;
- d. minimum new reseeds;
- e. minimum size of forest blocks;
- f. maximum diversity.

Land Allocation Procedure

Some emphasis has been placed, in the description of optimum allocations, upon the need to retain viable farm units and, as a consequence, it is on farm or estate sized units that the HFRO procedure is based. There is potentially a very wide range of patterns of land allocation to agriculture and to forestry within the area of even one farm and it might be possible to investigate the output from them all and thereafter, apply physical and optimising constraints to produce an optimum solution. This is, however, a time-consuming and expensive exercise. Our approach is to apply realistic constraints when land allocations are being made, this greatly reduces the number of solutions for which output has to be generated.

This approach has the advantage that it is more closely analogous to the process by which individuals make decisions about land allocation, with the advantage that explicit rules and priorities replace inarticulated considerations and intuitive processes. The procedure also provides a means whereby the significance and consequences of the decision rules can be examined by sensitivity analysis. These are not inconsiderable advantages when both agriculturalists and foresters remain to be persuaded that a more organised and systematic approach to the problem is both possible and practicable.

Resource Description

Land is the basic resource and the land characteristics of significance to forestry and agricultural production are soil type, vegetation type and altitude. Additionally, the relative geographical positions of the land units so described are of significance in assessing alternative patterns of land use. For this reason the description is based on a notional grid over the farm or estate area in which the size of individual blocks may be varied from example to example, 10 hectares being a reasonable average.

The assessments are made by visiting the farm and 'walking the ground' and by use of maps and aerial photographs. Soil type classification is restricted to blanket peat, peaty gley, peaty podsol and acid brown earth. Vegetation type is based on indigenous species associations, for example *Calluna/Eriophorum*, *Mollinia/Nardus* or *Agrostis/Festuca*. The altitude classes are related to forest production (Figure 1). It may be necessary to alter these classes according to geographical location of the farm or estate.

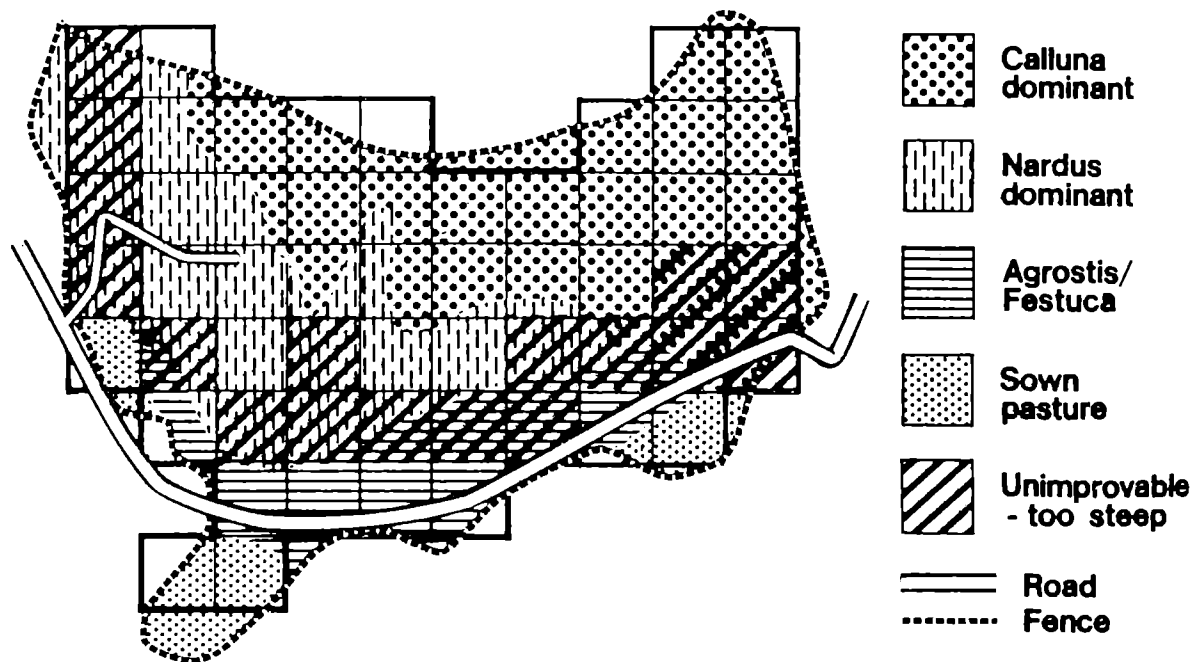


Figure 1 Vegetation classes, roads and fences within grid of 10 hectare blocks.

Each block is also classified for existing access, ie whether a block is served by an existing road or track, and for fencing, where a code is used to indicate which sides of the block are fenced.

Additionally a landscape code may be generated. Landscape is, of course, difficult to quantify but following discussions with the Landscape Architecture Department, run jointly by the Heriot Watt University and the Edinburgh College of Art, a set of codes relating type and scale of planting and restricting areas for agricultural development has been developed (Table 1).

Table 1 Factors taken account of in generation of landscape code.

Forestry - Scale of afforestation (block size)
- Areas where planting is desirable (as screens etc)
- Areas where planting is undesirable (leave open views)
- Areas for planting of non-commercial species
Farming - Areas which must not be reseeded

These five characteristics describe the physical attributes of the land unit and are used to assess production from, and the capital input required for, a range of patterns of integrated land use. An economic assessment of each pattern

requires a description of the current level of agricultural productivity of the farm ie current stock number and weaning percentage, stock-carrying capacities of indigenous vegetation class, prices and costs of the agricultural enterprise. Forest input is currently a Net Present Value (NPV) for the relevant Yield Class based on soil type, exposure, altitude etc and is provided directly by the forest interest.

An assessment of schemes in which the agricultural component of an integrated plan can be improved by introducing areas of improved pasture and grazing control by fencing is also made. This requires data on the potential for improved pasture production of the various soil types and on costs of reseeding, fencing and road building.

Constraints on Land Allocation

Any integrated solution must provide a viable agricultural unit - there is little practical value in assessing a pattern of land allocation which leaves a farm unit too small to support a farmer and his family. Equally, a sufficient area of land must be allocated to forestry to make a worthwhile unit either on its own or when taken into account with neighbouring forests.

A further realistic constraint is that all land allocated to agriculture should be contiguous so that it is possible to drive sheep to any part of the farm without going through forest. The block containing existing farm buildings and facilities is automatically allocated to agriculture, as is sown pasture, since permission for planting such land is unlikely to be granted by the Agricultural Departments.

The effects of all these constraints is to reduce the number of potential solutions to a realistic level.

The Procedure

Since the principal constraints are imposed by agricultural requirements, the procedure initially allocates land to agriculture and builds up the allocation of blocks to support a required flock size. These sizes range from, at the lower end, a number which could reasonably be expected to provide a living for one man, to, at the upper end, a number which would still leave sufficient land for a viable forest unit. For any particular flock size the area necessary will depend on the quality of the land, less land of good quality being required. To allow a comparison between the potential of both agriculture and forestry on both the better and the poorer land, each flock size is allocated over a range of land quality. This means that each flock will occupy, at one extreme, the good land, and at the other extreme a larger area of the poor land, with a converse allocation to forestry. The range of flock sizes allocates more, or less, of the total land areas to each enterprise (see Figure 2).

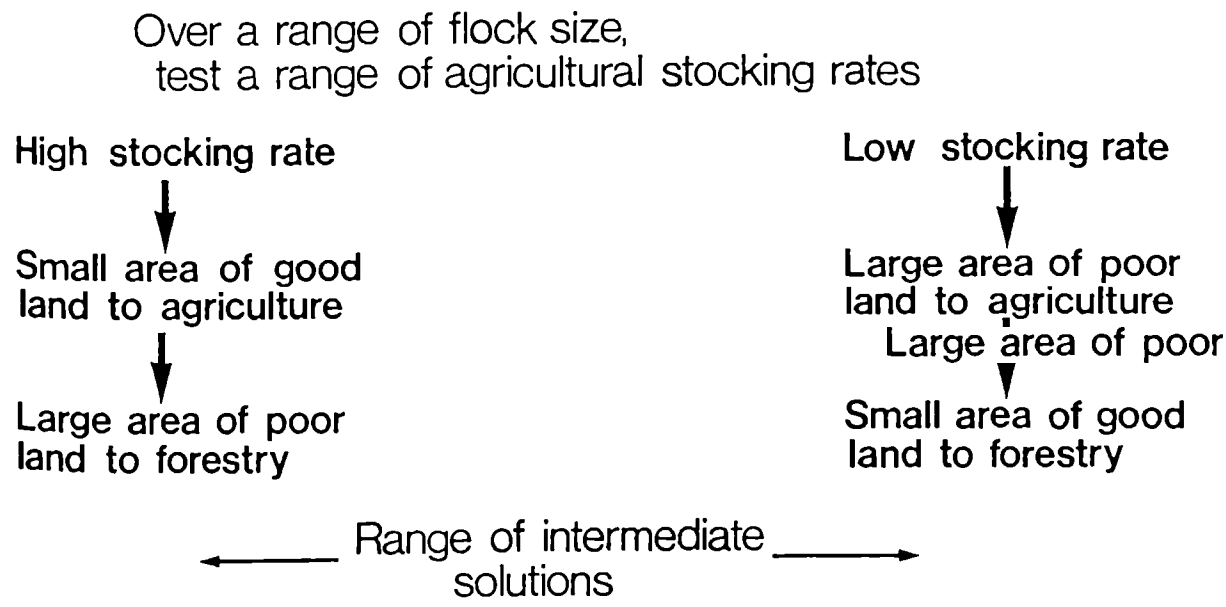


Figure 2 The effect of required stocking rate (land quality) on the allocation of land to agriculture and forestry.

An option exists to allocate to the agricultural component any land classified for forestry production as unplantable. Since, in general, it is high altitude that limits growth of trees, unplantable areas are usually at the opposite end of the farm to the farm buildings and sown pasture. Because of the constraint of agricultural contiguity, use of these unplantable areas, where they exist, tends to create land allocations with narrow strips of agricultural land connecting the unplantable area with the lower inbye/farm blocks, which may not always be a desirable arrangement.

Allocation of Individual Blocks

Land is allocated to agriculture block by block until a required flock number is achieved, where possible on a preselected land quality based on the required stocking rate. The allocation starts at the point where a farm buildings' block, blocks classified as sown pasture, and blocks considered unsuitable for forest production, are already allocated to agriculture.

The first block allocated after this stage is centred on that general area of 25 blocks (5 x 5) which most closely matches the required stocking rate (land quality). Each additional block is allocated on the basis of a hierarchical decision rule procedure (Table 2). If at any stage in this procedure only one block satisfies all the rules then that block is allocated to agriculture.

The order of hierarchy may be altered so that, as the allocation of land to agriculture is nearing completion, and the required flock number is nearly achieved, rules 4, 5 and 6 may be moved to the top in order to guarantee contiguity and to attempt to minimise the possible 'castellated' effect of block allocation. It is usual for a single block to be found by rule 5 or 6.

Table 2 *Hierarchy of decision rules in allocation of blocks.*

-
1. In order to maintain contiguity of the agricultural area, only blocks adjacent to existing agricultural blocks may be considered.
 2. From those blocks which satisfy Rule 1, consider those which will most closely maintain the required stocking rate (land quality).
 3. In order to provide a basis for subsequent agricultural improvement, consider from those blocks which satisfy Rule 2 those which have the best soil type.
 4. Consider from blocks which satisfy Rule 3, those which will improve by the greatest amount the likelihood of achieving contiguity, ie those which will move the agricultural area towards isolated areas already allocated to agriculture, eg unsuitable forest blocks, farm buildings' block, etc.
 5. Consider from blocks which satisfy Rule 4 those which allow landscape (scale of forestry) requirements to be met.
 6. Consider from blocks which satisfy Rule 5, those which will minimise fencing requirements by removing any 'castellated' effect of block allocation.
 7. Consider from blocks which satisfy Rule 6, those with the lowest forestry production level; this will leave better forest blocks to trees.
 8. In order to leave to forestry those blocks nearer to existing access, consider from blocks which satisfy Rule 7 those at the greatest distance from existing roads.
 9. At this stage all relevant criteria for land allocation have been taken account of and if there still remains a choice of blocks then the arbitrary decision to allocate to agriculture the block nearest the top left of the grid is made.
-

Creation of a Plan

When the required flock number has been achieved the allocation procedure stops. If contiguity has not been achieved at this stage then the contiguity decision (Rule 4) is switched to the top of the hierarchy earlier, and the allocation procedure is started again.

It is not always possible for the required stocking rate to be achieved. Both the quantity and distribution of particular vegetation types may restrict the quality search. However, the procedure ensures that, given the other constraints, the required stocking rate is matched as closely as possible.

When flock size and contiguity are achieved, the remaining blocks are allocated to forestry, and fence lines are created to separate the two land allocations. A check is then made to ensure that the forest area is serviced by roads so that the centre of any forest block is within 1 200 m of the nearest road. Roads are assumed to run to the centre of any block marked as being directly accessible and, if any forest block is not within the required distance roads are extended

diagonally, laterally or vertically to service it and to minimise road building. The costs of fencing and road building are filed for future economic assessment. By allocating land over a range of flock size and, within that range, over a range of land qualities, a series of plans is created and included in this are the allocations of all land to agriculture and to forestry. This series of plans is then economically appraised.

Economic Appraisal

The economic appraisal of each plan is based on two approaches. First, that agriculture will operate on its land allocation with no further improvement and, second, that up to 10 per cent of the agricultural area will be improved, fenced and used in a 'two-pasture' system. These approaches allow assessment of the current agricultural system and its potential for improvement.

Because cash flows from agriculture and forestry are to be merged for comparison of plans, a single assessment period must be used. This may be varied to suit individual conditions and is based on the predicted forestry production cycle, which is generally 45 to 60 years. Cash flows from each industry are discounted at a pre-selected rate, again to suit individual conditions, to produce a Net Present Value (NPV) for each industry, excluding in each case the original costs of fencing and road building required to set up the integrated plan since these are regarded as shared costs. The two NPVs are summed and then the fencing and road building costs are deducted to produce a Net Integrated Benefit (NIB) for each plan. Values of NIB tend to be fairly large and unwieldy so they are adjusted in comparison to a value of 100 set for the all-agriculture plan where agriculture remains unimproved. These adjusted values are called Net Benefit Indices (NBI).

Agricultural Improvement

When agriculture is to be improved it is assumed that the 10 per cent area limit on improvement will be achieved by improving and fencing blocks one at a time and year by year in order to spread investment because flock numbers cannot be increased quickly enough to utilise a faster rate of availability of improved pasture.

The decision on which is the best block to improve is made at any time on the basis of least cost per unit of potential increase in pasture dry matter production. The potential increase is based on soil type, and costs include materials, labour and off-road haulage. Any investment in fencing and road building required by agriculture at this stage is accounted for in calculating the agricultural NPV.

Increases in flock size as a consequence of the introduction of improved pasture are met by retention of extra ewe lambs produced by the flock itself and so rate of increase of flock size is restricted. Similarly, rate of increase of weaning percentage as a consequence of better pasture quality is also restricted.

The entire procedure involves many decisions in the land allocation phase and many calculations in the economic assessment and agricultural improvement phases. The procedure is therefore run on a computer in two stages. The first stage allocates land and produces a range of integration plans. The second stage carried out economic assessments on these plans and includes agricultural improvement when required.

Comparison of Alternative Plans

Direct comparison of the 'value to the nation' of alternative plans can be made through the NBI values produced. The highest value of NBI indicates the plan which will give the best overall return to the nation or to an enterprise over seeing both agricultural and forestry businesses. However, it must be borne in mind that while such a scheme would be best overall, it may not provide viable levels of production from either agriculture or forestry considered separately.

Forest viability can be assessed on the basis of its individual NPV, or on its proportion of the NPV which would be produced if the whole farm or estate area was afforested bearing in mind the proximity of other forestry interests.

Agricultural viability is dependent on the ability of the unit to support a labour force by a regular cash flow, and in addition to NPV, the agricultural assessment component of the procedure produces a total Management and Investment Income (MII) which is the annual cash flow before investments are made and an MII per ewe so that an assessment of viability can be made.

Results

A range of plans for a hill farm in the West of Scotland is shown in Figure 3. These plans would all support a flock of 600 ewes but on varying quality and therefore quantity of land. Table 3 shows a set of results for the three land allocations shown in Figure 3 and for a similar range of options for flocks of 500 and 700 ewes. The tables also shows results for all agriculture, with a flock of 862 ewes and for all forestry, solutions which must be taken into account when decisions on an optimum land allocation are being made. There is no further input of improved land in the agricultural component of this set of results.

Table 3 Example production figures for integrated and non-integrated schemes involving unimproved agriculture (discount rate 5%).

Ewe flock size	Land quality to agriculture	Percentage of area in forest	Percentage of potential forest production achieved	Stocking* rate-hill (ewes/ha)	Weaning %	Area in agriculture (ha)	NBI
500	poor	68	75	0.75	112.9	180	137
	intermediate	77	80	0.94	114.5	150	145
	good	79	73	1.30	118.5	120	152
600	poor	38	67	0.66	111.0	350	134
	intermediate	54	41	0.93	115.5	260	134
	good	63	62	1.20	117.6	230	158
700	poor	21	39	0.75	106.8	440	117
	intermediate	36	24	0.94	115.0	360	130
	good	42	28	1.08	116.4	320	143
862	all agriculture	0	0	0.89	102.8	560	100
0	all forest	100	100	-	-	0	145

* excludes inbye land

It can be seen that, with an NBI of 145, forestry is better in economic terms than agriculture at the chosen discount rate of 5 per cent. However, it is possible to identify in this example two allocations in which the integrated solution is better than forestry alone.

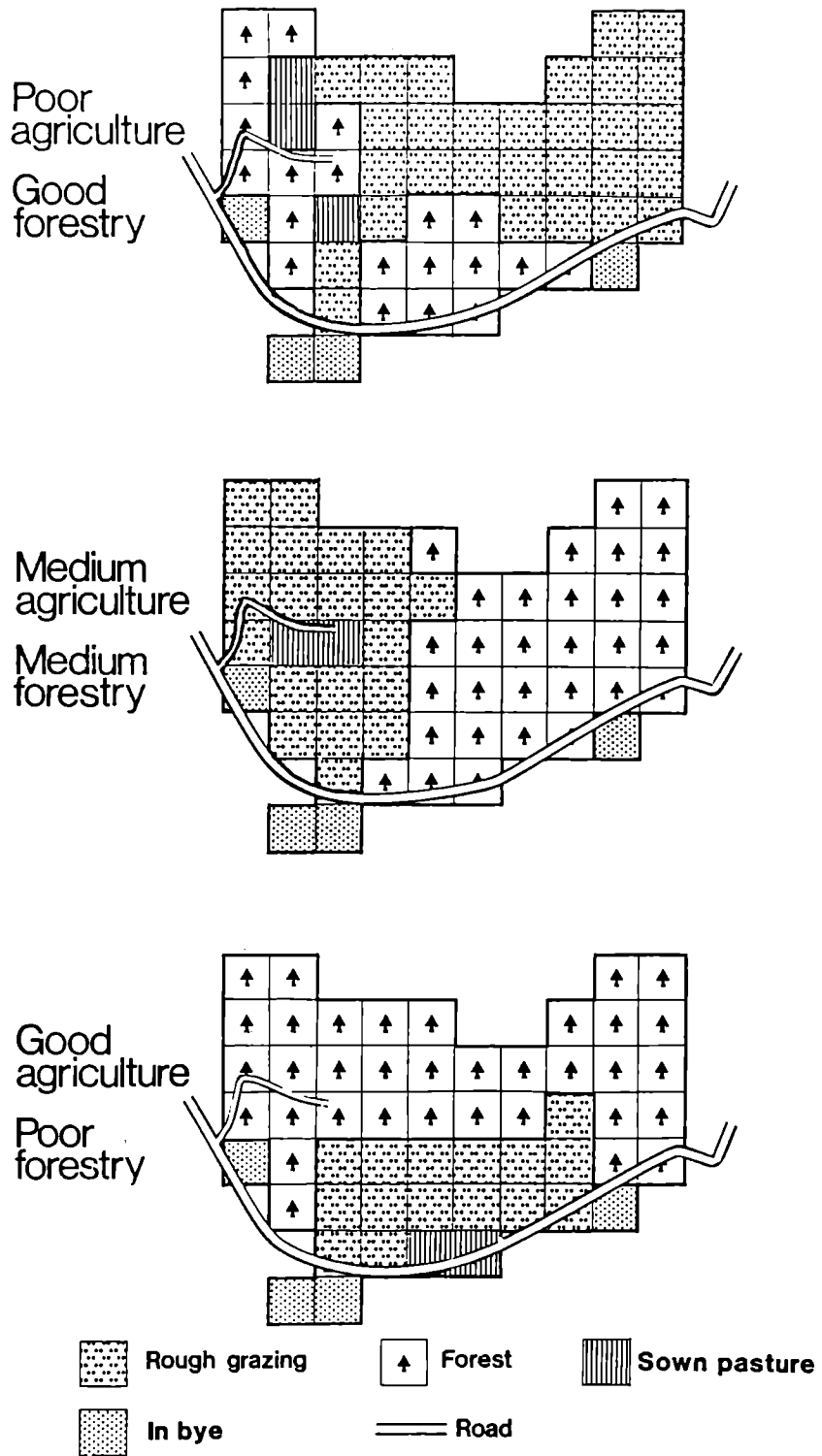


Figure 3. Three alternative land allocations to support a 600 ewe flock — also showing blocks subsequently improved.

Table 4 shows the set of results when each of the farm units from Table 3 is intensified by the input of an area of improved pasture up to 10 per cent of the farm area. Here stock numbers and individual performance are increased and as a consequence NBI values also rise. With improvements, all agriculture is better than all forestry but again, integrated allocations with values of NBI greater than all agriculture or all forestry can be identified.

Table 4 Example production figures for integrated and non-integrated schemes involving 10 per cent of agricultural land improved (discount rate 5 per cent).

Initial ewe flock size	Initial land quality to agriculture	Number of blocks improved	Stocking* rate (hill) after improvement (ewes/ha)	Wean % after improvement	Final ewe flock size	NBI
500	poor	1	1.36	112.3	591	152
	intermediate	1	1.72	114.0	589	160
	good	1	2.38	118.6	590	169
600	poor	3	1.55	110.7	882	174
	intermediate	2	1.71	115.2	776	163
	good	2	1.98	117.5	776	189
700	poor	4	1.62	112.3	1 048	173
	intermediate	3	1.74	114.8	958	169
	good	3	2.01	116.3	962	183
862	all agriculture	5	1.71	113.8	1 292	176
0	all forest	-	-	-	0	145

* excludes inbye land but includes improved hill areas

Decision Making

The objective nature of these results and the fact that a new set, based on different inputs, for example, changed price: cost ratios or discount rate, can be quickly computed should make the achievement of an optimum allocation of land an easier process. The cost of choosing one solution as opposed to any other can readily be appreciated and the landscape appearance of any land allocation, the proportions of semi-natural vegetation remaining and other interaction with the environment can be assessed from the plans provided.

The process provides the means whereby that aspect of hill land use in which change is both most rapid and most widely criticised can be examined critically. It also provides an objective analysis on which to base and develop a wider consideration of resource management in all its aspects to include the potential role of resource management incentives of the kind proposed by McEwan and Sinclair (1983) and the Countryside Commission (1984).

The Next Step

The procedure provides an aid to land-use decision making in the hills and uplands based upon an assessment of the agriculture and forestry production potential of land of varying quality which is apportioned to agriculture and forestry in a variety of ways. The 'acceptable' or 'chosen' solutions in economic terms, are of course a function of the fiscal arrangements (for tax concessions, grants, subsidies etc) operating at the time, and the private financial objectives of individual farmer or estate owners. More appropriate solutions might be achieved if existing fiscal and/or business structural arrangements were changed. For example, Fothergill (1986) has designed a Limited Partnership Scheme between farmers and forestry investors in an attempt to facilitate the continued provision of income to the farmer from land he has released for afforestation. An alternative would be the provision of a maintenance grant as proposed by various authorities (eg Denne, Bown and Able, 1986) or a Woodlands Compensatory Allowance (MAFF *et al.*, 1985). Such schemes may well encourage the transfer of land from farming into farm forestry. The procedure outlined in this paper can take account of these business and fiscal adjustments and an assessment can be made of their ability to lead to more 'acceptable' land allocation decisions.

Conclusion

Our objective has not been to provide a single optimum solution to the land allocation problem but to present a range of solutions, derived by an explicit methodology. It is believed that the approach provides information to those who have to make decisions about land use, which will improve the objectivity of the process: it will also present a clearer view of the balances being struck between agriculture, forestry, and landscape conservation objectives.

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Discussion

- Q:** *Mr D Goss (David Goss and Associates)* — Surely farmers are already financially motivated to realize potential by selling hill land and purchasing upland, rather than improving hill land?
- A:** *Mr A Sibbald* — Yes, there will be motivation to do this, but the decision will rest on the individual's situation and aspirations.
- Q:** *Mr P M Gorton (ADAS)* — How does land tenure influence the farm/forestry option?
- A:** *Dr W E S Mutch* — If pressures on farmers continue to be exacerbated then both the landowner and the tenant will be affected, and some rationalisation or agreement could result.
- Q:** *Dr M Carrol (REE Consulting)* — In calculating net benefit index, are capital requirements for agricultural improvements and afforestation roughly similar?

- A:** *Mr A Sibbald* — Yes, approx £300 per hectare.
- Q:** *Mr D Hughes-Hallett (Scottish Landowners' Federation)* — Does Dr Mutch think that farm-forestry as described by him, will be particularly attractive to certain sizes of landholding?
- A:** *Dr W E S Mutch* — Yes, the small farmer, especially an owner/occupier, would be more suited.
- Q:** *Mr D Lovelace (Friends of the Earth)* — Are relative subsidies for forestry and agriculture being compared eg tax concessions?
- A:** *Mr A Sibbald* — Assumptions to reflect subsidies can be readily changed and fed into the computer programme.
- Q:** *Dr M Bell (Institute of Terrestrial Ecology)* — Are the farms referred to by Mr Sibbald as Upland and Hill, the same as the extended and original LFA areas?
- A:** *Mr A Sibbald* — Yes.
- Q:** *Mr J Fletcher (Forestry Commission)* — Can the high price markets assumed by Dr Mutch's example be sustained both regionally and nationally if farm forestry inspires a major change in land use?
- A:** *Dr W E S Mutch* — Many farmers are showing initiative in developing new market outlets. Farm/foresters should seek to grow quality timber. Those who practice good husbandry will gain most.
- Comment:** Mr B Howell (Abbey Forestry)

Dr Mutch's 'up market' economic wood-managing farmer would be well recognised in northern Europe. To encourage such people into British farming we should see that young farmers from Britain have the opportunity to go to, and work on, such continental farms and do work in their woodlands as a matter of normal practice. Maintenance of the healthy rural population is agreed as being good for the nation; if farming declines and farm woodlands increase it will be in the interest of the nation to encourage farmers who are also active in their woodlands.

Bringing Woods into Positive Management and the Scope for Afforestation in the Lowlands

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Abstract

The paper poses and seeks to answer, from research and action project experience, several questions. Is there sufficient value in the growing stock of existing woods to make a contribution to farm incomes? Can they be managed to realise this potential? What levels of contribution? What is the scope for afforestation at individual farm level? What contribution to farm income would this make? One study showed that 32 per cent of woods had zero standing value but that the remainder ranged up to £7600/ha in value. They can be managed by farmers to produce gross margins of between £80 and £500/ha and even poor woods can usually yield much of the capital needed to bring them up to this standard. Other studies support this conclusion and show that (using investment criteria) perhaps 3 per cent of the farmland studied would give a better return if afforested. Existing woodland, if managed by farmers, would increase net farm incomes by 6.3 per cent. Afforestation, despite giving a low investment return, would contribute significantly to future farm incomes; 10 per cent of the average farm in the study area could contribute 25 per cent additional farm income. A major new programme, 'Silvanus', is described which aims, amongst other objectives, to bring 25 per cent of Devon and Cornwall farm woods under management in the next 10 years for the benefit of farmers.

Background

Dartington Institute has been involved with research into tree planting and woodlands on farms for over 10 years now and involved in action 'on the ground' for 3 years. It may be helpful to sketch out this background experience on which later opinions are based. The main projects drawn upon are listed below and Map 1 shows their geographical distribution. It will be seen that there is some concentration in the West Country but that the Institute has considerable knowledge of farm woods across England and Wales.

Small Woods on Farms, investigated the condition of all woods in small study areas of farmland in nine lowland counties; and included measurements to estimate standing volumes and quantities of timber in these woods (461 unmanaged woods were sampled). Some 160 owners were interviewed, twice in most cases. This work was sponsored by the Countryside Commission and it is worth pointing out that the country owes a considerable debt to the Commission for its pioneering role in research and action in respect of neglected farm and other woodlands in England and Wales. Our report was published by the Commission in 1983.

Wood Production for Energy in Great Britain was a desk study, in collaboration with five other institutes, of the potential for a switch of land use to energy and/or conventional forestry from agriculture. It established a sound methodology for land use modelling, with particular reference to comparisons of the economic returns from agriculture and forestry. The report was published by Energy Technology Support Unit, Harwell, in 1984.

The Potential for Farm Forestry on the Culm Measures, was a detailed 3-year study, recently completed, of a difficult lowland farming area in South West England; some 3000 km² in extent. Data were collected for every field and every wood on each of 100 x 1 km² OS map squares (over 500 woodland areas were sampled). These provided the detailed data base for computer based models which, separately, estimated the potential of farmland afforested under varying assumptions and the present and future production potential of the existing 200 km² of woodlands. These estimates were related to farm incomes in the study area. Over 60 farmers were interviewed and six farm-based case studies were carried out. This study was sponsored by the European Commission, Ministry of Agriculture, the Countryside and Forestry Commissions and the Natural Environment Research Council. The report will be published shortly. (Part of the research involved a short study of forestry on farms in France, Netherlands and West Germany; very relevant to the issues of this conference.)

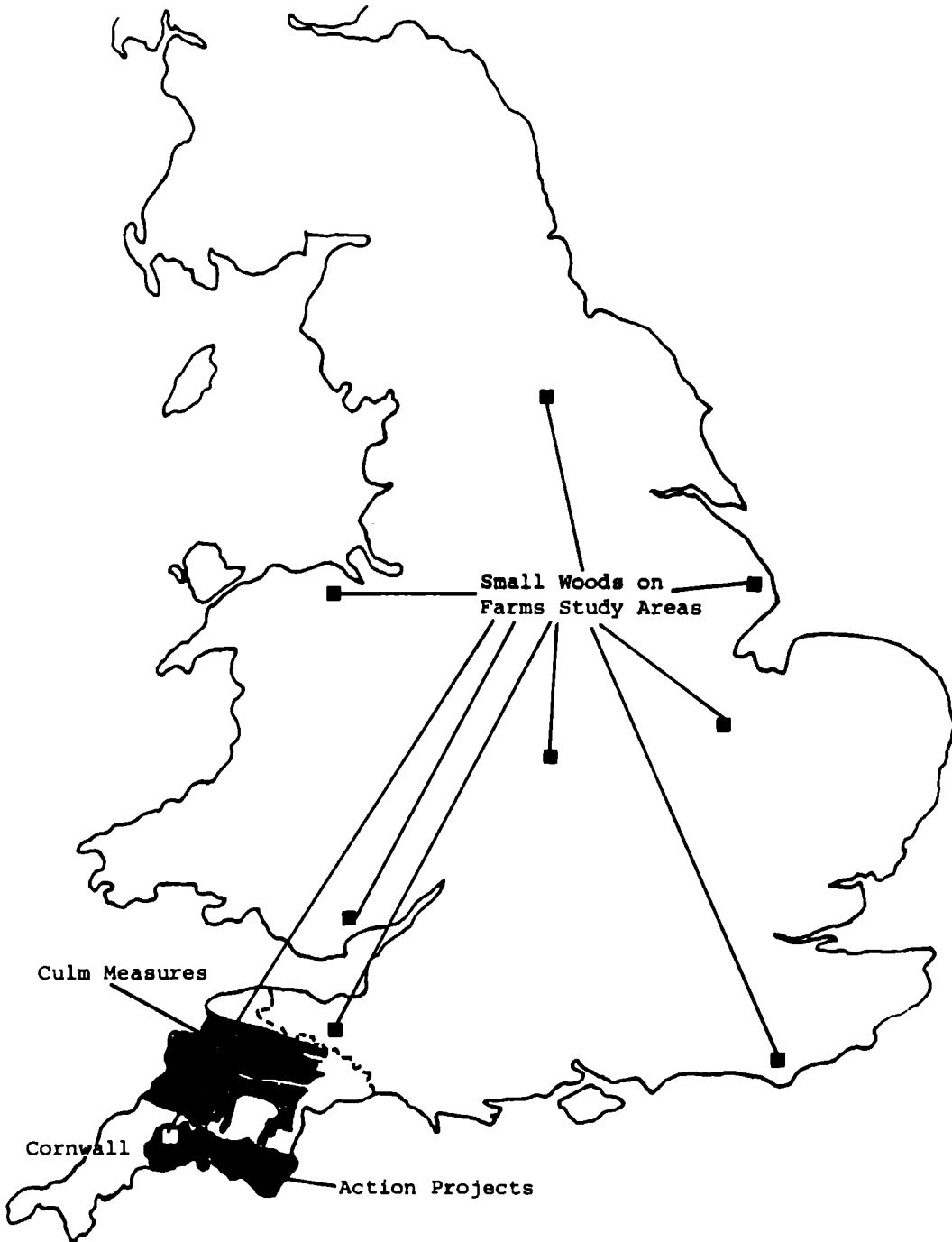
Finally we are drawing on the practical experience of running two Woodlands Projects, in Caradon (east Cornwall) and South Hams (Devon). In addition we have desk study data for Great Britain (by Institute of Terrestrial Ecology Land Class and by region).

In order to judge whether forestry is a serious option for Britain's farmers, there are questions which present themselves and require answers.

Map 1

Research Background

- Culm Measures Study
- Small Woods on Farms Study
- Caradon Woodlands Action Project
- South Devon Woodlands Action Project



- For existing woodlands:
 - is there enough potential value in the woods to make a contribution to farm incomes?
 - how should this contribution be measured?
 - can they be managed to realise this potential?
 - what levels of contribution can they make — now? — in the future?
- For afforestation:
 - is there an economic argument for planting up farmland?
 - what contribution to farm incomes would this make — now? — in the future?
- Both cases:
 - can farmers run a forestry enterprise?
 - will they be interested?

We plan to show that the answers to all of these questions are affirmative, beyond our doubts at least.

Existing Woodlands

Woodland Values

In Figure 1 the data on woods surveyed for the Small Woods on Farms study are shown broken down into value/hectare categories. It will be seen that, in some areas, a high proportion of the woodland area had a zero value — some 32 per cent overall — and a further high proportion were valued at £100/ha or less. However, the presence of a small but significant area of woodland of substantially higher value/ha will also be noted.

The Culm Measures data show a similar picture. For this study, the woods surveyed were not valued individually, only in aggregate, but broken down into a wide range (69 in all) of management prescriptions applicable to an estimated 20 000 hectares of woodland. These prescriptions obviously varied considerably but in the majority, the first 10 years was the most intense period of activity and we therefore calculated the net turnover for this 10 year period (after deduction of costs necessary contractors' works). Figure 2 shows these turnover data broken down, again by value/hectare categories and Figure 3 is a taxonomic analysis of the woods themselves.

The issue then arising is the proper context in which to appraise this potential and the choice of financial yardstick. Our contention is that the traditional forestry use of discounting techniques is not appropriate. Farmers do not appear to conduct their enterprises with the aim of maximising returns to investment in the long term. They are concerned with an annual picture of profit and loss; economic survival is their prime concern, together with the need to trade profitably, taking one year with the next, in order to survive. This achieved, their aim at heart is usually a satisfactory level of income rather than a maximised income. (This may not be wholly true of the 'agri-businessmen' but these are not in the majority.) (Newby *et al.*, 1977.)

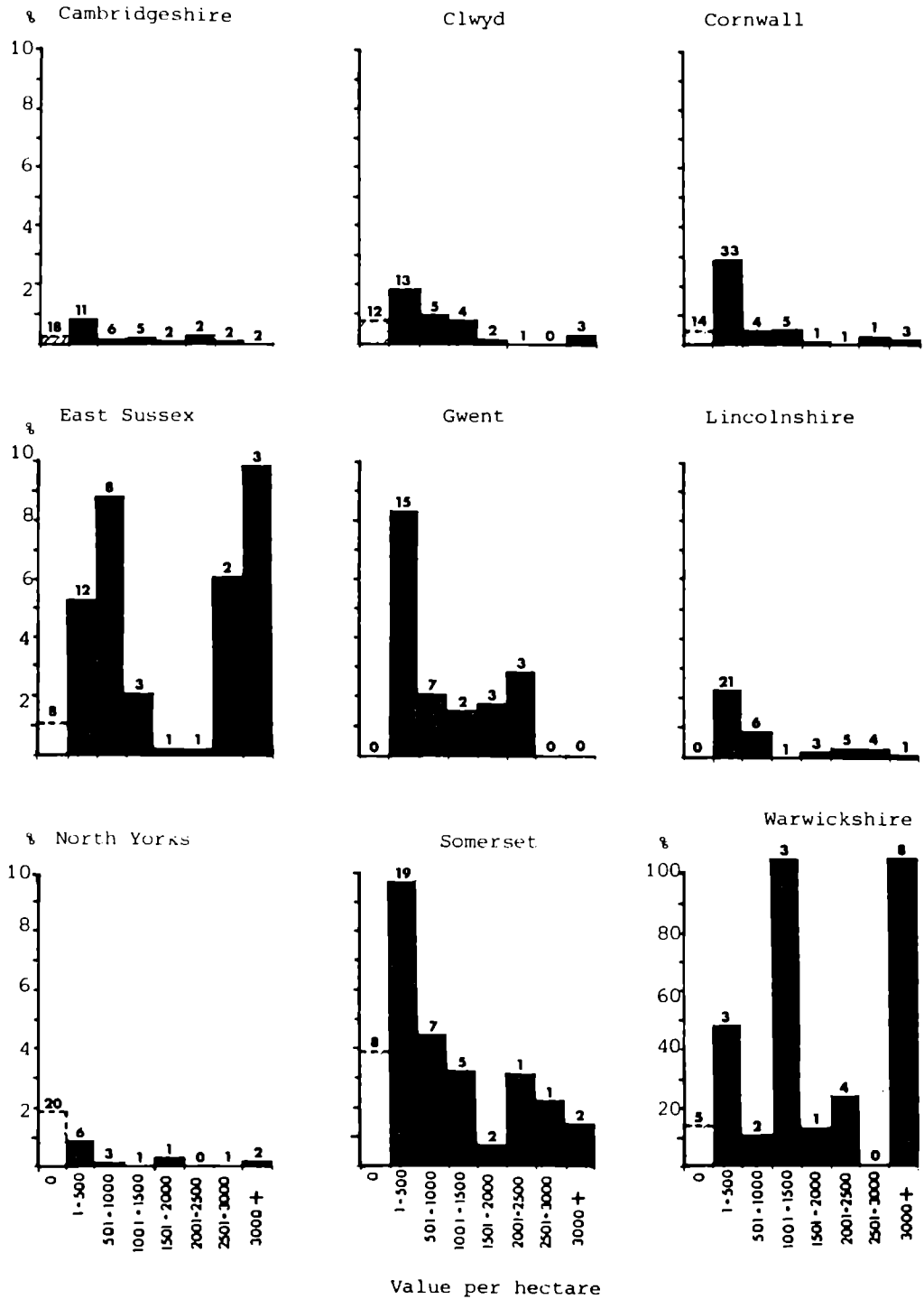
If this is accepted, the right way to examine the potential for a farm-based woodland enterprise is by looking at annual income. The choice of a suitable measure is easy; the 'gross margin' — the difference between the gross revenue of an enterprise and its variable cost — is widely accepted among farmers and agricultural economists as a means of judging the merits of a new enterprise. It can be calculated easily, if theoretically, for existing woodland, provided one assumes a similar time period, usually annual, for the forestry enterprise. For existing woodlands, the costs are historic, irrecoverable and usually unknown, so this annual treatment is quite possible.

The management of existing farm woodlands faces well-known problems; of small size, inaccessibility, highly heterogeneous and variable quantities and qualities of growing stock (these last being reflected in the above valuations). All the evidence from our own and other Woodlands Projects (Gwent, East Sussex, Suffolk) however indicates that these problems are not intractable. There are contractors interested and able to do the work; the produce can be sold to defray costs and, in many cases, to supply some net income or capital to reinvest in woodland improvement. If big enough, woods can be managed on an annual basis to produce a *minimum* 1 of £80/ha/year gross margin (based on a firewood cutting cycle in neglected oak coppice; common in this region and therefore a useful datum).

Management on a greater than annual periodicity requires the ascription of a gross margin equivalent, which raises the question of discount rate and compound interest. On the assumption of "satisfying" behaviour on the owners' part, one simple analytical technique is to take the periodically realised clear fell value and deduct from this the net present value of the stream of future costs needed to replant, tend, insure, etc the felled area (a "sinking fund"). the net value thus realised is then annuitised over the appropriate rotation at a selected rate of real compound interest. At 5 per cent this, of course, amounts to 5 per cent of the capital sum per annum for all but short rotations. From this it will be seen (Figure 2) that the most valuable category of woodland on the Culm Measures would, under these assumptions, give an annual gross margin equivalent of £500/ha/year (allowing for attenuation of realised capital over the first 10-year

Figure 1

"Small Woods on Farms": Breakdown of data on standing values



■ Number of woods

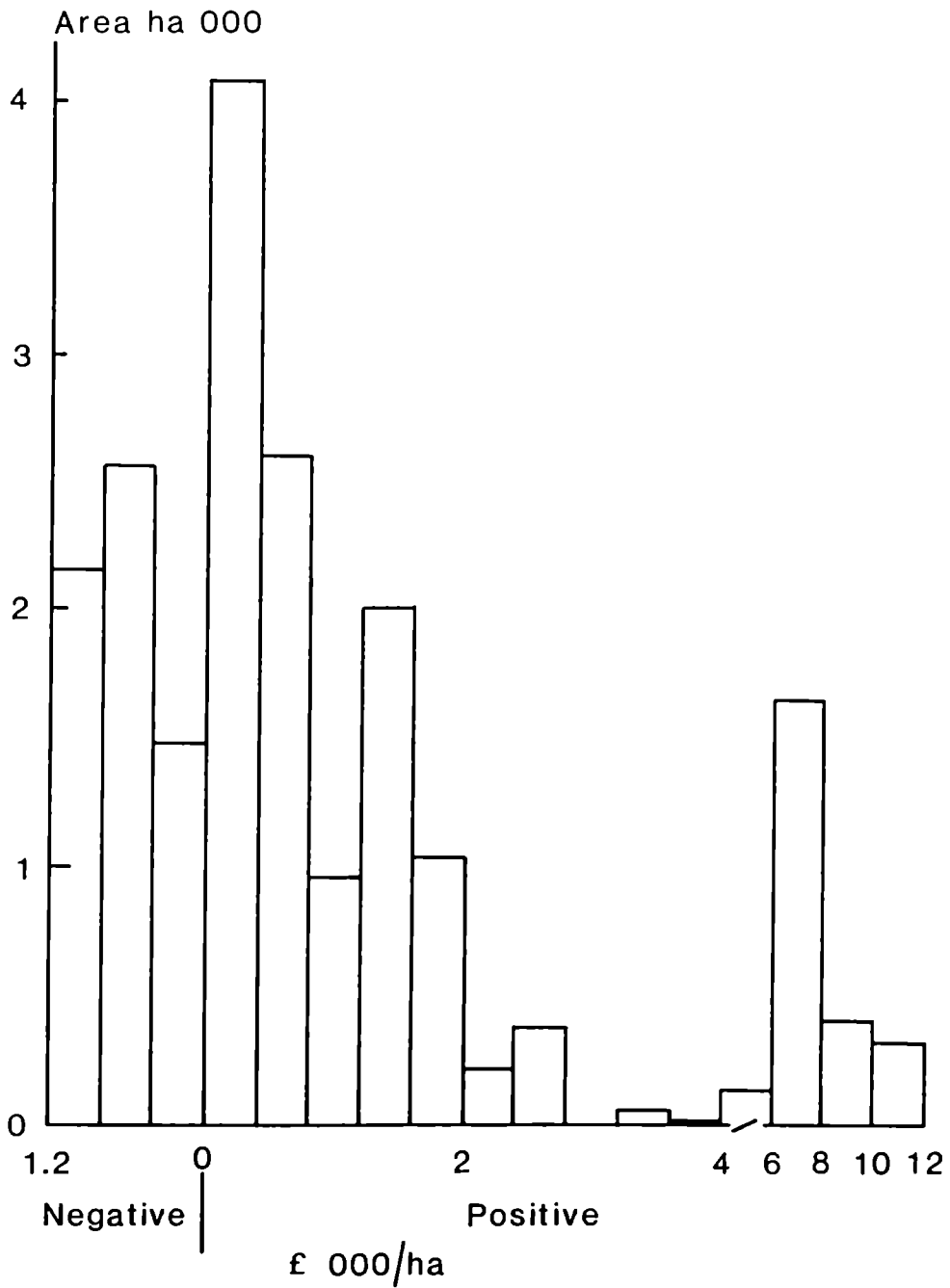
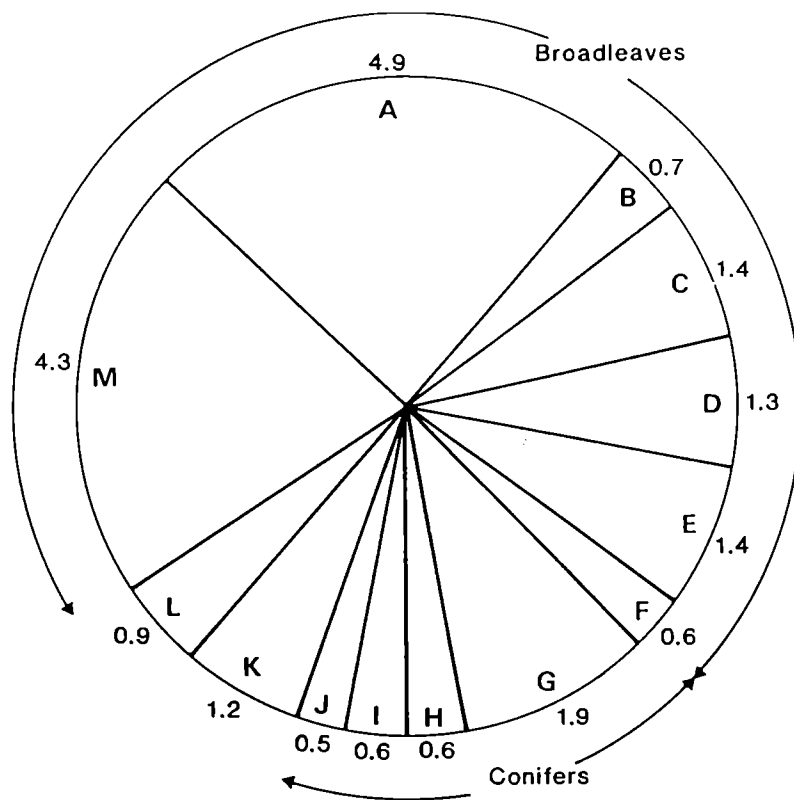


Figure 2

Net turnover (£/ha) during first 10 years of management of existing woodlands on the Culm Measures



- A Oak
- B Beech
- C Ash
- D Alder
- E Birch
- F Other broadleaves
- G Douglas fir
- H Larch
- I Spruce
- J Other conifers
- K Mixed species woods
- L Recently planted/clearfell
- M Poorly stocked woods

stocked woods dominated
by one species

Figure 3

Area of woodland types on the Culm Measures
Total: 20.1 kha

period). The average woodland on the Culm would, under the same assumptions, be worth £115/ha/year to the farmer, despite buying in all labour and materials. If farmers themselves did much of the work these figures would improve materially.

This is a potentially contentious framework for economic analysis, so it is useful to point out that, assuming revenue maximising behaviour by the owners, and using normal discounting techniques (again at 5 per cent) the annual equivalent of the net present value to full rotation (up to 250 years) averages £150/ha (with a range of £0-800). This still compares favourably with returns to agriculture on these farms and is *additional to farm income*; about £478 per farm and a 6.3 per cent increase (1983 datum) on farm income. Since many of the woods are valueless at present, the scope for increased income in future years, after improvement, can clearly be seen from the potential of the better woods. (See Figure 4 for detailed breakdown.)

Practical experiment from our Woodlands Projects indicated that, in the majority of cases, all but the poorest woods can yield enough marketable produce to provide the capital which, taken with standard planting grants, suffices to pay for the necessary improvement works. In good time these works will bring the value and/or income potential up closer to the maximum the site will allow. However, these practical examples are a "self presenting" sample and have no statistical validity. It is interesting therefore to note that a similar picture emerges from the data in Figure 2. About 31 per cent of the woods sample would, if brought under sensible management, cause a negative cashflow within the first 10 years. It will be recalled that this is calculated on a contracted out basis. If farmers were to undertake much of the necessary work themselves, then the proportion showing negative cashflow would be considerably reduced.

Afforestation

One finding of the research into land availability for energy wood production was that, putting energy markets completely aside, about 1.6 million hectares of land appeared to offer better returns from conventional plantation forestry than from its present (1977) agricultural use. As might be expected, the greater proportion of this area was in the hills and uplands but a surprising amount, aggregated from fairly small individual fields etc, was located in lowland areas, in every region except East Anglia. It appeared that, on most lowland farms, there were fields which, in their present unimproved state, were yielding quite low gross margins, even though the average for the farm might be high.

It was this potential which was appraised in considerable detail in the Culm Measures study. Each field on all the 100 km² OS map square samples, had calculated for it a net present value, the present agricultural gross and net margins, the gross and net margin achievable after improvement (such as drainage), and the net revenues from the most financially promising of afforestation options; all coniferous since modelling techniques used assumed profit maximisation as the farmer's objective. (Net margins were also used because, over the long timescale of forestry, all "fixed" costs are variable.)

A baseline set of assumptions was made: constant prices for agricultural and forestry produce; grants, subsidies and tax incentives as at the time of study; and a 5 per cent discount rate. Under these assumptions, afforestation appeared competitive with agriculture on about 9 400 ha or some 3 per cent of the land. This land obviously yields poor financial returns in its present use so this level of afforestation would not reduce agricultural production by any significant amount. About 40 per cent of this 9 400 ha estimate would be under Sitka spruce and 40 per cent under Douglas fir, with smaller areas of larch and pine.

However, in net present value terms, expressed as annual income equivalents, forestry income only exceeds that of agriculture by a meagre £14/ha/year; that is to say, using a standard investment criterion, it is only barely competitive, as Figures 5 and 6 show clearly. Low yielding forestry species or systems, and almost any forestry in areas of high windthrow risk (which parts of the Culm are prone to), are not competitive with any agricultural land use. In almost every circumstance a Yield Class of 16 (m³/year average) must be attained to become competitive. The mean afforested area per farm would be 1.12 ha and the net contribution to farm income (annual equivalent of net present value) negligible at £17 per farm per year. In some areas it is higher but it never exceeds 0.5 per cent of current net farm income.

The sensitivity of this estimate to changes in assumptions regarding grants, subsidies and tax concessions was tested and the table below shows the results. Note that checks on sensitivity to changes in discount rate were not carried out; the objective was a reliable conservative estimate, so the government "test rate" was used throughout. In this connection, the importance of environmental conservation constraints was also taken into account. Some 7 150 ha of the land predicted, by the models, to be afforested was in areas where such planting is unlikely to be opposed by local authorities, national parks or the Nature Conservancy Council.

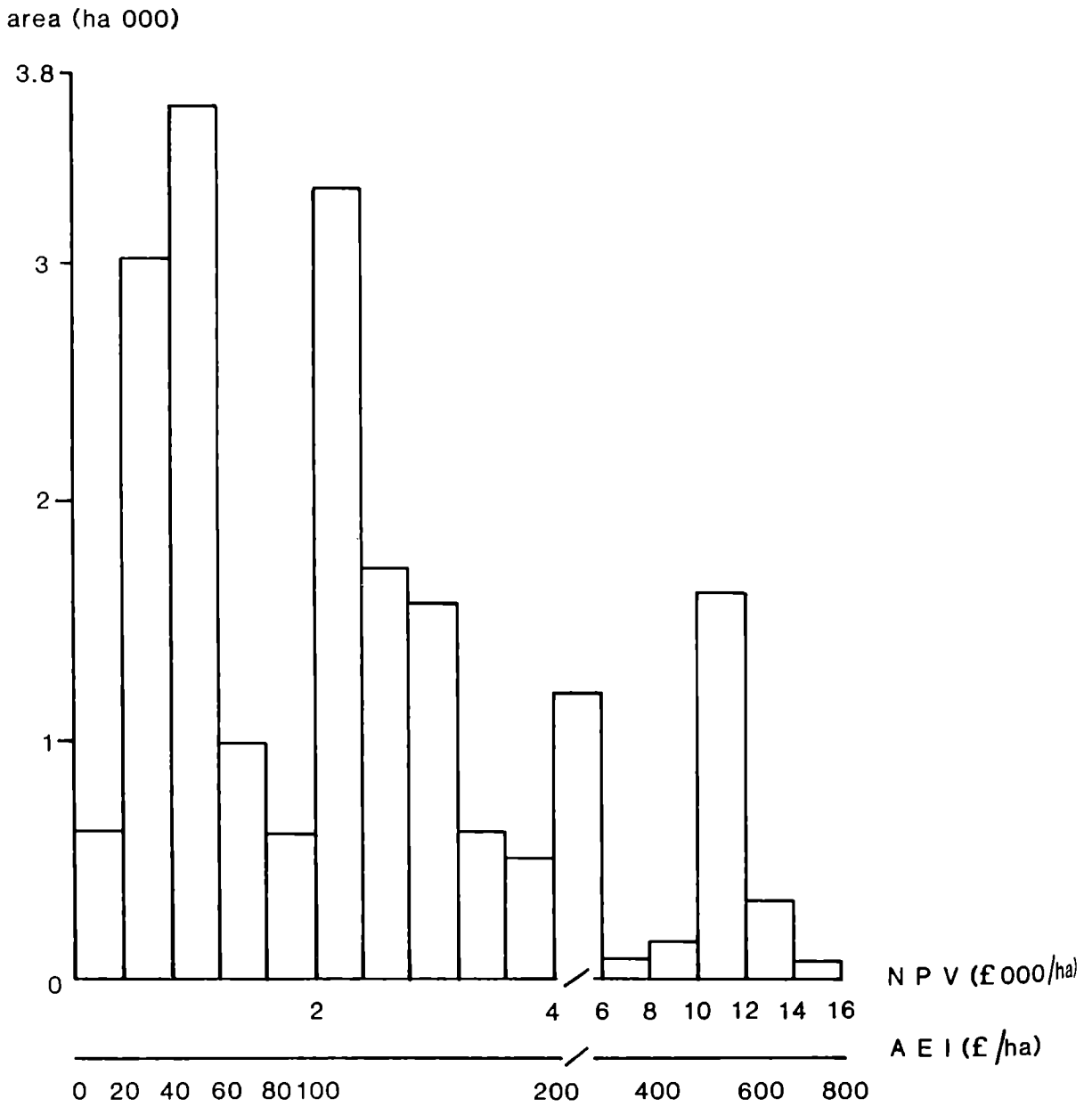


Figure 4

Net present values (£/ha (5%)) and Annual Equivalent Income of woodland on the Culm Measures

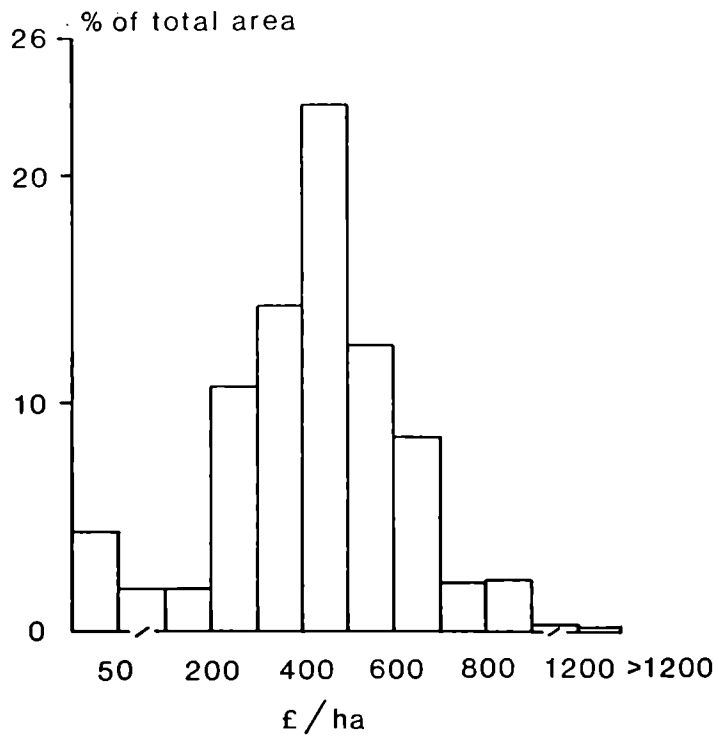


Figure 5

Gross margins (including subsidies) for agriculture on the Culm (£/ha)

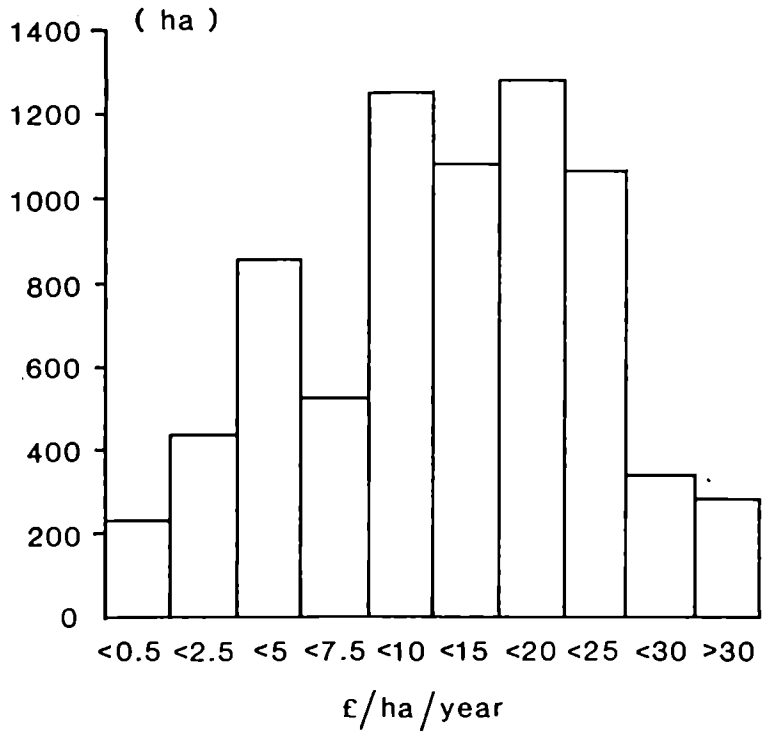


Figure 6

Areas (ha) of "base case" afforestable land on the Culm Measures, showing the margin (£/ha/year) by which forestry displaces agriculture

Table 1 *Potential of afforestation (a): results of sensitivity analysis*
(figures in '000 ha)

FORESTRY		AGRICULTURE			
		Current status		Potential status(b)	
		Subsidy	No subsidy	Subsidy	No subsidy
Planting grant	Tax support	9.4(c)	11.8	6.9	11.9
Planting grant	No tax support	7.8	11.1	5.8	10.9
No planting grant	Tax support	5.2	8.4	4.4	8.1
No planting grant	No tax support	0.6	1.28	0.50	2.9

(a) All at 5 per cent discount rate, calculated from *net* margins.

(b) Agricultural income potential after improvements.

(c) Baseline case.

It is arguable that the use of discounting techniques paints too gloomy a financial picture; the annual equivalents of net present values given above are easily taken by the uninitiated (farmers among them) as estimates of the actual income achievable. It may therefore be helpful again to point out that, established and with production "on stream", the future annual incomes will be similar to those given for existing woodlands above. Simplifying heroically, if the existing Culm Measures farm woodlands had been managed in the past to the level of the present upper 25 percentile, and the 3 per cent of marginal agricultural land had been afforested say 60 years ago and also managed properly, then something like 10 per cent of the average farm would today be contributing an additional 25 per cent to farm income.

Forestry enterprises on farms can also be cost-efficient to operate. German and French farmers reported spending 25 to 30 per cent of their time on forestry work (mainly in winter, at slack periods for agriculture), to produce no less than 40 per cent of their net farm income.

Farmer Ability and Interest

The final links in the chain of this paper's argument are the practical ability of farmers to take on forestry as a genuine farm enterprise (as distinct from, say, a joint venture) and their likely willingness to do so. As the preceding paragraph infers, there are farmers in other European countries for whom forestry is a normal farming activity. This is the case in many parts of France, West Germany and Denmark; some with long established woods, others where the activity is no older than the last two decades. They use, modestly adapted, their own tractors and other machinery. They market their produce themselves or variously through co-operatives or middlemen.

There is nothing arcane about forestry. Its skills can be learned if the will exists. The timing of most operations can be slotted easily into other farm work on most farms, since they are far less dependent on day-to-day weather conditions. Necessary farm labour will have an opportunity cost of course, but this may be zero at certain times of the year. Our Culm Measures study suggested a degree of slack in labour requirements averaging 70 standard man days a year or just under a third of a farmer's or farm worker's normal time. And, as we have shown, there is a 2:1 probability that the management of existing woodlands at least would not make calls on farm capital. Nearly 80 per cent of Culm farmers owned a chain saw; 40 per cent had a sawbench suitable for adding value to produce; 20 per cent had a suitable tractor and the ownership of more specialised equipment (eg winch, hydrasaw, rackbench) was also noted.

Would farmers be willing to take a forestry enterprise on? Our surveys showed that most were unwilling to contemplate this. Their perceptions of the time and cost needed was the major reason; only four Culm farmers felt that lack of experience would inhibit them. However, our surveys were conducted in 1978/79 and 1983. With recent changes in the Common Agricultural Policy and general public discussion of the likely squeeze on farm incomes, it is likely that a survey now would have different results.

European experience may again be useful. In Finistere, Brittany, a local, very low key campaign by one agricultural adviser has led to the planting up of 15 000 ha of farmland by 8,000 farmers and other landowners in 25 years — in an area with no previous tradition of farm forestry. In Nordrhein-Westphalie in West Germany, farm income from forestry recently grew from 0.6 to 4.9 per cent of total income from all sources over 10 years, that is a rise of 800 per cent, compared to 156 per cent from agriculture, again in an area without recent forestry tradition. There is no reason to suppose that similar, indeed much better results, cannot be obtained in the United Kingdom.

Given this, there will nevertheless be problems. There is a general lack of expertise in the management of this sort of small woodland, even among those to whom farmers would look for advice. This is a new kind of forestry which will

have to be learned by foresters if they are to help the farmers. There are problems in particular with marketing, where both markets and marketing expertise are going to be required.

Silvanus

In order to overcome these problems and to achieve economies of scale, a major new initiative has been taken in the south west region, named after Silvanus “a deity or spirit of the woodland bordering on clearings... partly wild and partly civilised... the only Roman deity who first to last retained the same... rustic character. His double nature as deity of woodland and cultivated land is seen well in the artistic representations... he carries a young tree in one hand and a pruning hook in the other”. (Encyclopaedia Britannica, Vol 20.)

The initiative is a Dartington idea but owes its existence to seven Government bodies, led by the Countryside Commission. It is a fully integrated programme with the following aims:-

- a. conservation of woodlands as habitats and as important landscape features;
- b. development of a new source of income to farmers in:-
 - the wise exploitation of their own woodland;
 - the management of other people's woodland;
- c. development of sustained new employment in forestry and allied industries;
- d. promotion, support and execution of research and development into woodlands and the sale and exploitation of woodland products, and publication of information so gained.

The programme will be carried out initially in the counties of Devon and Cornwall and in that part of Somerset which falls within Exmoor National Park; but with the intention of extending into other parts of the West Country later. Its principal objective is to bring 25 per cent of all unmanaged woods in its area of activity into management within 10 years (this would be about 10 000 ha; Forestry Commission, 1983). It will have the following elements.

Forestry advisers with an ‘animateur’ role.

Contracting agency, networking with consultants and contractors.

Marketing agency with market development (particularly for low grade hardwoods).

Woodland management/farm forestry training.

Integral Community Programmes (about 360 places).

Properly set up and well carried off, this initiative will take woodland activity — including farm forestry - over a threshold of viability.

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The Economics of Managing Farm Woodland for Game

I McCall
The Game Conservancy

Abstract

Through increasing pressure on agriculture many farmers are considering planting woodland as an alternative crop, or managing existing derelict forest. Even after grant and fiscal advantages this is often inherently uneconomic partly because of its long-term nature. Game shooting rents can contribute much more quickly and sometimes a far higher sum to the farm economy than the forest crop of woodland. Similarly a good shoot can transform the capital value of a property as well as making it more saleable.

This is only so if the shape, size, design and management of the woods are laid out and conducted with game conservation and shooting in mind. This may result in a sacrifice of between 10-25 per cent of the potential timber production area. However, other wildlife species than gamebirds, the landscape and general amenity of the farm are generally greatly enhanced by woodland management for shooting.

The Game Conservancy has been conducting research and advising farmers, landowners and keepers for over 50 years on shoot management. There is a network of experienced regional consultants over the whole of Great Britain. Particularly when planting trees it pays to be right first time. They may be there for over 100 years and if woods are designed carefully they may generate a valuable annual income to help the overall economy in addition to their timber crop.

Introduction

The majority of farm woodlands have shown a poor financial return by comparison with agriculture. This has resulted in part in a low level of management or even total neglect throughout many areas of Great Britain. With agriculture coming under increasing financial pressure farmers are being forced to scrutinise the burdens on their overall enterprises and to investigate the options for supplementing their traditional incomes from crop and stock production.

Some are surprised by the significance of the effect that game shooting has had on lowland woodland management in the past. The Game Conservancy's Advisory Service employs regional consultants to assist sportsmen, farmers, landowners and keepers to improve their shoots. As an example, the longest serving consultant has in his 30 year career been asked to plan and design no less than 4 000 hectares of completely new woodlands, mostly less than 2 hectares in size, while he has also been responsible for the management and replanting of 30 000 hectares in the same period.

A recent survey by the Department of Land Economy at Cambridge University showed that of the farmers who had planted new woodlands under 5 hectares in recent years, a staggering 80 per cent gave game shooting as one of the reasons for doing so.

Shooting, traditionally a recreation of the landowners, is now practised by all sectors of society and the demand for game shooting has grown dramatically over the past 20 years. Sporting rents have responded accordingly and especially near to centres of high population can provide some welcome additional income to hard squeezed farm economies.

An Example

If one considers a predominantly arable farm of 500 hectares in the home counties dominated by agriculture with a few hedgerows but no permanent coverts in the form of woodland, it might attract a shooting rent of up to £1 per hectare totalling £500 per year, purely for rough shooting even though there is likely to be little to shoot at and small opportunity to improve that situation. However, if the same farm in the same location had 10 woods averaging one hectare carefully sited and established for sporting purposes, then the potential shooting rent might rapidly rise from £1 per hectare up to £5 per hectare totalling £2500. Although only 10 hectares of woodland are involved the rent increase of £4 per hectare applies to the entire farm. Thus the annual increase in income from these 10 hectares of woodland will be £2,500 a nett gain of £2,000 or £200 per hectare per year.

There are few forestry crops which could approach this financial yield. Of particular importance the additional income is received within 1 to 10 years of the initial planting depending on the system, and design of woodland establishment.

Capital Value of the Farm with a Shoot

The major land agency companies involved in marketing estates and farmland suggest that the effect of a good shoot, which is an on-going concern, on the value of a property can be much more significant. In the south of England an attractive farm, with good potential for, or an existing driven shoot, can realise up to £500 per hectare more than a purely agricultural holding. Perhaps even more important is the fact that they say that the demand for good sporting properties is rising fast and that they are consequently quite easy to sell by comparison to more efficient but aesthetically less picturesque and pleasing places.

Timber Production is Long-term

Most woodland income suffers the problems of requiring significant investment in planting and maintenance but shows no yield for many years thereby laying any package for profit at the mercy of interest rates.

Perhaps of equal importance is the fact that between 75 and 90 per cent of a game covert can be established to a traditional forestry crop and still yield income, if and when it is harvested. In a sense the game and sporting elements can be used to subsidise and support the longer-term woodland crop.

Any Woodland will not do

The 10-25 per cent sacrifice of forest crop is required to ensure a suitable design to attract and hold the quarry species, in particular the pheasant. Regrettably any woodland will not do. Cold, draughty woods have never and will never hold game. Gamebirds are, of course, part of our wildlife and to a great extent what is done for the pheasant, or deer by way of creating suitable habitat is good for many other non-quarry species. This has enormous implications for the present state and future of the countryside. It is so much easier to persuade a shooting or hunting farmer to preserve or even plant a hedge which will be of value to a partridge or fox, than to tempt his non-sporting neighbour to do likewise for the benefit of a butterfly or orchid. Indeed, professional conservationists recognise this and are generally lavish with their praise for our sporting, landowning and agricultural predecessors as are most modern landscape designers who, like game and so many wildlife species, also prefer the mosaic of mixed farming interspersed with skilfully sited small woodland to the monotony of monoculture.

Size, Shape and Siting

Size and shape are both key ingredients for woodland that is going to give a high increase in the sporting rent value. Large blocks of forestry are often of little use for shooting. The pheasant is a bird of the edge and the cocks are territorial in the spring. As Game Conservancy research has shown, each male requires approximately 100 metres of suitable hedge or woodland edge to set up home and attract his harem of hens. Copses, spinneys and shelterbelts therefore have the best potential for wild pheasants. Equally the first requirement for big woodland areas is to drive wide rides through, effectively splitting them into a series of smaller more manageable compartments. This is also important from a practical shooting point of view. For driven or rough shooting, birds need to be flown from one compartment to another if guns are to see the quarry. Beaters or walking guns, even with the help of their canine companions, can only cover a certain width of ground in a manageable manner.

Siting is almost as important as size if the higher values of driven shooting are being sought. Today's shooters are much more concerned about a few testing shots than accounting for a large bag of simple targets. Physically it is very much easier to lower the gun than it is to persuade the birds to fly higher. Therefore game coverts should, if possible, be perched on high ground and not planted in the valley bottoms. In steeply undulating ground this frequently means that the less agriculturally valuable banks and odd shaped fields can be taken for game and tree production. Sloping ground and the scope for showing sporting birds from it are so significant that even in the wetter West where wild game has traditionally struggled to survive, rental values of up to £10 per hectare are paid for really steep valleys with ideally sited woods, and even more can sometimes be made by sound shoot management.

Design, Layout and Management

The basic woodland shape, size, and site have a vital effect on the presentation of birds and shoot potential. The design and content of the woodland are just as vital to determining whether it will hold game or not. In a sentence the secret is to 'keep the wind out and let the sun in'. If this old saying is achieved then the covert will succeed in harbouring pheasants in the shooting season and cold winter months which follow.

Excluding the wind in, what by definition, is an exposed site in a high position is not always simple. A perimeter shelter hedge is the standard requirement of flat ground. On a sloping site a second taller line of defence may be required to lead the wind over the top. Thorn is the traditional plant for hedging and provided it is regularly trimmed to give a tight A shape with maximum shelter at ground level it is excellent. In the harsher climates of the uplands of the north, tree hedges although less scenic in appearance and non-native may be more practical. For the medium height hedge a mix of berried trees such as whitebeam, rowan, crab apple, quickthorn yew, holly and field maple, all provide a mix of colour, food for wildlife, and never grow to tremendous heights.

This is of the greatest importance because where farm and forest meet one or other must give way. Tall trees, especially on the north edge of a wood cast shade over the adjacent agricultural headland and also, less obviously, below ground they compete with the crop for moisture and nutrients. Even after grants and fiscal benefits, it is rare for farm woodland to be more financially productive than crops so it should suit most enterprises to design forest edges which allow for shelter hedges and ensure full sunlight for the field headland.

Moving into the wood, sunshine is the key requirement. In small plantations there may not be room for the luxury of wide rides, and so deliberately planning areas of coppice may prove a more practical method of ensuring some open spaces. It is vital to choose a tree species for which there is a coppice demand. Hazel, wonderful though it is for pheasant and other forms of wildlife, is rarely regularly cut now that hurdles, thatching spars and spiles, and pea sticks have their modern alternatives. The result is thousands of hectares of over-mature coppice growth which has shaded sun out from the forest floor producing cold, bare and draughty woodland no longer favoured by pheasants.

Fortunately, sweet chestnut coppice is still in demand for fencing stakes while the coppicing of fast growing hardwoods, like ash, is becoming an economic proposition near areas of high population where open fires and multi-fuel stoves starved of their once plentiful supplies of dead elm, require an alternative to satisfy their appetites. The common problem, even where such beneficial practices are still conducted, is that for commercial purposes rather large areas are cut at a time. For game and for wildlife it is important to operate on a little and often basis because variety of habitat is the key. Instead of hectares felled at a time, fractions of acres are preferred.

Choice of Species

In fact, even with full grown forest trees much can be achieved by careful selection of species. Remembering that gamebirds spend virtually all the daylight hours on the ground it is the shrub layer and the undergrowth it provides particularly in winter that is all important. Often hardwood species, such as beech and Sweet chestnut (unless coppiced) tend to produce a bare forest floor because of the dense shade they cast. The invasive, self seeding, non-native sycamore is a worse offender in this respect, while oak, cherry and ash develop a canopy which, if adequately thinned, will ensure the survival of natural ground cover shrubs such as bramble in the south, and wild raspberry in the north. Of the conifers larch and pine generally allow much more light through their canopy, while the spruces, firs and cypress will sooner or later shade out most shrubs if planted in pure blocks. However, at night a pheasant enjoys a warm sheltered roost, and in many parts must have this provided if he is not to end up as part of a fox feast. Small groups of conifers especially Western Hemlock, spruce, larch or even the native yew are extremely valuable in this respect. In a young plantation on a previously arable site they often offer the only significant winter shelter, and cover to hold game for the first 20 to 30 years, depending on how long the shrub layer takes to colonise. Many argue that the answer is to plant special shrubs. However, this can be very expensive in terms of plants and the special protection, maintenance and guarding that they require to establish successfully. This situation is accentuated by the Forestry Commission being unable, through their terms of reference, to grant aid shrub planting while Countryside Commission and County Council grant officials quite understandably prefer on aesthetic grounds, to limit the proportion of conifers planted as a nurse, but are often happy to accept native shrubs.

Perhaps the greatest disincentive to farmers who are searching for an alternative profitable form of land use for their more marginal agricultural areas is the dreadful time lag between planting woodlands as game coverts and the day when they begin to hold game. Traditional forestry techniques rarely produce a wood of use for pheasant shooting for 10 years, and frequently the surrounding rabbit netting ensures no use of the area by gamebirds for a much longer period.

The Game Conservancy's 'Instant Spinney'

Recognising this dilemma The Game Conservancy's Advisory Service has over the past 15 years developed techniques for establishing small woods which will provide shooting in their first season after planting. The 'instant spinney' involves planting trees into special game cover crops so that while the former establish the latter provide a temporary habitat to hold birds. Rabbit netting is avoided by using individual guards which have proved so successful at increasing survival rates of tree and shrub plants that wider spacing of rows is possible — which is important in reducing costs. Individual plants can be as close as a metre within tree lines, but row spacings of 3 metres are essential to enable tractor work between the lines for cultivation and drilling of the inter-row game crop. The system has revolutionised the planting of small woods for sporting purposes, basically by creating instantly productive coverts. With the inevitable cash flow problems caused by woodland crops that may take up to two human generations to complete their cycle, the game and shooting revenue of farm woodlands must surely be the answer to many a forestry maiden's prayer. Here at last is an expanding demand for an increasingly valuable commodity which can attract an income not in 10, 50 or 100 years time, but every year from the very first season after planting. Surely for many farmers and estate owners alike, it must be worth investigating the option of planting marginal land to woodland, in suitable sites, sacrificing maybe 10 to 25 per cent of the pure forestry production and designing and shaping these areas to yield not just timber but an annual sporting income, a more attractive countryside, and additional general wildlife habitat.

Taking Professional Advice is Cheaper than Trial and Error with Trees

For 53 years The Game Conservancy's Advisory Service has been helping landowners to do just this. Experienced local consultants are available in every area of Great Britain and with tree planting it pays to be as right as possible first time. Those who grow corn crops see the mistakes disappear into the combine each harvest, but with forestry they may remain to haunt not just you, but your children and even your grandchildren.

Agroforestry and Growing Wood for Energy

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Forestry Commission

Abstract

There is a strong historical association between pastoral woodland, the use of wood as an energy source and farming. Silvi-pastoral systems in both uplands and lowlands have benefits other than spreading the risk in any one commodity. Recent studies show the systems to have potential, but basic work is needed to verify the desk studies.

On the relatively small scale, energy from woodland has potential on carefully selected schemes, but the price of alternative fuels is too low to make large-scale energy woodland a viable system. Adding value by the use of otherwise waste products from conventional woodland has most to offer.

Introduction

The use of trees as part of an agricultural system is not a new phenomenon. It is only in relatively recent years that British foresters and farmers have become specialists through both training and practice. Only on the larger estates that contain a wide range in site types are agents or factors expected to have knowledge of both professions. The only remnants of woodland pasture systems are parkland with trees where cattle and sheep graze separated from the ornamental gardens by the ha-ha wall.

Woodland pasture was at one time an important asset to a farming community and "pannage", a right to graze woodland pasture, was a common right. In Saxon and early Norman times the size of woodland and even the tree preservation legislation used swine as a measuring unit. "In Eastern Counties it was customary to measure woodland in terms of pannage for swine, entries suggesting woodland of sufficient extent to keep 1000 swine" (Loyn, 1962). Anglo Saxon tree preservation enshrined in the Laws of Ine fined a man "30 shillings for the first tree, and as more if he burned the tree he paid 60 shillings, and the same sum if he cut down a huge tree so big that 30 swine could stand under".

The following two quotations illustrate the integration of farming and forestry and the various uses for the wood produced:

"not only the arable is more or less carefully tended but also the woods grown between the two periods of arable. The wood products are of great importance as firewood, often a scarce commodity as well as for various on farm uses such as houses, barns and fences" (Vink 1981).

"In Cambridgeshire, swine pasture was used as a standard extent of woodland, but a further method of measurement was used and mention is made of wood for fences, houses, repairs or fuel" (Darby 1952).

The former is describing a farming system in Venezuela in 1981 and the latter Cambridgeshire in Norman times. There is a 900 year time span but these are two of the systems which are considered in *Farming Trees*, the recent NFU Policy Document, as methods for "getting round the income gap" — agroforestry and short rotation coppice for energy.

Agroforestry

This is a term used for dual cropping on the same piece of land. Professor Roche (1986) defines it as "The whole or part of a farming system in which woody perennials and herbaceous crops are grown together in mixtures simultaneously and/or sequentially, with or without animals, and which provides greater benefits than agriculture or forestry alone". Other definitions include "improved micro-climatic conditions and soil regeneration" (Nair and Fernandez, 1984).

Arable crop/tree combinations have rarely been tried in this country, and when they have have not been successful. The systems on which current research and interest are concentrated are silvi-pastoral, ie trees and grazing animals, both in upland and lowland situations. A list of some current projects is given in Table 1.

Table 1 *Some recent, current and proposed silvi-pastoral research projects in the United Kingdom.*

Project	Institute	Status
Theoretical evaluation of lowland, ash and sheep system.	AGRI and FC	Completed
Evaluation of some of the elements of the above theoretical study.	AGRI and FC	Current
Experiments on lowland systems, ash at wide spacing, cattle.	AGRI and FC	Proposed
Lowland trials, trees and sheep.	Queens College Belfast	Current
Agroforestry upland trial (Phase I) Henaes Tfridol.	UCNW	Started
Agroforestry upland and lowland (Phase II)	UCNW	Proposed for 1987
Upland - Sitka spruce spacing effect on microclimate and pasture.	HFRO, University of Edinburgh and FC	Current
Trials on upland farms.	" "	Proposed
Trials on upland farms.	Welsh Plant Breeding and FC	Current
Pastoral nutrition effects on open grown trees - larch (respaced), three levels of nitrogen.	" "	Current
Development of economic systems	Welsh Plant Breeding and HFRO	Proposed

Taken from Carruthers 1986 and updated.

To have two quite different commodities to deal with can reduce the total risk. Inputs into the short-term system of grazing by livestock can be varied according to markets and any financial inducements. For the trees timing of the operations is less critical than with farming and the time of marketing can be varied by years, either to await high prices or to meet a financial need in the rest of the enterprise.

Economic appraisals and modelling have been carried out for both the upland and lowland site types and the following summarise these appraisals.

Upland study

Sheep, with conifer at wide spacing (Hill Farming Research Organisation and Forestry Commission).

Objects

1. Over a range of tree species, planting patterns and stand management regimes, to assess the effect of the trees, as they develop from planting to maturity, on pasture production and seasonality.
2. To identify those options most promising in economic terms.

Assumptions

Trees will be planted on "inbye" wintering ground, or open hill ground which is improvable, with freely draining mineral soil, and not more than moderately exposed by forestry standards. Breeding ewes will be used for the model.

Results

Forestry is disfavoured by the use of high discount rates because of delayed returns, at 7 per cent it does not compete. However, at 3 per cent and 5 per cent forestry lies midway between these two agricultural options.

When wood and 'upland' sheep production are combined on the same land the combined revenues equal or exceed those for either forestry or agriculture alone.

The 400 stems per hectare option is less valuable than the 100 stems per hectare and there is an advantage in protecting trees individually since sheep can then be stocked on the area from the first year.

Lowland study

C J Doyle, J Evans, J Rossiter (1986) (Animal and Grassland Research Institute and Forestry Commission)

A mathematical model using ash on a yield class 10 site although cherry, sycamore and Southern beech would have been equally suitable.

Trees were tested at densities of 0, 50, 100 and 200 stems per hectare,
Fertiliser at 0, 150 and 350 kg N/ha.

Felling of the trees at 15 cm for firewood and 45 cm for timber.

Sheep grazing system.

Results

1. Growing firewood was less economic than sheep alone or sheep with timber.
2. Felling of timber would be at around 40 years (range 36–45 years).
3. Highest economic benefits are at a planting density of 100 stems per hectare for N levels of 0 and 150 kg N/ha.
4. At 300 kg N/ha the highest value is realised with sheep alone.
5. At a discount rate of 5 per cent the indications are that combining wood and sheep meat production on the same area could be financially attractive.

In both cases some of the assumptions required improvement, eg — tree growth characteristics at the wide spacings, the effect of pruning, and additional knowledge on the effects of microclimate.

Additional work is planned and progressing. On the lowland study, sites have been selected to monitor grass growth and microclimate under ash trees, and trees have been selected on which to do stem analysis. On the uplands study, a larch plantation has been respaced and a grass sward established.

The potential risk has not been included in either study. This is an essential aspect of an appraisal, especially with investment in tree crops where there is such a long time span between planting and harvesting. Peter Blandon (1985) suggests the use of a risk analysis system called 'Portfolio theory' used in financial economics to diversify a portfolio of stocks in an optimum way with regard to risk and return.

There is obviously much work to be done to evaluate and refine complete systems, but the first look appears promising, and the shorter rotation of the tree crop with a continuing return from the pastoral input removes many of the problems of a complete switch from agriculture to plantation forestry.

Wood for Energy

Introduction

Natural sources of energy are so easily accessible in this country that the thought of developing new systems does not come readily to mind. Only if we had no carbon fuels, no water power, no wind power, and a Government policy against nuclear power would there be commercial interest in wood as a large-scale energy source. Wood is still a major source of energy on a world scale and in countries such as Sweden and North America considerable effort is going into developing other systems. Apart from a major expansion into domestic wood burning stoves for personal reasons of ecology or economics there has been very little use made of wood except in the wood working industry where normally waste products have been used as an energy source. *How much wood for the stove* and *Coppice* (Crowther and Patch, 1980) give the details necessary for working out the basis for a wood fired system. Keighley (1986) compares the different fuel options.

The Department of Energy is funding research to a value of £2 million over 3 years (or £0.6 million a year) at present in the use of biomass as an alternative source of energy. Last year the United Kingdom returned to being a signatory of the International Energy Agreement which enables research and development in this country to participate with, and obtain information from other countries who are making major commercial development systems due to necessity.

Investigatory work on the establishment of new systems is controlled by the 'Energy Technology Support Unit (ETSU)' at Harwell and the work supported ranges from environmental impact, through types of boilers to methods of growing the wood. It is the latter that the farmer will be interested in and this is where the Forestry Commission is involved.

Studies are being carried out on three cropping systems:-

- a. conventional forestry (60-120 year rotation);

- b. short rotation single stem (20-30 year rotation);
- c. short rotation coppice (3-6 year rotation).

a. Conventional Forestry

Timber value is very much higher than firewood value. It is therefore only poorly formed stems, small size material from branchwood, and small roundwood from early thinnings that have been looked at. A recent study in South West England by Brandon at Dartington has examined the harvesting and chipping of first thinnings from a conifer plantation and this showed that at current alternative energy prices it is not worth aiming for the energy market.

Larger diameter material can always go to the firewood log market.

Dealing with the otherwise waste material left by conventional harvesting systems gives rise to two problems. An irregular size of material, which is scattered haphazardly across a site has to be made into a form suitable for transport and use. It has to be gathered and chipped. Desk studies on the machinery available and field trials under the ETSU programme should be under way next year.

I know of one commercial scheme, on Speyside, where the boiler at the Tormore Distillery is being supplied by wood chips produced from material gathered from conventional forestry systems.

The conventional forester finds difficulty in adjusting to the next two systems. The aim is to produce as much burnable material as fast as you can. The traditional requirements of straight stems, regular growth rings, light branching, etc. have to be forgotten as fast growth is the sole aim.

b. Single stem

Trials of a wide range of species both broadleaved and conifer at close spacing have been established by Aberdeen University on a good spread of sites, many on sites of better quality than those normally released for tree growing. I would have thought it possible to estimate what the yield of these crops will be for the more common forest species. As these trials have only been established over the past 5 years there are as yet no results. Harvesting will be at some time between one-half and one-third of normal rotation.

c. Short rotation coppice (SRC)

Conventional coppice with sweet chestnut and a rotation of 20-25 years is well known and understood (Crowther 1984). The rotation length is governed by the market at which the material is aimed, palings as cleft material or in the round. SRC is aimed at weight production as quickly as possible and the rotation length makes it closely allied to osier production as already practised in Somerset.

Long Ashton Research Station has many years' experience with willow growing and in Northern Ireland biomass trials have looked at spacing, use of nutrition and harvesting, with several willow varieties. Some of the results of this work are shown in Table 2.

Table 2 Annual dry matter production in tonnes dm/hectare/year.

Willow v grass on surface water gley soils. Castle Archdale Experimental Station, Fermanagh.

	1978-79	1979-80	Mean
Pasture			
Perennial ryegrass	9.2	9.5	9.4
Improved permanent	6.6	4.8	5.7
Willow			
<i>(S x aquatica gigantea)</i>			
1 Year-old rods	10.4	11.0	10.7
3 Year-old rods	-	15.8	15.8
K Stott (1985)			

Under the ETSU programme, the Forestry Commission has established a series of experiments on former agricultural sites, both arable and pastoral and also on old woodland sites. The situation of these sites ranges from the fens in Cambridgeshire to the most recent at Aberfoyle in Scotland on an old pastoral site on carboniferous gley at an altitude of 800 ft. The species used are: alder, willow, poplar, eucalyptus and Southern beech (*Nothofagus*). The two other variables being tested are spacing, (1 and 2 m), and cutting regime (2 and 4 years). They have been planted over the past 6 years and the first major harvest was in winter 1985/86.

Certain conclusions can already be drawn from this work. It is more akin to horticulture or agriculture than to conventional forestry. Intensive weed control is essential to obtain best growth and poplar and willow are the most regular producers. As both are available as clonal material this is an additional advantage. We have had establishment problems with the alder and Southern beech, eucalyptus although growing as fast as poplar on the lowland trial sites has problems with winter cold and silver leaf disease following cutting.

Implications for the farmer

The conventional firewood market is not new and is aimed at logs for open fires or wood burning stoves either for the farm itself or for sale. Improved boiler technology and the use of 'chippers' has opened fresh possibilities such as greenhouse heating or larger heating plants for small-scale industries, eg the Tormore Distillery (Crowther and Patch, 1980; Keighley, 1986).

I can see nothing in the single tree energy plantation for the farmer as the time scale before any return is too long and it only supplies material available from conventional working, ie thinnings from plantation, poles from coppice.

Short rotation coppice is a new concept for this country, it gives a quick, and a regular return. Establishment is akin to farming operations and the use of irrigation if available has potential for increasing output.

There is however no large-scale user, so there is no scope at present in this country for large-scale energy plantations of SRC. The only potential at present is for small-scale operations to supply local consumers, choosing species, spacings and cutting regimes that supply the size of material required. A 4-year cutting regime on poplar or eucalypt will produce small logs.

Development of farming systems using willow is well advanced in Sweden. As government policy there is to replace nuclear energy in the not too distant future and they have no fossil fuels, biomass is of major interest to them. Grants are paid by the Department of Energy to establish the crops and prices are guaranteed on delivery to local power plants, some of which are already in existence.

What type of land is likely to be suitable? C P Mitchell (1985) using the ITE land classification as a basis summarises suitability, on site and economic criteria, on a national basis, and estimates the overall area which might be viable under each of the three systems examined in the ETSU contract. This assessment for willow biomass varies from 2.6 million hectares to 0.59 million hectares according to firewood prices.

Table 3 is taken from a Long Ashton publication and is summarised by K Stott as "855 000 hectares are worth considering for willow biomass, of which 25 000 have real potential, notably 4 800 hectares of Midelney and Fledbury soil series in Somerset".

General Comments and Conclusion

If land is to become available for tree planting there are obvious attractions in a half-way position, not fully committed to either agriculture or woodland. This could be either partly planted with trees as under silvi-pastoral systems or the land could alternate between uses, as under short rotation coppice stem size is kept below the threshold for tree felling controls.

Is it possible that amelioration of erosion by wind or water, a period of respite from pesticides and tractor pounding, and the use of deeper rooting species will improve long-term fertility and thus give major benefits to the agricultural industry in addition to short-term environmental improvement. If so, silvi-pastoral systems and short rotation coppice either for energy, or perhaps some other use appear to offer worthwhile possibilities.

The current state of knowledge suggests a cautious approach. A lot of basic work is still needed in order to clarify the subject.

Table 3 Potential willow biomass area, England and Wales (hectares)

Soil water regime	National soil maps: soil group numbers	Most likely Somerset soil series	cf profitability willows for pulp and existing land use: ADAS assessment
2b	Alluvial gley 4, 6	Somerset	17 800
		54,300	4 860
	275 400	Rest	
		221 100	8 060
		Assessment via local ADAS drainage officers	
3b	Stagnogley 68, 51, 69	120 000	12 600
		460 200	?
Total		855 600 (8% land surface)	25 520
3a	Stagnogley 56	175 200	Speculative eg by reference to SW region land utilisation maps grades 4 and 5

K Stott (1985)

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Discussion

- Q:** *Mr R Thompson (Soil Survey of England and Wales)* — Would Mr Booth comment on the nutritional inputs required to grow bio-mass crops and on the limitations to production yields? Is the moisture supplying capacity of the soil a limiting factor?
- A:** *Mr T C Booth* — The input requirements are nil. Trials done with chestnuts show this, although all the answers are not known yet. The most limiting factor is water, and irrigation may be economic as shown in Sweden.
- Q:** *Mr P Swain (ADAS)* — What comparative results have been found for the establishment of trees with and without growth tubes?
- A:** *Mr T C Booth* — Chafing and breaking have been the main problems. A saving of 3-5 years in establishment is the advantage.
- Q:** *Mr D Brierton (Tilhill Forestry Ltd)* — Mr Downing referred to a remarkably successful rate of planting of farm woodlands in Brittany. Could he please say something about the initiatives that have promoted this?
- A:** *Mr P Downing* — The planting has been done over a 20 year period with free trees from the Government. It illustrates what can be done in integration with farming.
- Q:** *Mr D Scott (Royal Agricultural Society)* — The productivity of the lowlands for grazing may be 20 times greater than that of the highlands. Is it likely that the Government will give its support to the better quality land when considering forestry?
- A:** *Mr P Downing* — If the Government wants to see land go out of production it simply does nothing. Positive use of the land requires forward planning and policy making. Incentives such as 20 year payments and resources in the countryside are in the Government's interest along with landscape and wildlife considerations.
- A:** *Mr T C Booth* — The rotations are shorter in the lowlands producing quicker returns.
- Q:** *Dr P Lack (British Trust for Ornithology)* — Would Mr McCall care to comment on the value of woods in the uplands? You talked about lowland woods and game.
- A:** *Mr I McCall* — The idea of small packages of afforestation is exciting in the lowlands. The upland grouse shoots are falling into decline in areas with cellulose factories, illustrated by recent grouse projects.
- Q:** *Dr P Mayhew (British Association for Shooting and Conservation)* — Where a farmer is interested in game and forestry incomes as of equal importance, can the two properly integrate bearing in mind a forester prefers large blocks, little shrub competition and close hardwood spacing etc?
- A:** *Mr I McCall* — There would need to be a compromise. The income will be higher if there is mutual benefit. Short-term game revenue can in some cases subsidise long-term forestry.
- Q:** *Mr J Watson (Cotswold Estate Services Ltd)* — What is the effect of planting small woodlands for game on the capital sale value of the farm, especially in the lowlands?

A: *Mr I McCall* — No specific study has been made. However £2-300 per acre in extra value for a good shoot in the Home Counties is the response to such a question from three major land agent firms. £350 per acre freehold shooting rights can be added to capital value on farms having considerably greater demand as compared with pure agriculture.

Q: *Mr J Josephi (Royal Agricultural College)* — Can Mr Booth suggest a fool-proof method for long-term protection of large trees against grazing stock?

A: *Mr T C Booth* — Not yet. Electric fencing is fairly economical if kept slack so that it gives a little.

Comment: Mr D Goss

Damage usually occurs in February perhaps due to nutrient deficiency in stock. Mineral blocks may help as well as lower stock density.

Q: *Mr J Workman (National Trust)* — Could we have more research as to why stock do damage so we may give them the necessary additives and reduce their urge to eat bark. This is an important issue in parts.

Comment: Dr W Mutch

Research — yes! Remember that work on this subject has also been done abroad, eg Veckermann in West Germany.

Comment: Mr T C Booth

In some cases, sheep are used for weeding.

Comment: Mr R Williams Ellis (Royal Forestry Society, TGUK)

The importance of control of vermin makes development of sporting an incentive. In Wales, the income from sporting is just £1 per acre. Without a keeper running a shoot, the costs of controlling vermin would be enormous. Responsibilities also exist for protecting neighbours properties.

Q: *Mr R Turner (National Farmers Union)*

- a. The problem of bio-mass is finding markets for wood chips. Is work being done to make chips more usable?
- b. Advisers are reluctant in agro-forestry to recommend high pruning for quality. Is work being done as in New Zealand?

A: *Mr T C Booth* — Pruning must be part of the system for both conifers and broadleaves.

Comment: Mr L Martindale

The only current economic way to burn chips is in industrial steam boilers. They cannot compete with coal and oil prices at present.

Q: *Mr J Dreysa (European Commission)* — What are the production costs (in £/tonne dry matter chipped at the forest road) of wood produced in energy plantations?

A: *Mr T C Booth* — It is too early to give costs yet. Another 2-3 years of larger scale production is needed.

Comment: Dr P Mitchell (Aberdeen University)

Work is being done on trials including larger areas for production levels. A view on costs of operation should be found in 2-3 years.

Q: *Mr R Rutherford (Dwyfor Woodlands Ltd)* —

- a. Is shake a problem with hardwoods in the 'Culm' experiment.
- b. What research is the FC doing on the problem of shake?

A: *Mr P Downing* — Oak and chestnut are the most susceptible species to shake, particularly on the shales in Devon and Cornwall. This is not evident in traditional coppice systems.

A: *Mr T C Booth* — The FC are funding a study at Bangor on shake, Huw Davies is examining genetics and site factors, long-term problems. Shake only seems to occur in trees 40 cm DBH or larger, ie timber trees. Genetic problems will take a long-time to sort out.

Q: *Dr M Carroll* — Did the gross margin figures produced by the Dartington Institute on the Culm measures for forestry receive any response from local farmers?

A: *Dr P Downing* — The response by farmers tended to be two-fold:

a. Very aware and had objectives for woods, mainly aesthetic.

b. Woods are a problem for economic reasons.

Therefore two different approaches are needed on management. A need to define what the objectives are and the available resource — often unrealised. A perception of time is important, often missed by busy farmers who have not organised an approach to management.

SESSION III: INCENTIVES, MECHANISMS AND MOTIVATION

Grants and Fiscal Incentives - MAFF

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Abstract

MAFF capital grants have traditionally been restricted to essentially agricultural business improvements including land reclamation, field drainage, farm buildings and fixed equipment. The new Agricultural Improvement Scheme, introduced in October 1985, still covers buildings and fixed equipment but the highest rates of grant, both in the uplands and the lowlands, are paid for environmentally beneficial items. This includes those saving energy and those protecting conservation interests.

The conservation items include tree and hedge planting and the use of traditional building materials. The scheme is designed to help farmers invest in a way which strikes a good balance between effective conservation and the needs of agriculture. It does this by offering grants for a wide range of environmentally beneficial capital investments linked to agriculture and by including safeguards against unnecessary damage to the countryside.

Since 1 January 1986 concessions have been made in the payment of Hill Livestock Compensatory Allowances in areas planted with trees and grants will also become available, under the Agriculture Bill, for the maintenance of traditional farming practices in Environmentally Sensitive Areas.

The Agricultural Improvement Scheme (AIS)

Coverage

This scheme covers a wide range of agricultural improvements including farm buildings, drainage and water supply, power supply, horticultural buildings and equipment and several environmentally beneficial items.

The whole range of eligible works and the appropriate grant rates are set out in Appendix I.

The items of particular interest to this conference include the following, which attract grants of 30 per cent in the lowlands and 60 per cent in the LFAs:-

hedges — planting, replanting of sections in a gappy hedge and hedge laying;

walls, banks and dykes built of traditional materials and associated gates, stiles and foot bridges;

shelter belts or shelter hedges to protect crops and livestock, and trees for shading stock (including trees planted singly). Shelter belts comprising more than 50 per cent broadleaved trees are particularly encouraged in the lowlands, with only half the rate (15 per cent) being paid for mixtures with less than 50 per cent broadleaves.

farm ponds (at 15 per cent and 30 per cent in LFAs) also qualify for grant under an improvement plan.

In addition, if a farmer spends extra money in carrying out conservation work in connection with any agricultural investment, eg if more expensive cladding materials are used on a building to make it less obtrusive, then the full cost of the work is eligible for grant. Grant is no longer available for removal of hedges and trees, for grassland improvement on heather or moors or for land reclamation.

Eligibility

Established agricultural and horticultural businesses may be eligible, provided that they do not have a current development plan under the earlier Farm and Horticultural Development Scheme or Agriculture and Horticulture Development Scheme.

Applicants must demonstrate that their business earns less than £8,650 per labour unit* (for 1986), and must show how the proposed investments, as part of a development plan, will improve the farm income up to a maximum (for 1986) of £10,380 per labour unit. The plan must achieve a "lasting and substantial improvement" up to this fixed ceiling. (A schedule of these upper and lower limits — or reference income — is shown for each year to 1992 at Appendix II.)

In order to qualify for most AIS grants, investments must form part of a plan for improving the economy of the holding. But grant for conservation work may be claimed whether or not it is included in such an improvement plan. The limit to the expenditure which may be aided under the scheme is £50,000 in any 6-year period. However, as an exception, grant may be paid on £24,000 of additional expenditure on conservation work done outside an improvement plan.

The application must be made by or on behalf of the person who controls the business. This can include tenant, owner-occupier or a partner, company or other corporate body. The applicant must earn at least half of his/her annual income from the agricultural business, spend at least 1100 hours per year working on the holding, and must either have been farming for at least 5 years or hold a suitable Training Certificate.

Protection of the environment

A significant new requirement of the AIS is that applicants for an improvement plan must provide information on the effect of their proposed investments on important landscape features, such as hedges, trees and ponds. If the proposed work is likely to be harmful, grant is put at risk and the farmer is encouraged to consider how the damage might be avoided. All proposals for work within designated conservation areas — ie national parks, the Broads, SSSIs and NNRs — must be cleared with the relevant authority before work is started.

The scheme also includes arrangements to minimise the risk of pollution. Where a farmer's proposals include work with a high pollution potential, eg a farm waste treatment works, silage stores or animal housing, he is first urged to consult the water authority, who can advise on such matters as siting, proper construction standards and correct management. If the farmer has not consulted the Water Authority, the Ministry reserves the right, in doubtful cases, to instruct him to do so.

Information

Details of the scheme and how to claim for grants are described in a handbook AIS 1, and all the relevant literature is listed at Appendix III of this paper. You can discuss your own eligibility and whether grant is available for your proposals with your Divisional Office of MAFF.

Hill Livestock Compensatory Allowances (HLCAs)

HLCAs are payable in the designated Less Favoured Areas (LFA) for hill cows and sheep up to a maximum stocking rate, with an overall ceiling per hectare of £62.48. The individual rates are as follows:-

In the original LFA —£54.50 per suckler cow;
£6.75 per sheep for hardy breeds;
£4.50 per sheep for other breeds.

In the LFA extension, or marginal areas, the HLCAs are paid at half these rates. Note:— There is no separate rate for hardy breeds of sheep in the LFA extension.

Forestry Concession

Under Article 15(3) of EEC Directive 797/85 there is a concession which allows continuation of HLCA payment to areas which are planted up with trees. This has been in effect in the UK since 1 January 1986 and, for example, if a farmer with 100 hectares of grazing land plants up 10 hectares with trees, his assessment for HLCA payments will still be made on the basis of 100 hectares for the first 15 years.

The European Commission has tabled an amendment to increase the period for which payments can be continued to 20 years. The concession is designed to enable a farmer to sustain some income from that land until such time as the first income becomes available from the sale of timber itself.

The Commission is now also discussing incentives for those who are giving up farming and this could include land 'given up' to afforestation. Details are unlikely to be available until later in the year.

Environmentally Sensitive Areas (ESAs)

Environmentally Sensitive Areas are to be designated under Clause 15 of the Agriculture Bill, which is expected to be enacted by the new Parliamentary Session in the autumn of 1986. However, the areas will be finally designated by

* Labour unit = 2200 hours.

Statutory Instrument, projected for January 1987. EC authority for this designation arises from Article 19 of the Structures Directive, which allows member states to introduce special national schemes. The current sites being considered for designation by MAFF include:—

West Penwith
Somerset Moors and Levels
Test Valley
South Downs
Suffolk River Valleys
Norfolk Broads
Breckland
North Peak
Pennine Dales
Clun
Radnor
Anglesey
Lleyn Peninsula
Cambrian Mountains

In view of the relatively small sum available for this designation in the UK, £6 million per year with 25 per cent FEOGA reimbursement, it is likely that a fairly small number of sites will actually be designated and receive grant.

The scheme has an approximate parallel in the established Broads Grazing Marshes Conservation Scheme. This experimental scheme was made under Section 40 of the Wildlife and Countryside Act 1981, and pays grant of £50 per hectare to farmers who agree to manage their grassland in a traditional way. This involves a written agreement as to the levels of stocking, nitrogen and herbicides rates, and to notify The Broads Authority on proposed changes to land use or management. From January 1986 this scheme was extended to cover a total area of 4 500 hectares. It runs until 1987.

It is probable that ESAs will include some farm woodlands, and proper management, including regeneration, will be a condition of receiving payment. Thus any hectare payment could be extended to cover farmed land and woodland alike. There is no intention that ESAs should involve payments made in areas of commercial forestry.

Although there is no intention to introduce blanket exceptions from grant eligibility within ESAs, cases will be considered on their merits and improvement plans under the AIS may need to be amended to uphold the general ESA objective. Ministers do have discretionary powers under the grant Statutory Instruments to withhold grant for conservation reasons.

It is not proposed to introduce the prior notification system which exists for capital grants in National Parks, but the farmer must notify the Agriculture Department prior to commencement of works on which grant is to be claimed, and so there will be an opportunity for modifications to be put forward at that stage.

Woodland as a Farm Crop

Finally it is worth mentioning the MAFF report on *Woodland as a Farm Crop*. Although this document is no more than a collection of ideas on possible ways forward in the future for farm woodlands its recommendations do include some ideas for financial assistance.

Enhancement of planting grants for small woods

This type of assistance may not be necessary where the small woodland owner can obtain the enhanced rates under the Broadleaved Woodland Grant Scheme.

Woodland compensatory allowances (WCAS)

These payments were suggested for LFAs only, but consultees agreed unanimously that this item does not go far enough, and should be extended to cover more marginal land outside the LFAs. Some environmental groups were opposed to the payment of WCAs for conifers, and it is feared that such payments might prompt renewed pressure for planning control.

EC Structures Regulation — Article 20

It has been suggested that Article 20 should be re-examined as a possible source of funding for grants. The scope of this Article is wide enough to cover measures outside planting and establishment, such as improvement and infrastructure works.

Management grants

These are seen as essential to the achievement of any farm woodland initiative, and grants for co-operative marketing have also been suggested.

At this stage the *Woodland as a Farm Crop* report has no special status other than as a respected part of the total and growing debate on alternative land uses.

Conclusion

None of the grants described in this paper can be related to commercial forestry, although some of them will help farmers to manage some farm woodlands. The grants necessarily have an agricultural benefit although, unlike some earlier schemes, these benefits are very much more sympathetic to conservation interests.

APPENDIX I

List of Capital Grants

This list is only a guide. To see whether grant is available for the work that you intend to do, you should read the numbered leaflet shown against each item.

Description	Leaflet number	Rate of grant	
		Basic	LFA
	AIS		
Aprons	7	15	30
Banks (materials traditional in locality)	4	30	60
Bridges	4, 11	15	20
Bracken control (other than soil cultivation)	4	15	30
Bulk dry stores	7	15	30
Buildings — main framework	7	15	30
Craft and light industries — facilities	6	Nil	25
Creeps	11	15	20
Culverts	11	15	20
Drainage (field)	10	15	30
Dykes (material traditional in locality)	4	30	60
Dykes — (non-traditional)	11	15	30
Earth banks	11	15	30
Electricity — supply and distribution for agricultural purposes	8	15	30
Fencing	11	15	30
Fish farming facilities for food production (fresh water)	16	5	10
Flood protection of agricultural land (by watercourses)	10	15	30
Fords	11	15	20
Gas supply and distribution for agricultural purposes	8	15	30
Grids	11	15	20
Hard standings	11	15	20
Heather burning or regenerating by cutting	13	15	30
Hedges	4	30	60
Horticulture: Buildings (new), main framework — for production of horticultural produce	5, 7	15	15
Horticulture: Equipment — designed and intended for the preparation for market of harvested horticultural produce	15	20	20

APPENDIX I (cont'd)

Description	Leaflet number	Rate of grant	
		Basic	LFA
	AIS		
Horticulture: Glasshouses (new) — whether heated or not, main framework — for production of horticultural produce	5, 7	15	15
Horticulture: Glasshouses — replacement of	5, 7	25	25
Horticulture: Glasshouses — replacement/ improvement of heated glasshouses	5, 7	50	50
Horticulture: Glasshouse heating system (Provision/installation/replacement)	5	20	20
Horticulture: Plant — designed and intended for the preparation for market of harvested horticultural produce	15	20	20
Horticulture: Plastic clad structures — new for production of horticultural produce	5, 7	15	15
Horticulture: Plastic clad structures — replacement of	5, 7	25	25
Jetties	11	15	20
Livestock gathering facilities including temporary shelter	12	15	30
Lime and fertiliser applications for grassland other than normal husbandry	13	Nil	30
Loading platforms	7	15	30
Moling (as integral part of new drainage systems)	10	15	30
Orchard grubbing	5	15	15
Paths	11	15	20
Permanent pasture — (laying down to permanent pasture of land used for cropping)	56	15	30
Piers	11	15	20
Plastic clad agricultural durable structures	7	15	30
Ponds — water storage	9	15	30
Preparation of improvement plan	-	15	30
Railway crossings	11	15	20
Ramps	7	15	30
Replacement of apple and pear orchards	5	35	35
Reseeding and regeneration of grassland (excluding heathland and moorland)	13	15	30
Roads	11	15	20

APPENDIX I (cont'd)

Description	Leaflet number	Rate of grant	
		Basic	LFA
	AIS		
Shelter screen	4	15	30
Shelter belts (50%+ of broadleaved trees)	4	30	60
Shelter belts (other)	4	15	60
Slips	11	15	20
Silos	7	15	30
Solar heating	4	15	30
Subsoiling (as integral part of new drainage)	10	15	30
Thermal insulation — agricultural use	4	15	30
Tourism in Less Favoured Areas	6	Nil	25
Walls (materials traditional in locality)	4	30	60
Walls (non-traditional)	4, 11	15	30
Watercress beds	14	15	15
Waste disposal	4	30	60
Water facilities/distribution/storage	9	15	30
Wind/ water powered pumps	4	15	30
Wind/ water powered generators	4	15	30
Wirework for hops, cane fruit and vineyards	14	15	15
Yards	7	15	30

Reference Income

Calendar Year	Reference Income (Great Britain) £ per year	Reference Income x 120% (Great Britain) £ per year
1986	8,650	10,380
1987	8,825	10,590
1988	9,000	10,800
1989	9,180	11,016
1990	9,365	11,238
1991	9,550	11,460
1992	9,745	11,694

1. These figures will be reviewed on or about 1 January each year.

2. Reference Income is based on the average earnings of full-time workers outside agriculture in Great Britain (excluding the Greater London area). Reference Incomes calculated for 1987-92 allow for an increase in average earnings based on past trends at a compound rate at 2 per cent per annum.

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APPENDIX III

LIST OF LEAFLETS AND FORMS

- AIS 2 Application Form
- AIS 2A Standard earned income form
- AIS 2B Tourism and craft application form
- AIS 3 How to apply for farm capital grants
- AIS 4 Farm environment and energy-saving grants
- AIS 5 Horticultural buildings and orchards
- AIS 6 Tourism and crafts
- AIS 7 Agricultural buildings
- AIS 8 Gas and electricity supply
- AIS 9 Water supply and storage
- AIS 10 Field drainage and fresh water flood protection
- AIS 11 Roads, paths and fences
- AIS 12 Gathering, treatment and temporary shelter of livestock
- AIS 13 Land improvement
- AIS 14 Stakes, wirework and watercress beds
- AIS 15 Horticultural plant and equipment
- AIS 16 Fresh water fish farming
- AIS 17 Claim form

Grants and Fiscal Incentives - The Role of the Countryside Commission and Local Government

M Taylor
Countryside Commission

Abstract

The Countryside Commission's grant-aid schemes are described. They have been established for more than 10 years and fulfil a specific purpose in promoting the Commission's objectives, alongside assistance from other sources. Coed Cymru, a co-operative woodland management venture in Wales, is described. The Commission's role in advising on eligibility of woodland for Capital Transfer Tax Exemption is noted, as is its concern with the relationship between woodland tax arrangements and management.

Introduction

For more than 10 years the Countryside Commission has been grant-aiding tree planting and woodland management on farms. Whilst this conference is primarily concerned with forestry and farming it is appropriate to spend some time discussing the opportunities for relatively small-scale plantings which can be incorporated within the normal farm structure as opposed to larger-scale plantings which might form an alternative land use for significant parts of the farmed countryside.

There are often fairly ill-informed views expressed that there are too many organisations grant-aiding the same activities in the countryside. Invariably when this criticism is made people will refer to the fact that both the Ministry of Agriculture, the Forestry Commission, the Countryside Commission, the Nature Conservancy Council and local authorities are all engaged in helping farmers with grant-aid to establish trees and woodlands. I think much of this criticism is misplaced and does not recognise that each of the organisations involved is actually offering a different package to the customer. Most people accept that it is a good thing that the high street contains a range of shops and a range of organisations selling similar goods. This is customer choice. The current arrangements for public funding of forestry on farms give the farmer a choice of ways in which he can become involved in woodland management and tree planting.

The Countryside Commission is an agency of the government which has a special responsibility for promoting the conservation of the natural beauty of the countryside and where appropriate providing facilities for the general public to enjoy it. Our work with woodlands and trees is not therefore primarily aimed at either import substitution by growing more timber in the British Isles, nor primarily concerned with increasing farmers incomes. However it is inevitable that both of these objectives will be served by the policies which we have operated for tree planting and woodland management over a number of years.

In this paper I intend to set out the policies which the Countryside Commission operate to encourage and support farmers in their woodland and tree planting activities. At the same time I hope to draw attention and give proper recognition to the role which local authorities, particularly county councils, have played in this activity on a scale which is often grossly underestimated and unrecognised by others particularly central Government departments and agencies.

Small Woods and Tree Planting Projects

Before explaining the role of the Commission in both grant-aid and the place of fiscal incentives in encouraging farm woodlands I would like to spend a little time setting out some of the historical background to the Commission's activities. Whilst this paper is primarily concerned with grants and fiscal incentives it is very difficult to separate these from the arrangements for providing advice which will be dealt with in other papers.

The Countryside Commission has been involved in a number of projects over the last 10 years which combine advisory services and support with grant incentives. The Commission has been responsible for setting up a number of woodland management and advisory projects usually in association with local authorities (see Figure 1). These projects have been designed to ensure that farmers have access to proper professional advice on managing woodlands and trees in order to meet a range of objectives but primarily for conservation of landscape and wildlife whilst at the same time easing the often difficult passage through the systems which have been devised for making public money available to farmers. In nearly all cases the projects have continued in some form or other after the initial experimental period. This is usually because the presence of an advisory officer on the ground who is not only skilled in woodland management and conservation but is also knowledgeable about the bureaucracy concerning the grants available, has been welcomed by farmers in the community who have made it clear through their support that there is the need for this sort of service.

New Agricultural Landscapes and Small Woods Projects

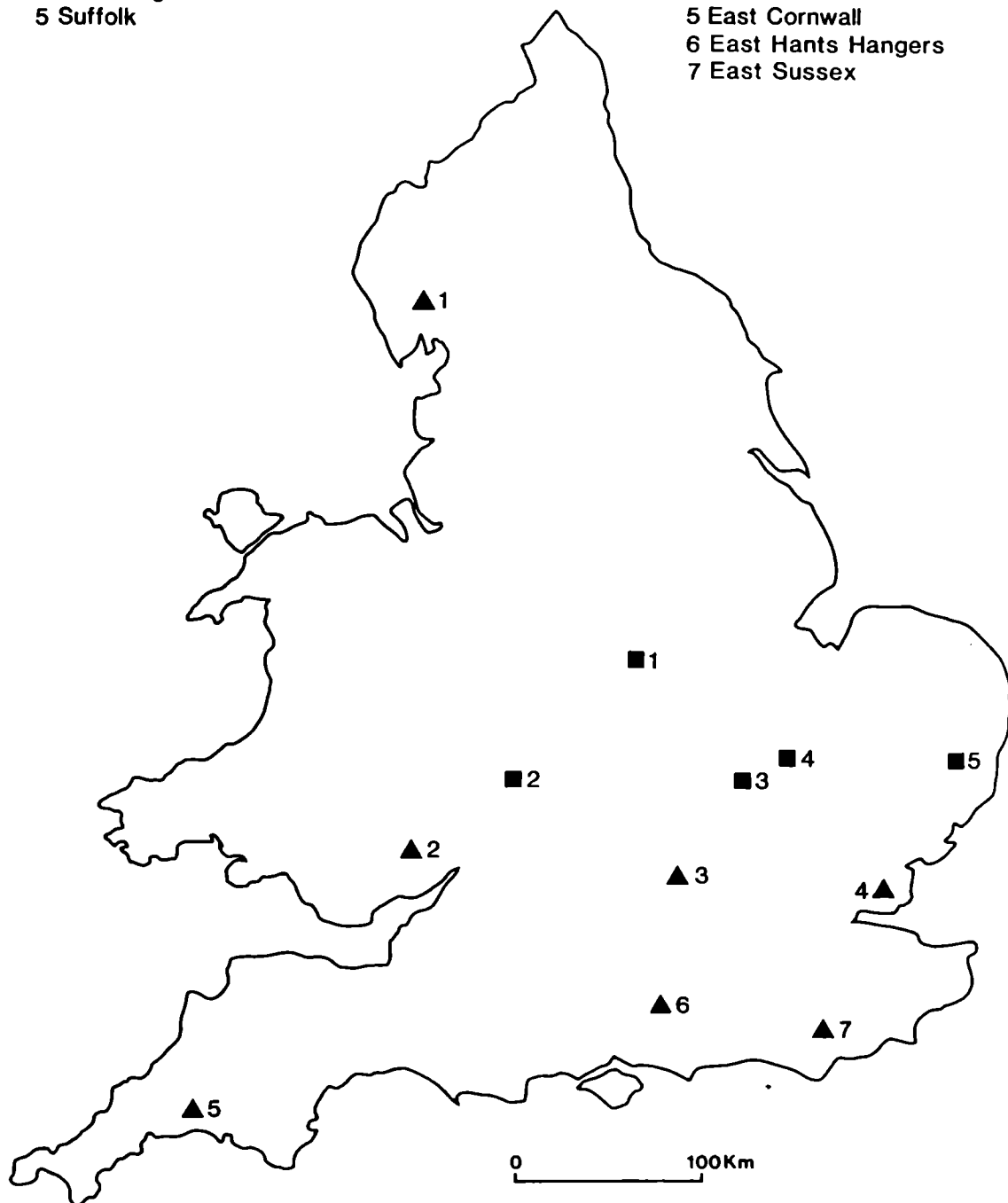
Figure 1

■ NEW AGRICULTURAL LANDSCAPES

- 1 Charnwood
- 2 Hereford & Worcester
- 3 Bedfordshire
- 4 Cambridgeshire
- 5 Suffolk

▲ SMALL WOODS PROJECTS

- 1 Lake District
- 2 Gwent
- 3 Chilterns
- 4 Rochford DC
- 5 East Cornwall
- 6 East Hants Hangers
- 7 East Sussex



In some local authorities woodland advice has developed into fairly significant services within the local authority system.

Coed Cymru

The development of Coed Cymru in Wales is a particularly good example of co-operation between central and local government and farmers. Coed Cymru is the "brand name" of a network of woodland advisory and management services available to farmers in Wales. It is based on County Council Tree Planting Services. It is however, co-ordinated at a national level by a committee serviced by a national co-ordinator. This committee is made up of representatives of Countryside Commission, Nature Conservancy Council, WOAD/ADAS, Forestry Commission, Local Authorities, Farming Union, and Voluntary Conservation Groups.

In addition to grant-aid and advice, Coed Cymru can also arrange the services of workforces sponsored by MSC which is particularly useful for small-scale tasks which do not justify the costs of professional private sector contractors. The scheme is about to be expanded to provide more specialised advice on marketing, establishment of management co-operatives, and training in woodland management for farmers.

Coed Cymru in conjunction with the Agricultural Training Board (ATB) in Wales has organised eight training courses for farm workers on woodland management. The ATB is developing courses to ensure that Coed Cymru Woodland Officers are qualified as instructors for ATB woodland management courses.

In the 12 months Coed Cymru has been active it has dealt with 400 requests for advice or information from Welsh farmers.

I think it is appropriate to lay to rest a few of the myths which one often hears surrounding the relationship between farmers and local authorities. In our experience there is little or no resistance from farmers in dealing with local authority staff providing it is clear that local authority officers are there to provide an advisory service to the farmer. The important thing is that the advisors should be readily accessible and easy to contact, preferably by name, and that they should also have a measure of independence from the normal committee procedures which are often a feature of the local democratic process.

Tree Planting and Woodland Management Grants

As well as the specific projects which have been running, in some cases, for a number of years the Countryside Commission and local government have developed an almost universal network of arrangements whereby local authority and Countryside Commission grant-aid is combined to provide a single support service to farmers. In most counties this is managed for the Countryside Commission by the local authority in question. In the jargon of the Commission these are known as agency arrangements. The arrangements represent a partnership between local government and the central government agency to the mutual benefit of both. We would find it almost impossible to manage the 3-4,000 grant applications which are made for our funds each year; whilst our money enables local authorities to have a much larger budget for woodland management and tree planting in the countryside.

Under these arrangements all of the administration and decision making on individual grants is delegated by the Countryside Commission to local authority staff. As a condition of this delegation however the Commission does have certain principles which it expects to be exercised by the local authority on the Commission's behalf. The details of the arrangements on grants available are set out in Countryside Commission leaflet CCP 171 *Conservation Grants for Farmers and Landowners*.

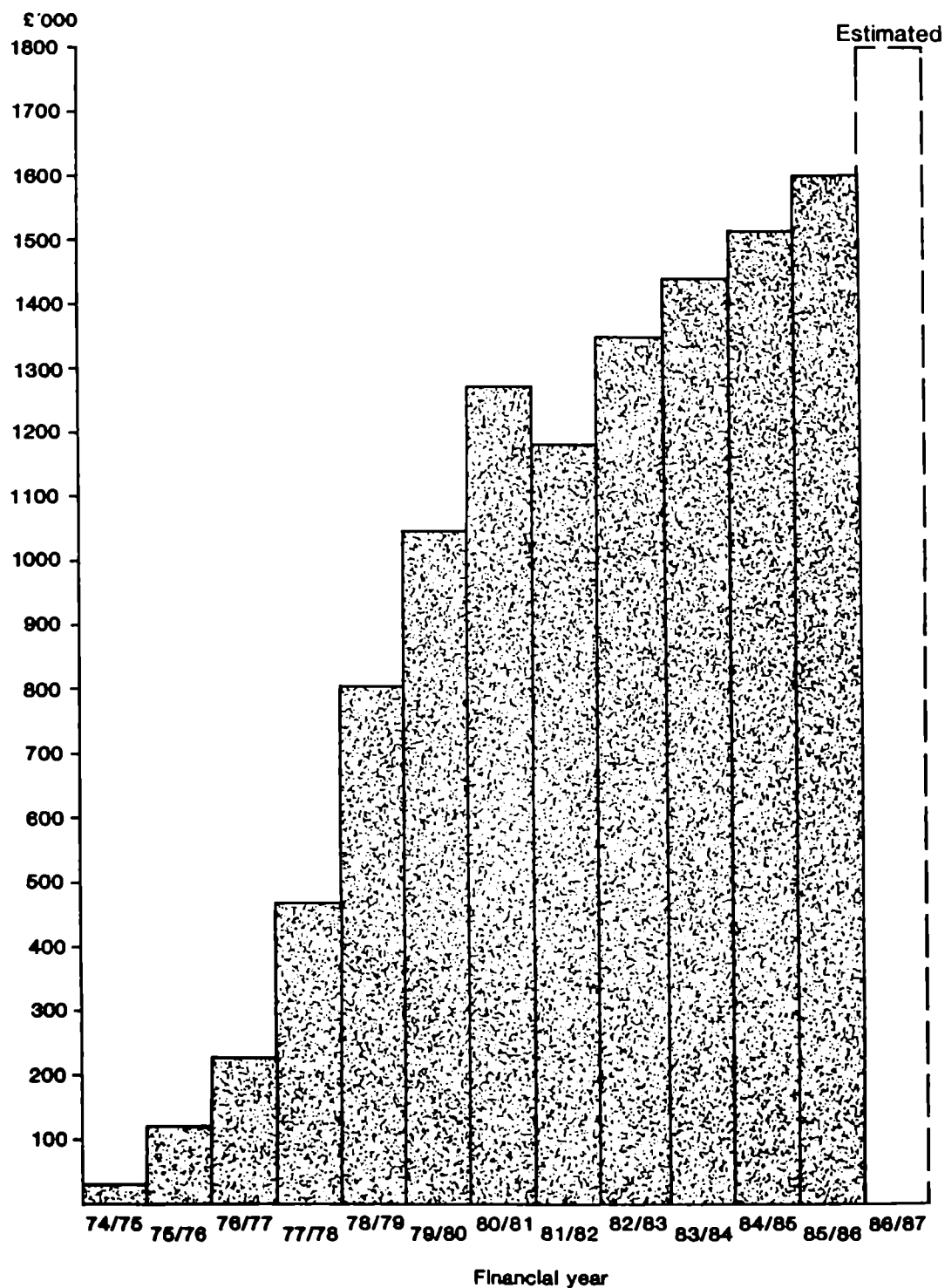
In general terms, these conditions are that:-

- the planting should contribute in some way to improving the natural beauty of the countryside;
- there should be a presumption in favour of indigenous hardwood species (indigenous might mean trees which are appropriate to the local area rather than just which are indigenous to the British Isles);
- there should be a commitment on the part of the farmer or landowner to maintaining the trees to maturity;
- there should be a contribution from the landowner to the cost of the planting;
- new plantings should be less than 0.25 hectare in area.

Figure 2 shows annual expenditure by the Countryside Commission over the last 10 years on amenity tree planting and woodland management. The figures refer to total expenditure by the Commission. Some of this money will have been spent by local authorities on their own land. However the overwhelming bulk of the funds will have been spent on private land within the countryside. What is important to recognise is that these figures represent the contribution by the Commission. Currently we would expect our contribution to be around one third of the total expenditure incurred. The remainder being shared between the local authority and the landowner. This leads us to believe that at least some £5 million per annum is being spent on tree planting and woodland management on farms for amenity purposes within England and Wales.

Figure 2

Countryside Commission Expenditure: Tree Planting and Woodland Management



The levels of grant-aid available from the Commission are based on actual planting costs. So far the Commission has avoided national flat rate grants which are paid irrespective of the real costs of planting. This in part is possible because of our network of local authority agents and their ability to assess the local circumstances as far as costs of fencing and young trees are concerned. The basis of our grants is as a percentage of actual costs. Prior to 1980 we operated many grants at 75 per cent of costs. However it became very clear that this level of grant-aid from the public sector was not necessary in order to stimulate a demand capable of absorbing all the funds we had available.

Over the years therefore the levels of grant in some parts of the country have moved steadily downwards. In many parts of England and Wales it is now unlikely that farmers will be offered more than 30 per cent of their actual costs from Countryside Commission funds. This does not preclude local authorities from adding to that level so that farmers may still receive grant offers in excess of 50 per cent. However I must emphasise that this arrangement is designed to be flexible. We are well aware that in some parts of the country, notably Wales it is very difficult for farmers to find the capital sums which are often required in order to pursue tree plantings. In these areas therefore we accept that our grant needs to be higher and 50 per cent Countryside Commission grant is quite common place in some of the poorer parts of England and Wales.

There is often confusion over the variety of grants which are available from the public sector to farmers. I think it is appropriate at this stage to identify the differences between our grants and some of the other agencies. As I have explained the grants from the Countryside Commission are primarily concerned with conservation of the natural beauty of the countryside. We are not in competition with the Forestry Commission. In fact we have worked with the Forestry Commission in the development of their broadleaves policy and welcome the widening of their interest in woodlands on farms. You have heard a paper from Peter Downing of the Dartington Institute explaining the background to a project called *Silvanus* in the west country which is in fact a joint initiative involving a number of public agencies including the Forestry Commission and ourselves. I have already referred to the *Coed Cymru* project in Wales. The essential difference in interests between the two agencies is the motive and the purpose for the growing of trees and the management of woodlands. This was recognised in an agreement which was reached many years ago that the Countryside Commission would focus primarily on small plantations or individual trees which could not be considered to be commercial timber produce, whilst the Forestry Commission would address itself primarily to those plantations which were sufficiently large to offer some prospect of economic production of timber in the long-term.

The Countryside Commission does not therefore normally grant-aid plantings of more than 0.25 hectare. However over the years and in many cases the Commission has grant-aided plantings larger than this where the Forestry Commission has decided that the objectives of the scheme were too far removed from their primary concern with the production of utilisable timber to qualify for its grants. Equally the Countryside Commission has been concerned to grant-aid the management of abandoned or neglected woodlands on farms in order to bring them into health and vitality which will ensure their long-term survival as woodlands. Inevitably this has involved bringing them into a more productive state of management, but again the primary motive for the Commission was to retain the existence of a broadleaved woodland in that particular location.

As I have shown above the Commission has been spending considerable amounts of taxpayers' money over the last decade or so to encourage farmers to plant and maintain trees and woodlands on their farms. Occasionally there has been criticism that many of these trees are either in a poor state of health or are completely dead and that the sort of planting which we have encouraged has actually been a waste of money, effort and time. The Commission was well aware of the need to ensure that taxpayers money was achieving the objectives which had been set. In 1985 the Institute of Terrestrial Ecology was commissioned to carry out a survey of schemes which we have grant-aided over the last 10 years. We chose to look at schemes which had been planted for 3, 7 and 9 years. The object of the exercise was to see whether the trees were still alive and also to assess their state of health and where possible to make some estimate of the contribution that they would eventually make to the landscape. The results of this survey are summarised in Figure 3.

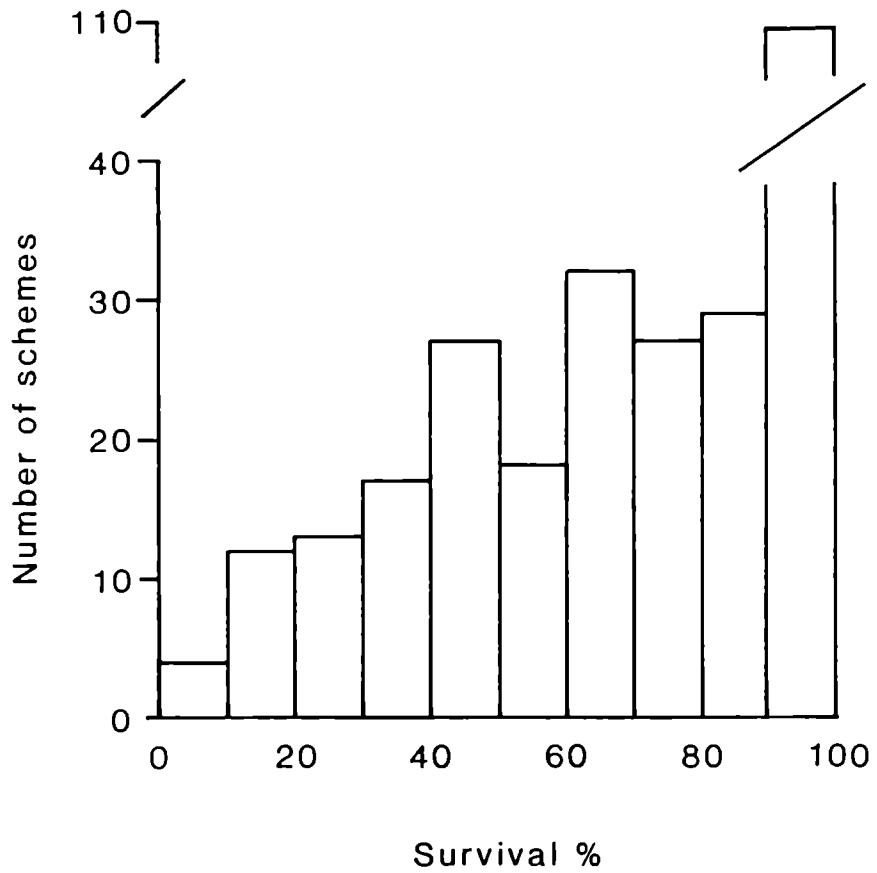
I think the main message which the Commission has drawn from the results of the survey is that we have an acceptable survival rate by and large. However the average survival of 77 per cent of the trees does disguise a number of schemes where survival appears to have been less than acceptable. In most of these cases the difficulties appear to be due as much to the location of the planting as to any deliberate acts of neglect. It is clear then to us that farmers do require some professional advice on the siting of possible plantations and it should not be assumed that any odd corner which happens to be available will necessarily be a sensible place to locate farm woodlands.

The other feature of the results is the unacceptably large number of schemes where some form of maintenance was required. However I think it is also important not to over-exaggerate the neglect; in most cases all that was required was that tree ties should have been slackened off or removed. It does suggest that durable tree ties made of rubber or PVC are in fact undesirable and that it would be far better to use much cheaper degradable materials for holding large whips and standards to stakes so that the tie will not restrict the tree's growth if not regularly adjusted. This approach is a realistic one and recognises the fact that no matter how hard we try there will always be situations where tree ties will not be adjusted on a regular basis.

The full details of the results of this survey will be published by the Commission.

Figure 3

Countryside Commission Tree Survival for grant schemes



Fiscal Incentives

There will be other papers at this conference dealing with details of the tax exemptions and concessions which are available to woodland owners and managers. However, there are two aspects of fiscal incentives to which I would like to refer. The second of these concerns the relationship between the current tax arrangements and the management of woodlands for conservation purposes or amenity. I will deal first with the role the Commission plays in advising the Capital Taxes Office on exemptions from Capital Transfer Tax in cases where woodlands are considered to be of national significance from the point of view of landscape, amenity and recreation.

Under the Finance Acts 1975/6, *et seq*, Parliament provided for owners of land judged to be of outstanding scenic interest to be conditionally exempt from Capital Transfer Tax (renamed Inheritance Tax in the 1986 Finance Act). Alternatively, where owners of such land are not willing or able to continue to own and manage it in the traditional way, there are other tax concessions for helping it to pass by gift or reduced price purchase, into protective ownership eg National Parks or the National Trust. The Countryside Commission is the expert advisory body nominated to advise the Inland Revenue (Capital Taxes Office) on whether any land for which these tax concessions are claimed is of nationally significant scenic interest. Prime examples of the most precious types of landscapes in England and Wales have been recommended by the Countryside Commission, many in nationally designated areas, but some elsewhere.

Woodlands, which are so often an important landscape feature, have always been recommended for exemption with 'qualifying' landscapes of which they form an integral part. Woodlands also frequently feature prominently in land recommended by the Historic Buildings and Monuments Commission as part of the setting for an outstanding historic house. The Nature Conservancy Council (NCC) and the Forestry Commission have also been able to recommend woodlands for exemption on the basis of their scientific or silvicultural merits, respectively. The NCC have sometimes done so, usually where they have SSSI (site of special scientific interest) status. Recently it has been confirmed that NCC are free to recommend woodlands "which are or could be properly included in the NCC's inventory of ancient semi-natural woodlands" and that they will consider doing so in future, whether they are in an SSSI or not. This may result in some woodlands being conditionally exempted which would not have qualified on scenic or historic land criteria.

The Commission offers advice at two levels, formal and informal.

Under the formal arrangements, the Commission deals with cases referred by the Capital Taxes Office in respect of applications for exemption from capital taxes for which there is an actual liability, eg on the death of the owner or on a sale to an appropriate conservation organisation such as the National Trust. This advice is provided to the Capital Taxes Office after the Commission has discussed and agreed with the landowner or his agents specific management requirements which will be a condition of the tax exemption. It should be emphasised that the exemption will only last for as long as the management arrangements are adhered to or until the next tax liability. There is scope for continuing it thereafter if the next heir reaffirms the conditions. In the event of any departure from the management proposals the land may become liable to tax.

In the case of woodlands covered by capital tax exemptions of this nature the Commission would normally be looking for a form of silvicultural management which would ensure the long-term survival of the woodland within its particular landscape. This would not imply a fossilisation of the woodland at any fixed point in time but would require its management according to good forestry practice compatible with the conservation objectives and aims of the management plan. The Commission has produced an advisory booklet for farmers and landowners setting out the way in which a management plan for these sorts of purposes should be prepared. (Countryside Commission publication CCP 205 "*Heritage Landscapes Management Plans*".)

At the informal level the Commission is prepared to offer advice to owners and agents direct on the likelihood of land being recommended for capital tax exemption on scenic merits when a liability arises. This enables landowners to plan their tax affairs in the long-term. It is assumed that providing the landscape is conserved and the legislation and criteria remain the same when death or transfer takes place, they may expect a recommendation for exemption from capital taxes. Advice is also given, in general terms, about conservation management in the intervening period, to preserve the chances of a favourable recommendation. It should be emphasised however that this advice is informal and is given without prejudice to the eventual decision. Neither does it commit the Capital Taxes Office, or even the Commission, in any way to any exemption when the tax becomes due. However this arrangement has been found useful by many landowners in helping them to identify and conserve land in a way which may minimise their tax liabilities. Again in the case of woodlands, our advice would not normally require any significant change from the prevailing management practices. It would assume that we would be seeking a form of management which would result in the long-term existence of the woodland retaining both its scenic, wildlife, historic and recreational characteristics.

It is not possible to identify the value of these tax exemptions, though individuals will have some idea of their own circumstances. It should also be borne in mind that the capital tax arrangements are complex and take into account all lifetime transactions as well as liabilities incurred from activities other than forestry or farming. It does therefore require individual farmers to ensure that they have taken proper professional advice on their tax liabilities before they consider a management programme for woodlands which is aimed specifically at obtaining exemption from capital tax liabilities.

Current Taxation Incentives

Under the current arrangements for income tax owners of woodlands have an option of the tax base on which their woodlands might be assessed. Very simply they can opt to pay tax under Schedule D in the initial phase of the establishment of a plantation and therefore obtain tax relief on their expenditure. In order to avoid the consequence of the revenue which is earned at the time of harvest there is an arrangement whereby there can be a switch of tax liabilities from Schedule D to Schedule B providing there is a change in ownership. This arrangement is attractive particularly to people who are able to set the costs of the planting against higher rates of tax and in the initial phase whilst the owner at harvest avoids Income Tax on the income from the timber.

From a conservation viewpoint this arrangement is not particularly helpful or attractive. The system requires the primary objective of the woodland to be the production of commercial timber. The growing of timber must be part of a business enterprise. In addition the arrangements for the Schedule B tax on harvest force owners to enter into a clear felling regime over a very short period of time. This is necessary in order to replant and revert to a Schedule D arrangement whereby the cost of replanting can be offset against tax liabilities. The consequence of this mechanism is that it is only really attractive to people who are able to set up management or trust arrangements, who have higher rates of tax liability and who are operating forestry on a commercial basis. The form of management required to take full advantage of these arrangements is one that requires as short term a rotation as possible, ie softwoods, particularly species with high yield classes and harvesting based on clear felling of the complete area and replanting subsequently in a new financial year.

In order to make these tax concessions attractive from a conservation management viewpoint there would need to be an arrangement whereby an owner could claim the cost of planting against tax liabilities whether or not his objectives were to grow commercial timber and at the same time he would be able to spread the harvesting and replanting of the woodland over a number of years. This would imply some rather unusual hybrid status in tax terms for the land during the period of harvesting and planting the second rotation. The only other option would seem to be a special tax regime for any woodland which was managed as part of a farm enterprise. Whilst this might be attractive in conservation terms and to the conservation interests as well as no doubt to farmers, it amounts to a special pleading for woodlands as opposed to all the other worthy enterprises which are currently subject to general taxation arrangements.

Conclusion

The financial support available to farmers for woodlands and tree planting on their farms from the Countryside Commission can be summarised as falling into three categories:-

- a. provision of free advisory arrangements through local authorities acting as agents for the Countryside Commission in respect of our conservation grants;
- b. provision of grant-aid towards the cost of planting small areas of farmland to amenity woodland plus grant-aid towards the renovation and revitalisation of neglected woodlands;
- c. help in achieving exemption from Inheritance Tax liabilities or favourable capital gains tax arrangements to owners of woodland which are considered to be of national importance from a scenic and amenity view point.

Grants and Fiscal Incentives — Forestry Commission

G R Hatfield
Land use Planning Officer
Forestry Commission

Abstract

The main Forestry Commission scheme is the Forestry Grant Scheme, introduced in 1981 and providing for establishment of conifer and broadleaved woods. The new Broadleaved Woodland Grant Scheme places particular emphasis on the environmental benefits of pure broadleaved woodlands. Both schemes are linked to consultation procedures designed to take account of other land use interests. Woodland taxation measures have developed over the years to accommodate the unusually long time scale of forestry investment. The incidence of Income Tax, Capital Gains Tax and Capital Transfer Tax (now Inheritance Tax) on woodland owners is briefly described. The combination of grant and tax incentives has been reasonably successful in encouraging private sector investment in forestry, particularly by those paying high rates of tax.

Introduction

Forestry is an unusual field of investment, involving very long return periods, and no significant revenue until thinning commences after 20 years or more. The greater part of the income is generated at clear felling, generally 40 plus years after establishment for conifers, and much longer for most broadleaved species. These special characteristics are recognised in grant and taxation arrangements for woodland owners, the purpose of which is to encourage investment in forestry, thereby providing timber for industry and helping to secure positive and sensitive woodland management.

Details of the tax and grant arrangements described briefly here are to be found in a series of pamphlets available from Forestry Commission offices, and listed at the end of this paper.

Grants

Forestry Grant Scheme

The Forestry Grant Scheme is the main instrument, and was introduced following closure of the Basis III Dedication Scheme and Small Woods Planting Grant to new applicants in 1981. Applicants are required to work in accordance with a 5-year plan of operations, with the primary objective of producing a utilisable crop of timber, but covering other aspects of sound forestry practice, including integration with agriculture, environmental considerations and, where appropriate, arrangements for public recreation. As with the other Forestry Commission schemes, a lower limit of 0.25 hectares applies, with the intention of avoiding overlap with the schemes operated by the Countryside Commissions for smaller amenity woodlands. In recognition of the increasing importance attached to environmentally sensitive measures, enhanced rates of grant were introduced for pure broadleaved stands (and mixtures where the conifer element was intended as a silvicultural nurse) under Basis III dedication in 1974 and these have been carried through to the present.

Parallel arrangements for establishment and restocking of native pinewoods in appropriate localities provide for payment of grant at the same rate as for broadleaves under the Forestry Grant Scheme.

Grants are paid in two instalments, 80 per cent on completion of planting and the balance 5 years later provided that the plantation has been properly maintained.

Broadleaved Woodland Grant Scheme

In response to continuing growth in awareness of the environmental advantages of broadleaved woodland and concern at the loss of ancient semi-natural woodlands, a review of broadleaved policy was initiated at a conference held here in Loughborough in July 1982 and came to fruition with the announcement in July 1985 of a new policy, followed in October by implementation of the Broadleaved Woodland Grant Scheme. This embodies a departure from previous practice in that production of timber need no longer be the primary objective — although it is still expected to feature amongst others — and the scheme is specifically directed towards rehabilitation of existing broadleaved woodlands (both by planting and natural regeneration), and establishment of new ones. It was introduced in parallel with the *Guidelines for the Management of Broadleaved Woodlands* which lay down the general framework for establishment and maintenance of all broadleaved woodlands, including five main points:-

- woodland which is now broadleaved should remain so;
- there is a presumption against clearance of broadleaved woodland for agricultural purposes;
- an increase in the present area of broadleaved woodland should be encouraged;
- special attention should be given to ancient semi-natural broadleaved woodlands to ensure continuance of their special features;
- managed woodland is more likely to survive than unmanaged woodland.

In recognition of the longer time required for establishment of broadleaves, grant is normally paid in three instalments, 70 per cent on completion of planting and 15 per cent in instalments 5 and 10 years thereafter.

Initial indications confirm that the higher rates of grant available for pure broadleaved planting and regeneration under the scheme are attracting an encouraging level of interest, notably in those parts of the country where broadleaves traditionally predominate, and, not surprisingly, with an emphasis on smaller schemes, frequently involving regeneration and restocking of existing woods. There is, however, also an encouraging element of new planting.

Table 1 Rates of grant per hectare (£)

Area (ha)	Forestry Grant Scheme		Broadleaved Woodland Grant Scheme
	Conifer	Broadleaved*	
0.25 - 0.9	630	890	1200
1.0 - 2.9	505	735	1000
3.0 - 9.9	420	630	800
10.0 plus	240	470	600

* also native pinewood grant

Consultation procedures

An important feature of the grant schemes described is that they provide the framework for consultation arrangements designed to take account of the effect of afforestation and forest management proposals on other rural land use interests. Applications are submitted to the Forestry Commission in the first instance, and with the exception of those falling below agreed thresholds, are then referred to the relevant Agriculture Department (where agricultural land is involved), the Nature Conservancy Council (where National Nature Reserves or Sites of Special Scientific Interest are affected) and the local planning authority. In appropriate cases, the Countryside Commissions and Red Deer Commission may participate in the process, and the applicant is required to consult directly with the Inspector of Ancient Monuments. Those consulted are encouraged to consider the views of voluntary bodies in formulating their response.

These are comprehensive arrangements designed to ensure that all interests are taken into account, and have achieved a high degree of success in reconciling potential differences of opinion. In cases where there are outstanding objections the Forestry Commission's appropriate Regional Advisory Committee meets the parties, usually on site, and explores the scope for reconciling opposing views. In the vast majority of cases this is successful. However, in a small proportion of cases differences prevail, and the case is referred to the Forestry Commissioners for a decision. Unless they decide to concur with the objections and reject the application, they take advice from the appropriate Forestry Minister before reaching a decision (and normally also from the Secretary of State for the Environment in English cases involving environmental issues — in Scotland and Wales the responsibilities of the respective Secretaries of State include environmental as well as forestry matters).

Fiscal Arrangements

Woodland taxation is a complex subject to which I can do no more than give an introduction here. Special arrangements have been developed over the years to accommodate the unusually long timescale of forestry investment.

Income Tax/Corporation Tax

As a result of the provision allowing an owner to elect for assessment under Schedule D (rather than the usual schedule for woodlands — B) it is possible to offset losses incurred in establishing and managing woodlands for commercial ends

against income from other sources, thus effectively reducing the cost of these operations by something approaching the marginal percentage at which the company or individual pays tax. This applies in full to 'revenue' operations (eg the cost of ploughing, plants, planting, weeding etc), but for capital items (roads, drainage, permanent fences) relief may only be claimed at 4 per cent of the cost of the item per annum, spread over a 25 year period (following introduction of revised arrangements with effect from 1 April 1986). The effect is to substantially ameliorate the cost of establishing plantations for higher rate taxpayers, although one side-effect is to correspondingly diminish the value of the grant (which reduces the amount of the eligible loss by its full value).

In order to take full advantage of the woodland provisions an owner elects for assessment under Schedule D before commencing establishment operations, and arranges for the area to be transferred back to Schedule B — this step requires a change of occupier — after the main items of expenditure have been incurred, but before the crop comes into production. Under Schedule B assessment is based on one-third of the annual value of the land in its unimproved state, generally a relatively nominal annual sum, and no specific charge is levied on profits from sale of timber.

Capital Gains Tax

Growing timber is excluded from the calculation of chargeable assets following a disposal, so the impact of CGT is effectively limited to the increase in value in the underlying land.

Capital Transfer Tax

Subject to confirmation under the Finance Bill, the Chancellor introduced new capital taxation measures, effective from the 1986 budget, and now to be known as 'Inheritance Tax'.

Most of the CTT arrangements applicable to woodland are retained, notably the option of electing to defer liability for payment of tax incurred following a death until such time as the timber crop is felled or the estate is sold. This measure is necessary to avoid obliging the new owner to fell immature timber in order to meet the tax obligation. The tax payable is based on the sale value (ie not the value at time of death), and the rate is calculated by adding the sale proceeds to the deceased's entire estate at time of death.

Transfers of commercially managed woodland during a lifetime, and on death, are eligible for business relief at up to 50 per cent of full value. Heritage relief, granting conditional exemption, may be available in cases involving land (including woodland) of outstanding scenic, historic and scientific interest. In keeping with the intentions of the Broadleaved Woodland Grant Scheme, these arrangements have been extended this year to embrace ancient semi-natural woodland in appropriate cases.

The most important change introduced under Inheritance Tax (and applicable to all transfers — not just timber) is that lifetime transfers are no longer chargeable, subject to tapering provisions in cases within 7 years of death.

Forestry policy

The Government's policy for forestry (as announced by the Rt Hon George Younger MP, then Secretary of State for Scotland, on 9 December 1980) envisages that it should be possible to maintain an afforestation programme at broadly the rate of the preceding 25 years, whilst maintaining an acceptable balance with other land using interests. In the event new planting has averaged about two-thirds of the 30 000 ha per annum or so which this implies, and has been carried out largely on hill land in Scotland, with a minimal contribution to date from 'farm forestry'. There is little doubt that the grant, and more particularly, the tax arrangements described have been instrumental in securing this level of activity, notably in recent years following the change of emphasis from planting by the Forestry Commission to planting by the private sector, which is now responsible for some three-quarters of the overall programme.

The impact of tax depends on the particular circumstances of the individual or company concerned. It is particularly difficult to draw any general conclusions as to the impact on a body as diverse as farmers and landowners. As a general rule the system offers greatest advantage to those who have a high income from other sources and/or substantial capital assets, and complements the grants described to provide a package of incentives directed towards making woodland establishment and rehabilitation more attractive.

It is probably true that farmers rarely achieve levels of income or capital availability which might enable them to take full advantage of the tax arrangements, but the search for alternative enterprises precipitated by overproduction under the Common Agricultural Policy has led to proposals, such as those outlined in the paper *Woodlands as a Farm Crop* (prepared by officials of Agriculture. Departments and the Forestry Commission and circulated for comment last year) for 'woodland compensatory allowances' as a means of substituting for loss of annual revenue until such time as there is a prospect of income from thinnings. One effect of such a measure would be to lessen the dominance of fiscal considerations and make planting attractive to a wider range of individuals/companies/institutions than is the case at present.

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Motivation: What Farmers Want

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Abstract

The scope for forestry and woodlands to take up land transferred from agriculture needs to be examined. NFU has published *Farming Trees* which recommends that woodlands should both reduce production of agricultural surpluses, and provide additional revenue to farmers. Problems to be faced include finance, marketing, lack of skills and the psychological barrier of prejudice against forestry. Existing grants are inadequate to encourage planting by farmers, even allowing for the wider (sporting, etc) benefits, because of the lack of annual income over 15 years or so following planting. Annual payments, either from Government, or from within the industry (through a 'reverse mortgage' scheme), are essential and must match income foregone. Farmers are not well placed to take advantage of forestry tax arrangements as incomes are generally low, but changes, in capital taxation particularly, could help. Improved market information will be essential if farmers are to be convinced that forestry is a viable option. The scope for forestry co-operatives should also be examined, as should the position of tenants, who need a dependable framework in which they can plant and manage trees.

There is great concern at present about reducing the EC and individual nations' surpluses of certain agricultural commodities, and this in turn has led those involved in, and observing, the scene to suggest that productive agricultural land needs to be transferred to other uses. My colleague Giles Sturdy has reviewed the possibilities that are open for such alternatives.

The debate though still usefully wide appears however to have encouraged many individuals and organisations (well established ones as well as newcomers to the scene) to advance the belief that forestry and woodlands provide the option with the greatest potential. This conference provides an informed opportunity for the elements of that debate to be tested.

The NFU has recently entered into this debate, with what is now seen as a considered, and I am pleased to record, respected contribution in the form of our *Farming Trees* document. In determining our policy for encouragement of an expansion of farm woodlands we offer the recommendation that it should satisfy two essential criteria. Firstly that it should be used to achieve a reduction in surplus agricultural commodities, and secondly that it should provide an additional source of revenue to farmers. In developing this approach we considered many of the aspects of this conference and the essential question which the document seeks to answer is the title of my talk: 'Motivation: What Farmers Want', or perhaps if you will accept a slight rewording, 'Motivation: What Do Farmers Need'. These questions can only be answered by reference to the barriers as we understand and perceive them to greater involvement of farmers in woodland management than at present. Perhaps through our wide and varied membership which includes farmers who undertake forestry as well as the majority for whom woodlands are a residual use, and though the democratic structures of our organisation we are uniquely qualified to identify these barriers.

The severest deterrents are financial, market requirements, lack of skills, and running alongside and being greatly affected by all these constraints is a psychological barrier. Farmers have for long been prejudiced against forestry. Therefore one of the requirements to encourage expansion of farm forestry, as it has been with the management of existing farm woodlands, is a major promotional campaign. If proof is needed of its value one only has to consider the response of farmers to tree planting, primarily for conservation and landscape reasons. Over the last 5 years alone farmers in England and Wales have planted nearly 30 million trees.

The experience of Norfolk County Council for example through its subsidised tree schemes supports this. Over half a million trees were planted in a 5 year period of that scheme. Clearly, if farmers are convinced of the value of these works, and the mechanisms are correct, they will enter into the spirit and practicalities of a campaign.

However, I would emphasise that there is a fundamental difference between this planting and that which is now envisaged. If new woodlands are to help reduce agricultural production, the land which needs to be devoted to forestry is not field corners or headlands but whole fields and large belts. The losses are therefore greater, the interest that much less and therefore the support and encouragement must be that much more.

I must be a little cautious about describing the financial incentive as being the central influence, not because it does not command that elevated role but because the financial incentives can be direct and indirect, open or hidden. At present private forestry expansion is encouraged by a combination of direct planting grants and indirect taxation reliefs. Financial attractions of woodland for farmers and landowners also need not accrue directly from its produce,

but from the benefits of woodlands as a cover for game or shelter. Thus the financial incentives that need to be available to the farming community can also be a combination of direct and indirect.

However, grant aid for woodland planting alone is insufficient for farmers, not only because it demands what can be a sizeable contribution from the farmer for the initial establishment costs, but because it is directed only at off-setting the costs in the very early years. Productive agricultural land provides farmers with their annual income, and even the worst examples, crops such as top fruit or strawberries which may take 5 to 8 years to establish, produce an annual income for the remainder of that plants life. To replace this with a situation in which a farmer would not derive income for at least say 15 years in the instance of fast growing conifers (or longer with present no-thin regimes), and certainly longer where hardwoods are involved, clearly demands a substantial commitment which to date farmers have been largely unwilling to make. Assistance for the majority of farmers to reach the productive stages of a woodland demands priority in our efforts towards achieving what the farmer wants. This we believe can only take the form of an annual payment, and this approach has now found favour from organisations as diverse as the Countryside Commission and Rural Voice, as well, apparently, as with all four main political parties. The Government has embodied the principle in its discussion paper *Woodland as a Farm Crop* to which the farming and forestry industries presently await a response. We appreciate that even for the Government this will be a substantial commitment but the benefits, financial and social which will accrue justify, we believe, our request for Government assistance.

Let me say at this point, however, that although we have turned to Government for the provision of such annual payments, this should not, and does not, rule out the possibility of a scheme being developed within the farming and forestry industries, and the NFU have started exploratory discussions with the forestry companies to develop such a scheme. Any offers would be kindly viewed.

If forestry is to provide an alternative to farm income on the land transferred to new woodlands, it must not only be forthcoming over a similar timescale but should reflect the size of that income foregone. As this may range from £100 per hectare to say £600 per hectare in lowland areas, it is clearly necessary to set an average figure for use in negotiations — thus the use in our *Farming Trees* document of an amount of £150 per hectare per annum. This payment should be made until the woodland at least generates its own income from thinnings. As this amount cannot, we agree, be related to the eventual timber value alone (as would need to be the case under a 'reverse mortgage' scheme) there is an element of social subsidy. Expansion of farm forestry will present not only environmental benefits but also benefits to the wider rural community though the maintenance if not the expansion of employment, the maintenance of a viable rural community making demands of and contributions to the physical and social intra-structure. Under such circumstances it is we believe right that the Government, or the European Community, would have to be a major participant in the development of such schemes.

However, I earlier said that the financial incentives could be direct or, through taxation benefits, indirect. It is widely acknowledged within the farming and associated industries (though not judging from our public image acknowledge outwith this community) that farmers are not high rate tax payers, a considerable proportion of their 'profits' being ploughed back into the farm business. Thus the manipulation of Schedule B and D income tax reliefs remains an attraction largely for non-agricultural woodland investors. These reliefs alone it is now accepted are sufficient to encourage certain investors into forestry planting and management, and it is not unreasonable to project that if tax reliefs more applicable though farm circumstances were to be introduced, they alone would encourage an increase in farm forestry.

The single most important tax deterrent to more investment in on-farm forestry, judging from the views of our membership, is capital transfer tax. Hence we have called for changes which may either reduce the incidence of this tax, thereby incidentally benefiting the growing of broadleaves, or removing it entirely where the woodland is planted on productive agricultural land under a scheme to reduce agricultural surpluses.

Those demands are for the Government to determine, but before I leave this consideration of financial constraints on farm forestry I must use the opportunity to address the involvement of the private sector, in the hope that amongst the audience these thoughts may find a fertile seedbed. Many observers of this scene have recommended the development of a 'reverse mortgage' scheme under which, as the term suggests, an annual sum would be paid to all woodland owners which is equated with the value of the final crop, suitably discounted. We in the NFU attempted to put figures behind principle, and although the sums of £34 per hectare over a 50 year rotation, based on £7,000 clear fell value, and £47 over the first 22 years are unlikely to interest many farmers, the concept merits further exploration with the industry and the financial sector. The inhibitory features are the length of the rotation, the difficulty of forecasting crop values in 50, 60 years or even longer, the discount rate — every economists bane, and the apparent need for woodland investors to own a freehold interest in the land and timber. Let me invite some of you to come forward and explore this further with us, because we believe it has potential, and we believe also that we may have ways of reducing the risk to an investor and increasing the return to the landowner. With that invitation I pass to other forms of motivation. The improvement of financial returns from forestry remains, however, for the majority of farmers considering forestry, the single most important requirement.

When farmers approach a new crop or a new venture, an integral part of their considerations is the nature of the market. Does it exist?/ where?/ what does it require? when and in what quantities? these are some of the questions which might be addressed and to which farmers must find answers if their involvement in woodland management is to increase. In the farming industry we have been criticised for not producing for the market, but simply producing and expecting the market to sell our produce. The NFU through its marketing division and its marketing initiatives is amongst the leaders in addressing this position, and increasing the awareness of farmers and the public as well as forging links between producers and their outlets. When we approach forestry, farmers must start several branches lower down the tree, and in doing so we need to answer a perennial source of confusion. If we as a nation have an annual import bill exceeding £4 billion, and are advised of shortages of timber and wood products in the 21st century, why have many of our colleagues been unable to find outlets for timber in existing farm woodlands. Part of this answer does indeed rest in promoting the message that we need to improve quality of management, to produce certain timbers, and that many of our trees are fit only for a firewood market. In part this encouragement will come through improved market information. We cannot develop this market service alone but we would hope that the timber trade and forestry industry will look on the experience of the NFU and the agricultural press and community, with its different and hugely successful means of disseminating market information, as a useful means of increasing market knowledge, encouraging the producers to meet market requirements and of increasing the contribution of farm woods to the market place, which will be of benefit to merchants, contractors and consultants as well as to woodland owners.

Knowledge of the markets, or the lack of them, is only one form of the improvement required in this important element. If the markets do not exist, then not only must we convey it to the future generation of woodland owners so that they build it into their management plans, but we must also ask why those markets do not exist, and more importantly determine whether there are means of developing them. Perhaps the markets do exist but the level of payment is insufficient to generate profit to the farm woodland owner. Their relatively small quantity and the infrequency of their supply can be a deterrent to timber merchants. This can only be improved by co-operation.

Nevertheless newcomers to the forestry scene are conscious that the forestry industry is littered with the dead wood of fallen woodland co-operatives. Problems of co-operative loyalty exist in farming circles also but, if those co-operatives provide a service which is better than any of its individuals can achieve or afford, then it is likely to receive the necessary support. Farm forestry we believe provides such an opportunity not least because most farmers do have the necessary skills, and are managing relatively small areas of woodland. Collective management and harvesting can not only reduce unit costs but will also improve the bargaining position with timber merchants and wood processors. We also see co-operation as the means by which the experience of the private forestry consultants and contractors can be brought to the benefit of woodland owners and foresters alike, when for many individuals cost alone would exclude this profitable union. We are encouraged in this belief not only by the experience of woodland projects like Gwent and East Sussex, but also the privately financed Upper Framlingham Farmers in Suffolk, and we wish the major development in this co-ordinated approach, Project Silvanus every success.

To establish these structures however requires time, effort and above all finance. We are heartened that the European Commission acknowledge this latter need and may be thinking of providing more assistance. We would like to believe that our own Government would also acknowledge this cheapest means of extending financial assistance to farm woodland co-operatives or associations, namely by extending the remit of the Food From Britain organisation, successor in one aspect to the old Central Council for Agricultural and Horticultural Co-operation, to allow financial assistance for the development of woodland as well as farming cooperatives.

Finally, I would address a constraint which must be overcome if farm forestry is to be seen as an alternative or additional enterprise available to *all* — a constraint formed by land tenure coupled with tradition.

Approximately one third of UK full-time farmers are tenants. It has been tradition based on legal principles that when a farm has been let the trees and woodlands have been reserved to the land owner. Even where such areas are not being expressly excluded from the let area, standard, and in our understanding regularly-used, clauses in tenancy agreements prevent tenants from undertaking works of tree and woodland management such as thinning, lopping, etc. As long as these clauses remain and apply to all timber-like trees on a holding, tenants will effectively be prevented from entering into and gaining any benefit from woodland management.

In the Agricultural Holdings Act 1986 (Schedule 7, part II) tenants were given a statutory right to plant trees and obtain compensation for so doing, provided that they firstly obtain the consent of the landowner which, if unreasonably withheld, could be granted by the Ministry of Agriculture. The compensation though is to be assessed, "as an amount equal to the increase attributable to the improvement in the value of the agricultural holding". In much the same way as the value of agricultural crops has been inadequately reflected in the capital value of agricultural land, so the value of managing a tree crop may be inadequately reflected in the land values of tenanted holdings.

As a matter of priority, therefore, we need to establish a right in all tenancy agreements for the tenant to manage and harvest the trees which he has planted with the consent of his landlord. Secondly, we must ensure that upon termination the outgoing tenant should be compensated in a manner more directly related to the value of those trees and

woodlands. Whilst we respect that landlords should have longer-term rights and responsibilities in the land than their tenants we also believe that it is iniquitous that approximately one third of farmers should be unable to participate in this form of 'cropping' simply because of the nature of their tenure. We are, therefore, exploring with the Country Landowners Association a means of granting tenants a right to participate in woodland management coupled with fairer means of compensating them for these improvements, while safeguarding landowners interests.

Conclusions

It is somewhat ironic that it is because of the success, rather than the failure of the European and United Kingdom agricultural industry that we have an opportunity, indeed a need, to reorganise our farming enterprises. To those cynical observers of the farming scene, and in particular the Common Agricultural Policy, it may appear that I have merely repeated the recipe for that failure in addressing the needs of farmers wishing to expand forestry on their holdings. However, the careful students of our industry and of this paper, and the realists among you, will I believe acknowledge that the ingredients are the same but not the mixture. For centuries, farmers have tilled the land, bred their livestock and derived annual financial reward from it. To change the nature of their investment and the timescale of their rewards demands a considerable change of attitude, coupled with many years of unhealthy bank balances. Farmers will respond favourably to forestry if and when it can provide an annual or regular and short-term source of income.

Farmers too have grown for the market, changing their enterprises to follow the demands for products. Oilseed rape is perhaps the best example in recent years of the importance of this stimulus. But even now farmers continue this tradition, increasing the area of land growing such diverse crops as borage, lupins, sunflowers and organically-grown produce. To follow the market, however, requires a knowledge of those market demands, coupled with the right price stimulus, and the structures to enable the grower to supply his produce to the consumer. Forestry is no different. The farmer with no tradition of woodland management, and owning a small area of woodland relative to the majority of forestry investors, needs advice about markets, needs assistance with marketing and needs convincing about the price, the structures, and the future.

We have an opportunity, perhaps more so than our European counterparts, to develop not only an expanded forestry industry, but an additional element to our present productive and efficient forestry industry. Provided with the right motivation our productive and efficient farming industry can form that additional element.

Raising Money from Private Sources: Joint Ventures

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Abstract

Investment in afforestation is made attractive to the private sector compared with alternative investment opportunities, principally by a system of fiscal incentives and to a lesser extent grants. This encouragement by Government is aimed at achieving an annual planting programme of approximately 30 000 hectares, contributing to an import saving operation, creating employment opportunities, and providing support for social structures in rural areas in a manner which is environmentally acceptable.

If forestry, through joint ventures, is expected to replace falling agricultural incomes resulting from overproduction of some commodities, it is essential to determine the elements of the investment which will need to be present if investment flow is to be diverted from existing forestry developments or (preferably) if additional sources of finance are to be attracted.

Introduction

Before examining the prospects of introducing financial resources from the private sector into the development of new woodland and forests on some joint basis with those who currently farm the land, it would seem sensible to examine both the scale of the investment made in recent years by the private sector into the tree growing part of the forest industry and what aspects of forestry attract investment from the private sector.

What follows, does of course exclude any reference to the investment made in the development of new plantations by the Forestry Commission itself as owner/occupier but because the Commission has in the past operated as a tenant in some situations it is perhaps important not to rule out entirely the prospect of joint ventures between the State and the farming community itself.

Current Private Finance

Determination of the scale of recent investment with a degree of precision is difficult, but necessary for the purpose of this exercise, and although there have been fluctuations, over a period of time the flow of the investment has been reasonably constant. An analysis of planting statistics indicates that the private sector has been investing approximately £12 million per annum in acquiring land, and approximately another £12 million per annum in development. In arriving at this figure, I have not included the cash flow associated with post-establishment stage young plantations, but this will partly be balanced by the positive cash flows from mid rotation crops which form the older part of the forest estate now in private hands. In addition the Forestry Commission has since 27 July 1981 disposed of approximately £50 million worth of its forest estate.

An analysis of the Forestry Commission sales discloses the fact that approximately 25 per cent by value can be attributed to purchases by the gross funds or 'Institutions' which are unlikely to be prepared to become involved with relatively small-scale joint ventures. Forestry tends to form a very small part of an institutional investment portfolio, and the size of any one parcel must be sufficiently great (commonly £0.5 million) to justify the administrative complications that follow. In assessing the scale of private investment in the recent past therefore it is probably important to exclude this element. Thus it would appear that money from the private sector is currently being invested in developing and sustaining the forest estate at the rate of approximately £34 million per annum.

It is important not to overlook the fact that stimulating an investment flow of this magnitude requires a substantial marketing effort in terms of time and resources, and despite the obvious attractions of forestry as an investment to those who are familiar with the industry, it is an up-hill task to get the message across to the private sector. In order to achieve this level of success it is vital to understand precisely what the private investor expects from his forestry. This last point cannot be over stressed. Failure to understand it will inevitably result in theoretically sound joint ventures remaining consigned to dusty shelves.

Characteristics Sought by the Investor

In general the forestry venture must stand reasonable comparison with other investment opportunities that are available in a wide number of respects, failing which forestry will be set aside, and any joint venture should be tested against these qualities to see whether or not they represent an opportunity which can be promoted successfully.

a. There must be confidence in favourable future markets for the commodity that is being produced and the property element involved if relevant, at prices which show a rate of return on the investment in real terms which is comparable with available alternatives.

b. There must be confidence in the liquidity of the investment over a reasonable timescale. Even in a simple owner/occupier situation, forestry suffers in comparison with other forms of investment because the overall market is relatively small and certainly in the early life of the plantation, for reasons which are well understood, values are disappointingly low, being in some ways analogous with early surrender values on insurance policies. Any additional constraints on liquidity which would result in the investor being 'locked in' severely inhibit promotion of any forestry scheme.

c. The interest of the investor should be capable of valuation at regular intervals on the basis of market value. This can present special difficulty when dealing with situations other than those of owner/occupier. Even relatively straightforward leaseholds can be a problem, as those of us who deal regularly with District Valuers are aware. More complicated joint schemes and partnerships may produce situations which in the absence of reliable and tested market information need to fall back on untested theory.

d. The people who are contributing the finance generally seek control over the speed at which the investment takes place, to the extent of being able to adjust rates of development so as to coincide with the availability of funds. Any scheme which required strict adherence to a particular cash flow plan would restrict the appeal to the private sector.

e. The investor must feel that he has adequate control over the quality of work being carried out, and should be in a position to influence the selection of contractors and managers. In any joint venture, the farming 'partner' may also have a legitimate interest in the quality of the development particularly where at some stage he may aspire to a share in future profits or have the prospect of converting his involvement in a joint venture to that of owner/occupier or of sharing the total equity.

f. The private investor in forestry is attracted by the advantage of flexibility in the timing of marketing options. Thinning and felling operations are not as time sensitive as many agricultural operations and unlike for example the store markets, if timber prices are currently going through a low, it is possible to hold off even for a number of years until things have improved. Conversely, income generating operations can be advanced to take advantage of a sudden rise in prices. Not infrequently there are situations where income from thinnings or fellings are either not required in a particular year, or would, if received, adversely affect financial plans. Any joint ventures which did not continue to allow this degree of flexibility would be handicapped and there can be serious difficulties where partners in a joint scheme have radically different cash flow objectives.

g. Generally speaking the majority of the investing private sector seek freedom from involvement with the daily decision making process and with direct labour relations. It is usually preferable to leave the ongoing supervision of a forestry venture in the hands of bodies in which they have confidence and about whose professional competence they have no doubt. I place particular emphasis on the word 'professional' because for obvious reasons, most of those who provide money from private sources are more or less ignorant on the subject of forestry in general and silviculture in particular and it is essential, if the fragile flower of confidence in the forest industry is not to wither, for a consistently high degree of professionalism to prevail.

h. To ensure that there is a reasonable take up by the private sector of opportunities to invest in forestry over what is of necessity a long time scale, it is important that those who are financing development are confident that the investment is politically, socially and environmentally acceptable. It is also true that for many of those who finance a forestry programme, the satisfaction and enjoyment obtained from being responsible for and associated with a rural activity with wildlife conservation and sporting connotations weighs heavily in the decision to proceed.

These points do not form an exhaustive checklist but joint ventures which can reassure the source of private money on all points could be expected to have a reasonable chance of success.

The Selling Option

The majority of new forestry schemes take place as a result of land being sold by a farming landowner and there is an element of 'joint venturism' about even such a straightforward and simple exercise. The success or failure of the operation can well reflect on both parties.

The financial return to the seller is of course the price paid which can be represented as an injection of capital into the balance of a farming operation perhaps facilitating a restructuring of the farming enterprise so as to meet future market specifications. There appears however to be evidence in many cases to suggest that sales take place because a farmer is

retiring, or wishes to reduce an existing overdraft burden, rather than to release capital for restructuring. The return to the seller even in such a seemingly straightforward selling exercise may however be significantly more than the price paid alone. The selection of an area to be sold should be a compromise between the operating efficiency, investment performance and liquidity of the forestry development, and specific agricultural objectives which can relate to the provision of access roads, fencing, sporting values, stock shelter and the like. But it is essential when making the selection of land to be sold, to keep in mind not only the needs of the remaining agricultural operation, but also the needs of a successful forestry investment, particularly with regard to the scale of the operation and accessibility.

It is perfectly possible to impose on a purchaser, certain constraints which might affect the speed of development, species selection, rights of pre-emption on resale, the location and timing of road construction, and fencing and road maintenance obligations, but it is also probable that these constraints would need to be 'paid for' either by a reduction in price paid for the land, or in extreme circumstances by the scheme not being adopted.

Although not a 'joint venture' in the strict sense, careful planning before a sale can maximise the benefits to both parties. The release of capital into the farming enterprise may also be extremely useful at a time of falling net incomes, although to be fully effective the manner in which taxation bears on such released capital might need to be adjusted. Purchasing as a way of beginning an investment in afforestation has clearly been the 'normal' route, the principal disadvantage being that substantial capital is required to finance the actual purchase of land. To stand any real chance of success a joint venture would need to exhibit clear advantages over an outright purchase. Reducing the existing package of fiscal incentives and grants available for the private sector which develops forests on land purchased, with the purpose of creating a preference for new joint schemes would reduce overall the private sector planting which already consistently fails to meet Government objectives.

Leasing

Less well known, although examples dating back many years have been well tested, the process of creating a lease between the agricultural owner of land and a forestry tenant can be very attractive to both parties. Leases have been regarded with general suspicion because some of the earlier examples were set to exist for long periods, with inadequate provision for rent reviews, and without taking into account the difficulties associated with succession and changes in the financial circumstances of the participating parties.

A standard lease applicable to all cases is unlikely to be achievable and to withstand the test of time.

The principal advantages to the landowner are that from the outset there is an immediate income on a regular basis and, by including provision for rent reviews on an appropriate cycle, levels of rent which are currently frequently in the range of 4-6 per cent of forest land values can be protected against effects of inflation.

The arrangements commonly run for a single rotation for a timber crop (40-60 years) and there is therefore a specific expectation of regaining the vacant possession option.

The terms of the lease may be drawn up so as to give the landlord a degree of control over the quality of the development and the tenant may be loaded with certain obligations for the benefit of the adjoining proprietors. However, it must be borne in mind that these constraints and burdens, as with the sale, may be paid for by a reduction in the rents.

The special appeal of leases to the private sector is almost entirely because it frees the forestry development from the need to fund with capital the purchase of the underlying land. Indeed in certain cases in return for higher rentals, the owner of the land may provide the funding for an infrastructure of roads although this is unlikely to be appropriate where the provider of the land is a farming business.

The principal disadvantage to the tenant is associated with the marketability of a leasehold interest in forestry, particularly in the early stages and it is usually essential to include options in favour of the tenant at some fixed time to require the landlord to purchase his interest or to provide for the forest estate, both land and crop, to be sold with vacant possession, with each party taking from the proceeds an appropriate share.

The specification for leasehold lands will be the same as that for the sale with regard to size, type and location and it is extremely unlikely that small badly located parcels of marginal land would have anything other than a very localised appeal. The demand for leasehold opportunities on parcels of marginal land of appropriate scale and with good access has exceeded supply in recent years. If there were opportunities for creating leasehold developments on higher grade land aimed at production of a range of materials extending from fuels to high quality hardwoods, then this is an area in which with suitable promotion there could be considerable expansion.

The higher yields available from land of higher agricultural quality should also result in smaller areas being economically viable, and in addition more compatible with the role which forestry is expected to fill in lowland landscapes.

Partnerships

A number of new schemes have been drawn up which attempt to address the problem of matching the objectives of the introducer of private money more closely with the needs of the farming partner who is attempting to replace falling income by being involved with the culture of a new crop in the form of trees. These all recognise that the long life cycle of tree crops, even those operated as fuel sources, contrasts sharply with the annual cycle of most agricultural enterprises of the kind where forestry might conceivably offer workable alternatives.

In many continental situations farmers have had a long association with woodland ownership and management, both as individuals and on a community basis. Woodlands frequently approach 'normality', a concept familiar to foresters, which simply implies that within a working woodland the range of age classes is so distributed that each year the same quantity of timber can be removed and the land replanted, the woodland as a unit going on in perpetuity. In such a situation those who operate woodlands have developed the technical skills to sustain the resource, and the integration of the woodland and farming enterprise is complete. The working calendar harmonises labour inputs and the woodland can provide ready to hand materials to which value is added on site, for use within the farming enterprise (akin to import saving in the national sense). At the same time income can be generated to the total business through external sales carried out individually or through co-operative marketing.

In the United Kingdom, examples of this type of integration are hard to find, and even where farms include areas of potentially productive woodland, technical skills are seldom present, the woods being raided for materials, or milked for capital when times are hard. Lack of marketing skills may also result in low returns for material sold.

A 'pump priming' exercise is clearly essential if forestry is to fill the void in production left by the collapsing markets for some traditional agricultural products, and as an addition to simple leasing of land to forestry tenants, partnerships need to be established between the landowner who provides the land on which the forest enterprise is to take place and a private individual who provides the money to develop and maintain a tree crop. Most schemes provide for the partnership to pay a rent to the farmer which has the merit of providing an immediate positive cash flow, and depending on the terms of the lease concerned, these rents could be the same as for a normal forestry lease.

As in the case of a sale or a lease, the selection of the area on which the enterprise is to be based must be made with the operating and investment efficiency of the woodland in mind, together with the requirements of the neighbouring agricultural operation. Consideration of scale, site quality, access, and cash flow forecasts, with particular emphasis on the relative needs for capital and revenue expenditure, is essential if a scheme is to evolve which will attract an appropriate partner.

In an attempt to increase the financial returns to the landowner, some schemes propose that the farmer could act as contractor to the partnership in carrying out all or part of the operations required in establishing and maintaining the forest resource. There are many cases at this time of farmers operating as contractors to the forest industry, carrying out fencing, draining and planting operations, but it is essential that the financing partner should have adequate control over the quality of operation, and have the freedom to use external contractors if he considered this necessary to safeguard his own position. An element of these partnership proposals is that during the formation phase, expenditure would qualify for tax relief under normal Schedule D arrangements, a provision which would be essential for there to be significant interest from the private sector.

For the time when the enterprise begins to produce income a variety of options have been proposed. One involves reconstitution of the partnership, in effect allowing income to be received by the financing partner under Schedule B. Such a proposal implies that rent continues to be paid throughout the rotation, not being eligible for tax relief, whilst the plantation is income producing.

Another option involves a change in the partnership, with rent being exchanged for a share in the total equity, and profits being distributed in a ratio related to net tax input by the two partners.

The precise tax implications of these arrangements are complex, and to some extent untested, and assumptions should be treated with caution.

Partnership schemes so far proposed offer less freedom of action to both parties than leasehold schemes and may suffer greater liquidity problems. They are therefore unlikely to replace leases if these continue to be available. There may however be scope for the involvement of a new smaller-scale breed of investor, less interested in normal investment criteria and more concerned with the whole concept of long-term woodland ownership with amenity high on the list of personal objectives. The scale of such operations is unlikely to be such as to make an appreciable impact on farming cash flow problems or on the needs of the processing industries.

Conclusion

Considerable promotional effort currently results in substantial funds from private sources being invested in afforestation because a financial appraisal proves that real and realisable benefits accrue.

Although schemes aimed at developing a diffuse pattern of small-scale woodlands may have desirable wildlife conservation and landscape benefits, the economics of such schemes are such that only limited investment from the

private sector can be expected. This would probably be of a local nature, not addressing the problems of sustaining farm incomes nor the wider national objectives of wood supply.

There is however substantial scope for well designed and uncomplicated development which could meet both these objectives and which would appear to be based most realistically on some form of lease. The importance of appropriate market research and subsequent adequate promotion must be recognised.

Discussion

- Q:** *Mr J D Hunter-Smith (Small Farmers Association)* — Is there a case for a bi-focal approach to policy? In one respect individual support per farmer within LFAs and on the other a tapering price mechanism to large agri-business? Would not such a system offer the best of both worlds and also release land for forestry?
- A:** *Mr S Gourlay* — No, because differential pricing would result and one cannot maintain community agricultural support with a dual pricing system. Similarly introducing a cut-off point on the issue of compensatory allowances would be unsuccessful. Forestry is a better employer than letting land fall into disuse.
- Q:** *Mr J Campbell (Economic Forestry Group)* — How much grant is being paid by the different agencies and what proportion is that of the total?
- A:** *Mr M Taylor* — Out of a total Countryside Commission budget of £10 million, £1.8 million relates to tree planting and this is estimated to fund 35-40 per cent of the total cost of individual schemes.
- A:** *Mr N Beard* — Only a small proportion of MAFF grants are allocated to forestry.
- A:** *Mr G Hatfield* — Forestry Commission grant to the private sector is just over £5 million, mostly attributable to new planting.
- Q:** *Dr A Mowle (Nature Conservancy Council)* — Why has Article 20 of the European Community Structures Regulation not been introduced into the UK, particularly as it is likely to mean higher levels of support for small farm woods?
- A:** *Mr M Taylor* — The Countryside Commission would support the introduction of Article 20.
- A:** *Mr G Hatfield* — Article 20 would not offer as attractive a payment as that available under existing grants in the UK and it would only have been available to farmers.
- A:** *Mr S Gourlay* — The NFU were advised that article 20 would be too expensive to introduce and it would not have been available for many farmers.
- A:** *Mr A R Williams (Timber Growers UK)* — Eventually member states rejected Article 20 because of the Section two eligibility clause. It might be more appropriate to alter the band rates of the Forestry Grant Scheme, reducing payments on large areas of planting and increasing rates offered for small planting schemes.

Comment: Mr J Wall (European Commission)

Clarification on Article 20 of Reg 797/85.

Rates of grant are set by the member state. Only the maximum eligible amount per hectare is set by the European Commission (EC). In this case the 'per hectare' limit is 1,400 ECU (c.£950) and 10,000 ECU (c.£7,000) per holding.

For more than a few hectares of planting the EC grant would be worth more than the FC scheme, but has not been widely implemented yet probably since only a 25 per cent element of the grant is reimbursable by the EC (if at 50 per cent uptake, this may be higher).

So far only Portugal, some regions of N. Italy and central France have indicated a desire to adopt Article 20.

- Q:** *Ms Catherine Bickmore (Travers Morgan Planning)* — With the predicted increase in part-time farming, what thought is MAFF giving to revising the eligibility conditions (ie over half time and income attributable to agriculture) for part-time farmers to claim grants offered by the Agricultural Improvement Scheme?
- A:** *Mr N Beard* — MAFF has already extended its grants to include part-time farmers.
- Q:** *Mr A Scott (Forestry Commission)* — How will the grant mechanism in Environmentally Sensitive Areas (ESAs) work? Will it apply to all woodland within ESAs? Will an ESA grant payment disenfranchise farmers from FC schemes?

A: *Mr N Beard* — The ESA grant mechanism is currently being worked out. A payment for the Broads has been set at £50 per acre. An ESA payment will include an understanding that the farmer will treat woodland as sensitively as other areas within his holding.

Each ESA will have its own management prescriptions, but they will be consistent and all grants will be available within ESAs. Woodlands will be excluded from ESA payments but farmers are encouraged to seek advice.

Q: *Mr O Brandon (Dartington Institute)* — What is the Ministry's definition of 'part-time' farming?

A: *Mr N Beard* — The definition in the Agricultural Improvement Scheme is 2400 hours of work (of which 1100 hours must be spent on agricultural work) and half the income.

Q: *Mr J B Workman (National Trust)* — Inheritance Tax is now payable on death (but not on gifts) and conditional allowances and exemptions may be granted on SSSIs and ancient woodlands. If capital taxation was abolished on small and broadleaved woodlands would this not be an incentive for the farmer at minimal public cost?

A: *Mr M Taylor* — Will the Treasury state the opportunities that exist for tax exemption?

A: *Mr A R Williams* — I understand that the Treasury is due to publish a document shortly.

Q: *Mr R Stirling-Aird (Savills)* — Mr Yull has ruled out joint ventures as a suitable source of finance for farm woodlands. Given that such woodlands are likely to be in the range of 10-25 hectares, is leasing or selling land to private investors feasible on such small areas?

A: *Mr L L Yull* — No, leasing is likely only to be attractive on substantially larger areas.

Q: *Dr Joyce Tait (Open University)* — Is any organisation considering serious socio-economic research to study the determinants which motivate farmers under all relevant circumstances?

A: *Mr L L Yull* — The Dartington Institute is undertaking this aspect of research, concentrating on relatively small areas. It is quite possible to co-ordinate environmentally sensitive parcels comprising 5-6 farms on a co-operative basis, but it is often difficult to reach agreement between all farmers.

Comment: Mr O Brandon (Dartington Institute)

Farmers interviewed on the project in the Culm Measures area of N. Devon were oblivious to current tax relief for forestry activities. Their interest concentrated on current income.

Comment: Mr J Wall (European Commission)

To clarify the situation regarding the European Community's forestry scheme in Ireland (1820/80):

Several speakers have referred to farmers planting in Ireland under the Western Package Scheme. On behalf of the EC Commission I would like to point out that the scheme offers an 85 per cent grant to a maximum of 1210 ECU per ha to farmers wanting to plant some or all of their land to forestry in the western area of Ireland.

As has been reflected in the meeting, the initial rate of take up has been very slow, but the situation is more complex than one might think and delegates should not be given the impression that farmers have no interest in tree planting or that the institutions have done most of the work.

To begin with the planting grant forms part of an overall EC scheme to develop agricultural infrastructure in the west of Ireland. Most of the areas covered have little or no forestry tradition and animosity towards forestry persists in some areas although, happily, attitudes are now changing.

The interest of farmers in tree planting is reflected in the fact that many hundreds have enquired about the grant scheme in the first 4 years. Unfortunately the state forest service has, on the one hand *not* been geared to assisting or promoting private forestry, and this is only just beginning to change now. On the other hand the forest service did retain the option to plant up to an area limit unused by the private sector. And, until the end of 1985 c. 65 per cent of all planting under the scheme was done by the State! Until now only 80 farmers have planted a small average area of c. 3 hectares each, largely because such areas represent a large percentage of the small holdings (average size 15-20 hectares), and larger areas cannot be afforded without assistance to replace the loss of agricultural income. The investment companies have planted rather more than the farmers.

But the situation will radically change from 1986 onwards (the half-way stage of the scheme) since:

- a. the state option will be reduced or removed;
- b. promotion of the scheme and co-operation with the agricultural advisory service will be improved;
- c. moreover Article 15 of Regulation 797/85 has now been implemented in Ireland thus providing the interim income necessary for small farmers to plant relatively large areas of their land. (Under this Article farmers can continue to receive compensatory allowances for up to 15 years after they have replaced their livestock with trees.)

As to the future of the 1820/80 scheme, whilst some scope will be available for institutional investors where this is the most appropriate kind of afforestation (two large institutions have recently given commitments for 800 hectares per yr), the main thrust is seen to be with farmers. In particular farm/forestry co-operatives are already being formed and are successfully grouping and planting blocks over 30 hectares in area.

Address to the Conference Dinner

John MacKay MP

Under Secretary of State, Scottish Office

Chairman, Ladies and Gentlemen, I was delighted to be asked to be your guest speaker tonight. I have now taken over responsibility in the Scottish Office for both agriculture and forestry, and that is a responsibility that I accept with enthusiasm. You may be interested to know that my own constituency of Argyll and Bute is not only an agricultural one, but I understand, has the greatest area of forestry of any constituency in Britain. My interest in both farming and forestry — and in the relationship between them — is therefore sharply focussed.

This conference is taking place against a background of the need to deal with mounting European surpluses in a range of agricultural products, and of impending change. The shape of that change will take time to emerge, and it would be a brave man indeed who attempted to set before you a blueprint for the future. Let me just say that the Government gives full weight to the fact that farming is the traditional industry of this country, that farmers deserve a decent standard of living, and that farming is the life-blood of most of our rural communities. These facts will not be forgotten in the difficult negotiations that lie ahead. That said, this is very much a time for reassessment, which leads me on to the theme of this conference — the relationship between farming and forestry.

For many years that relationship has been dominated by the presumption in favour of retaining better land in farming, and of confining forestry to the poorer land. This has had two results. The great bulk of afforestation has taken place in the hills and is coniferous, and what should be seen as sister industries have tended to develop apart. Over the years the main interface between farming and forestry has been the sale of hill land for timber production. There has been comparatively little integration. In many ways it has been a tale of lost opportunities.

Inevitably this has led to entrenched attitudes, and these may have continued had it not been for what I might term 'the Surplus Crisis'. This has brought to the fore that one of the few major crops that is not in surplus, or in the slightest danger of moving into surplus, is timber. Timber therefore appears as an attractive possibility in the range of alternative crops to those in surplus, and quite suddenly the interests of farming and forestry have come closer together.

This would appear to lead me straight to the subject of farm forestry. But let us consider for a moment what we expect from our forestry industry. We look to it to expand, to supply increasing volumes of timber that will serve the needs of modern industry, and to produce that timber in terms of a quality and price which is competitive in world terms. This suggests that much of that expansion of forestry will continue to be achieved through traditional types of planting — and that farm forestry will supplement this, not replace it. I am not suggesting of course that traditional forestry itself should escape the process of change, far from it. It is already changing to meet heightened public perceptions of the need to protect the beauty and quality of our countryside.

But beyond this, the opportunity is now opening up — and the pressures are building up — for a higher proportion of new forestry to come 'Down the Hill' on to better land. Not only will this mean more productive forestry but it will offer much greater opportunities for introducing a greater variety of species into our woodlands — for moving away from what many see as monotonous, blanket forestry — and for a better blending of forestry into the existing pattern of land use.

Where does this place farm forestry in the sense of farmers planting trees on part of their land? It leaves it with a vital role to play, not only as a supplement to more traditional types of forestry and as a means of adding to the environmental quality of the countryside, but as an important alternative source of income for the farming community. Let there be no doubt about it — the Government is anxious to encourage farm forestry, but important decisions have to be made on how best that might be achieved.

We published last year a consultative paper *Woodlands as a Farm Crop*, and we were grateful for the many and helpful responses to that paper, but quite a bit of work remains to be done, and we must take account of measures that might be adopted in Brussels and have a bearing on this. The rate of progress might seem a trifle disappointing, but it is important that we take the time to get things right.

No doubt there will be many arguments about how farm woodlands might be encouraged, but clearly savings in agricultural support costs and the contribution that farm forestry can make to meet the demands of our timber-using industries must come into the reckoning. The implication of this is that farmers will have to be allowed to show the same good sense in planting trees, and in choosing the species to plant, as they show in planting their other crops. Environmental considerations will be important, but these cannot be permitted to obscure the need for the trees to be suited to the soil and the climate, and to be of a type that will find a ready market when they come to be harvested. There is no guaranteed future for any scheme that does not make economic sense, and I want to see farm forestry become part of our traditional forestry scene.

I should be very disappointed if what I have just said were interpreted as a plea for conifers at all costs. I mean nothing of the sort. No Government has done more than we have to encourage the planting of broadleaved trees — and

with considerable success. I hope that broadleaves will feature large in farm forestry — but it would be unfortunate if farm forestry and broadleaves should come to be regarded as synonymous. We must recognise that farmers themselves, who know their land best, will have views on the types of trees most suited to their needs. This really comes down to striking the right balance between the requirements of the wood-processing industries and those of the environment.

While I do not wish to turn this into a political speech, I cannot let the opportunity pass without a mention of the labour party's recent statement on woodlands and forests. Far from accepting the challenge of developing a workable policy, a very simplistic view is taken of things. Their answer is to plant broadleaves everywhere — not only on land surplus to agricultural requirement — but by progressively replacing conifers in the uplands. Such a policy is not only closing down the options, but doing so with a vengeance and without regard to the fact that the overwhelming need of the wood-using industries in this country is for softwoods. In my view what they appear to be proposing is totally misguided.

The realities of the situation are those which this conference is addressing, and I look forward with interest to its conclusion and recommendations.

As far as my brief role in these proceedings is concerned, perhaps I may summarise the essence of my message tonight. It is that farming and forestry are being brought closer together — and that this is something we should welcome as the beginning of a new era. I think this can also carry with it substantial environmental benefits, but that is a subject for another speech on another day.

Our farmers and our foresters are adaptable people — they have had to be. With the support of a Government that understands their needs, I am sure they have the determination to meet the coming challenges, to grasp their opportunities and to continue to serve their country well.

SESSION IV: MARKETS, MARKETING AND ADVICE

Advice — Agriculture (1)

D A W Alexander
Divisional Surveyor, ADAS, Oxford

Abstract

Traditionally, agriculture and woodlands have been closely interwoven. As well as timber production for farm and estate, the sporting interest has strongly influenced the pattern of woodlands. In recent times the demand for many of the products of farm woodlands has declined. Coupled with other reasons this has led to a decline in the management of farm woods, many of which are now neglected and becoming over-mature. There is now an increasing awareness of the importance of farm woodlands for landscape and wildlife conservation. The commercial opportunities also become increasingly important as a means of supplementing farm incomes, or at least defraying the costs of management. The relative supply and demand positions for agricultural products and timber are likely to lead to changes in land use patterns and a substantial increase in the area of woodland. For these reasons there is an increasing demand for advice to farmers on woodland management. ADAS, as 'front line' adviser, is well placed to give this advice, in conjunction with the Forestry Commission and other organisations.

Introduction

As Divisional Surveyor for ADAS at Oxford, I practice in the counties of Oxfordshire, Berkshire and Buckinghamshire. Three lowland counties not noted perhaps as the most afforested corner of the British Isles, though we must not forget the Chilterns. Nevertheless, there is a considerable number of farm woods, mostly small and scattered, even on the Downs. Whilst the reasons for their establishment and especially maintenance and management may have changed, and in many cases disappeared altogether, their importance as landscape features and wildlife habitats is increasingly recognised. There is also the sporting interest and we must not overlook the commercial opportunities for timber or wood products. I refer here of course to existing farm woods, usually quite small, rather than forests for timber.

However, the problems of agricultural surpluses and the need for alternative land uses, of which forestry is mooted as one of the more likely propositions, may well lead to a considerable increase in the area of woodlands on farms and timber production on a forest scale. Thus there is already an increasing demand from farmers for advice on the management of their woodlands and new plantings. We are already dealing with an increasing number of such enquiries in my own Division. I certainly see the demand for such advice expanding further and quite considerably so in the future.

The Past Perspective

Farming and forestry have always been closely interwoven with the combination of the two forming the patchwork quilt that is such a feature of rural England. Woods were important for the production of timber and other wood products for farm and estate and indeed the country as a whole. They were also valued for their sporting interest, particularly fox hunting and pheasant shooting, which has been a significant factor governing the number and pattern of small woods on farms. In many parts of lowland England the traditional coppice with standards system fulfilled these objectives and, coincidentally, provided valuable wildlife habitats. Many of the woods were of course planted as landscape features in their own right on the great estates.

In an agricultural context, however, such woodlands were not always beloved by farmers. On tenanted farms the woods were frequently reserved to the landlord and excluded from the tenancy. Timber extraction across the farmers' fields, with deep rutting of pastures and so on could sometimes be a bone of contention. Although the pattern of tenure

has been changing and there are now many more owner-occupied farms, that basic objection can remain, especially where the direct and indirect costs of extraction may exceed the value of the timber.

Thus woodlands have in many cases been something of a 'cinderella' feature on farms. Many have become neglected and are now in a semi-derelict state due to over-maturity of the trees, lack of regeneration and lack of active management. A number of factors have contributed to their neglect and lack of management including:

- a. little or no demand for the produce of the wood. For example, the demand for coppiced hazel for hurdles and thatching spars is vastly reduced;
- b. the difficulties and cost of timber extraction. Extracting the timber from small isolated woods may cost far more than it is worth. Even where suitable timber exists for fencing stakes the necessary equipment, plant and expertise has to be available for it to be utilised economically;
- c. no spare labour capacity on the farm for woodland management;
- d. stock being allowed into woods for shelter, thus preventing natural regeneration.

The Present Scene

Factors influencing farmers' attitudes

Many farmers' perception of the woods on their farms has slowly been changing and this change has gradually been gathering momentum.

- a. The increasing interest in conservation has encouraged farmers to look closely at their woodlands and the diversity of habitats that can be produced there. The overall amenity value of woods, including sporting, on a property has always been recognised. The fact that many are literally tumbling down due to the over-maturity problem, and the closer look being taken because of the interest in conservation, has revealed the urgent need for management. Hence the increasing demand for advice, which at least in my Division, comes especially from owner-occupiers with relatively small woods on their farms.
- b. There is a continuing interest in woods for sporting, especially in the case of farmers, for shooting and the possibility of an increasing interest in woods for other recreational purposes as the demand for access to the countryside grows.
- c. There are signs of an increasing market for timber and wood products from farm woodlands, particularly roundwood for fuel, and for certain trees for turnery and crafts. The former coincides with the increasing interest in coppicing for conservation management purposes. Whilst the rewards may not be great, it may at least be possible to get the coppicing work carried out by a contractor in return for the wood which he takes out. The Dartington Small Woodlands report* pointed out some of the opportunities and potential which exist.
- d. Farm incomes are falling and in many cases farmers are looking at all the resources on their farms in an effort to diversify and supplement income from additional enterprises.
- e. There is a realisation that shelter belts which have continually been planted can fulfil other objectives beside just providing shelter.

Availability of advice

ADAS has advised for many years on the design of shelter belts, with grants being available under the various agricultural grant schemes over the years. This continues to be the case and under the Agriculture Improvement Scheme a basic grant of 30 per cent or 60 per cent in Less Favoured Areas, may be payable if a shelter belt is predominantly broadleaved. Grants for certain other tree planting may also be available from MAFF as we have already heard in Mr Beard's paper.

Within ADAS the Land and Water Service is chiefly responsible for giving advice to farmers on all aspects of woodland management. The advisers concerned are Chartered Surveyors whose training as surveyors included forestry. Over the years some of them will, for various reasons, have developed a special interest in forestry, whilst forestry and woodland management have been covered in our land management and conservation courses. In recognition of the need for expert advice we are giving further training to a number of advisers so that each Divisional Office will have a forestry 'specialist' with other surveyors also capable of giving advice on woodland management.

Much of the advisory work we do on woodland management at present is in the conservation context. As previously mentioned, a great deal, but by no means all of this is given on owner-occupied farms with comparatively small woods. On the conservation side we do of course work closely with the Farming and Wildlife Advisory Group. The Berks and Oxon FWAG Adviser is in fact located at the Ministry's Oxford Divisional Office. On the forestry side we obviously

*See reference on page 89.

liaise with our Forestry Commission District Officers. We also work closely with the Countryside or Forestry Officers of the County and District Councils. Our advice to farmers will certainly include information about financial assistance from other sources, such as Forestry Commission grants and the Countryside Commission grants administered by local authorities. On the sporting side we work in conjunction with the Game Conservancy and earlier this year in my own Division we held a very successful 'Shooting with Conservation' promotional event on a farm in Oxfordshire. This is not, of course, to forget the availability of advice from private consultants, about which we shall be hearing from Mr Stirling-Aird.

In addition to individual on-farm advisory visits, we also aim to get advice across to groups and larger audiences by means of on-farm promotional events such as the one mentioned above, and the series of Farming and the Countryside events held in June and conferences. At the same time we are making known to farmers the range of advice available from ADAS and other sources.

The Future Outlook

I foresee an increasing demand for advice and a need for the breadth of advice to be expanded for the following reasons:

- a. interest in woodland management for conservation purposes is increasing and will continue to increase;
- b. pressures on farm incomes will continue and on many farms there will be a need to consider what options may exist for diversification. The commercial opportunities presented by farm woodlands to supplement farm incomes, or at least defray the costs of management under item a. above, will need to be explored;
- c. changes on a major scale are likely to be necessary to overcome the problems of overproduction of certain agricultural commodities. On the one hand we are told that something like 20 per cent of our present farm land may need to be taken out of production. On the other hand, with only about 9 per cent of our surface area under trees we have one of the least wooded countries in the European Community, whilst 91 per cent of home timber consumption comes from imports costing £4500 million. The scope for adjustment of this equation, giving rise to a substantial increase in the area of woodland for timber production, seems obvious but the transition for farmers will not be easy;
- d. it hardly needs stating that if timber is to become an alternative 'farm crop' the cash flow implications in changing from a monthly milk cheque to a crop with a rotation of 50 or 100 years cannot be contemplated without some other financial incentives;
- e. advice on markets and marketing is likely to be required, be it for relatively small-scale disposals from existing farm woodlands, or on a much larger-scale in the longer-term. I have already referred to the Dartington Small Woodlands report in this context, and the current Forestry Commission 'Small Round Wood' market survey should also be valuable in this respect. Might there be a place for co-operatives in sharing the costs of equipment and in marketing enough timber at a time to satisfy the requirements of the trade?
- f. if timber production is developed as an alternative farm crop on a large-scale, this could even entail "retraining" for the farmer and farm workers.

The implications of the factors listed above, particularly items c-f, are that business management advice will be needed in addition to silvicultural advice. ADAS, as 'front-line' adviser, with suitably trained woodland management 'specialists', together with its farm (business) management and wider responsibilities for diversification, for the rural economy and the environment placed upon it by Section 41 of The Wildlife and Countryside Act 1981 is well placed and well equipped to give this advice in conjunction with the Forestry Commission and other organisations.

Summary

In summary, there is a growing demand for advice on the management of farm woodlands, particularly for conservation management purposes. This is likely to continue within the present framework of farm woodlands, in relation to their place within the farm economy and the farmers' objectives. The demand for advice both in quantity and scope could expand quite considerably in the future if timber production is developed as an alternative farm crop on a large-scale. I am confident that this demand can be met by ADAS in conjunction with other organisations to ensure that the woodland owners' objectives are met and that within the overall solution, management for conservation purposes will be one of the important objectives.

Advice - Agriculture (2)

R J Stirling-Aird
Savills, Brechin, Scotland

Abstract

Ignoring the large-scale upland planting in England, Wales and Scotland that has taken place over the past 60 years, the present pattern of woodlands in Britain has been developed, almost exclusively, by landowners over a long period of time, largely for sporting and amenity reasons in England, but with much greater emphasis on timber production in Scotland. Given the changing pattern of land ownership, with a much greater proportion of owner occupiers, any rehabilitation of existing woodland or extension of such woodland for commercial, sporting or whatever purposes will inevitably require the input of skilled professional advice with a knowledge of all the various land uses. This is particularly so because, unlike landowners who have their advisors, the farmer who aspires also to be a forester has no knowledge or experience of this role, and also because of the requirements of the forestry grant schemes which involve consultation with interested parties such as local authorities, public and private bodies, so that any eventual scheme must take into consideration a wide range of interests and land uses.

Introduction

I was asked, in this short paper, to outline my perception of the need for advice to farmers and landowners on the business aspects of entering or extending forestry enterprises and how I saw private consultants meeting that need. I hope I have just answered the first part of that question, but I will expand a little in a minute. I am a Chartered Surveyor, practising in Scotland with a national firm of land and estate agents. We have a long established national network of offices, principally dealing with agriculture, and a more recently established forestry department, based in Scotland, one of whose remits is to advise farmers and landowners on integrated forestry schemes, which is what I believe this conference is all about.

Donald Alexander has ably outlined the services ADAS can provide in England, and there is no point in my going over this ground again. I will therefore give a little prominence to how we see farming and forestry in the North, and how I believe this has considerable bearing on the development of the advisory services in England and Wales.

Level of Advice Required

Firstly, for existing small woods probably less than 10 hectares. These include most shelterbelts:

The farmer or landowner who wishes to rehabilitate such woods can draw on a wide variety of advisors, some of whom have to be paid and some who, at present, come free. They include the Forestry Commission, Countryside Commissions for England/Wales and Scotland, Ministry of Agriculture/ADAS and in Scotland DAFS, National Park Authorities in England and the Nature Conservancy Council in certain circumstances. Advice is also available through the private sector in the guise of various independent consultants and a range of chartered surveyors, some of whom operate on their own and some through firms. Indeed the RICS maintains a list of members with specialist forestry expertise, all of whom will have had training and experience in forestry as well as agriculture. Since the woods that are the subject of the advice are already in existence, the level of advice required tends to be lower and I should imagine the above agencies can cope perfectly well.

Secondly, the advice required in the establishment of new woodlands including farm woodlands:

Here I am really talking about woods over 10 hectares, where commercial timber production will be one of the main objectives. There has not, as yet, been an enormous explosion in the amount of advice required for such woodlands (although there has been an increase) simply because only a very small number of new 'farm woodlands' have been established in recent years. For instance, in the year 1983/84 the Forestry Commission approved 1,146 schemes under the Forestry Grant Scheme in England, covering an area of 16 290 hectares, an average of 14.2 hectares per scheme. In Wales the figures were 115, covering 2 175 hectares, an average of 18.9 hectares. Many of these schemes were medium-scale plantings on upland sites and only a few on low ground. In Scotland, over the same period, there were only 379 new schemes but covering an area of 34 096 hectares, an average of 90 hectares, (222 acres). The great majority of the Scottish new schemes are relatively large-scale upland plantings where there will, in most cases, have been consultation with agricultural interests but not usually any degree of integration.

Under the Broadleaved Woodland Grant Scheme, some 838 applications covering 1 700 hectares — an average of only 2 hectares — have been approved nationally in the first 6 months since the Scheme came into operation. It is clear that there has been a relatively large number of applications, and that the average area is much smaller than under the Forestry Grant Scheme but nevertheless the Scheme is involving the Forestry Commission, and the applicants and their advisors, in a great deal of extra work. However, a large proportion of the applications under this Scheme will be for restocking and regeneration of existing woodland.

If a practical scheme is introduced to encourage farmers and landowners to grow trees as an alternative crop, then the amount and complexity of advice required will be enormously increased. In this event, the great majority of applications would be for new planting schemes on ground previously used for agriculture. Just consider:

There are very roughly 250 000 farming units in Britain, of which 30 000 in Scotland. It seems reasonable to suppose that at least 20 per cent of these might enter a forestry scheme if the terms were sufficiently attractive, ie 50 000 units.

Another way of looking at it is that there is a requirement (according to a number of sources including the NFU) for some 500 000 hectares of agricultural land to be afforested over the next 10 years. Assuming an average scheme of 10 hectares, this also represents 50 000 schemes or 5 000 per annum over 10 years.

I appreciate this is entirely speculation, but I think it is useful to underline the sort of problems we would face if incentives to plant trees, perhaps as part of set-aside or some other policy, were to become a reality. I believe, then, that the existing sources of advice would be swamped, not simply because of the likely number of schemes but because each scheme would have to be treated on its own and would be inherently complex. It is quite possible that any grant scheme would be conditional on the applicant getting recognised professional advice.

Scotland

The level and complexity of advice which would be required for any grant aided farm forestry scheme (and farm forestry simply will not happen unless there is independent funding) is illustrated by the type of advice now required for Forestry Grant Scheme applications to be successful.

Whereas in England in 1985 only 62 Forestry Grant Scheme applications, covering 2 025 hectares, were remitted by the Forestry Commission to the Ministry of Agriculture for their comments (and none of these cases were, in the event, turned down on agricultural grounds) in Scotland the Department of Agriculture and Fisheries have a requirement to retain viable agricultural units which often means that large-scale applications are strongly resisted on agricultural grounds. This policy has recently been relaxed but the point is that the majority of Forestry Grant Scheme applications must be carefully considered by the applicant or his advisors in the light of the likely effect on the agricultural unit, of which the scheme may form a part, and also a range of other considerations made necessary by the Forestry Commission's consultation procedures, ie.

Agricultural viability, soil type, land use classification.

Local planning authority, regional structure plan, choice of species, layout and design.

Nature Conservancy Council/Countryside Commission (if appropriate), conservation and amenity aspects.

Red Deer Commission/Effect on Deer Management.

The Forestry Commission's requirement to consult with the Local Planning Authority usually results in them, in turn, consulting with a large number of semi-official and unofficial bodies.

Now, I am not criticising the system, merely stating that a great deal of input is often required to get an application through the Forestry Commission for grant aid. It is not uncommon for a major scheme to cost £1,000, although the cost per hectare will be quite modest.

However, in the case of farm woodlands occupying former arable land, the level of advice required to get a scheme approved may be just as great and therefore the cost per unit area much greater.

People must often imagine how nice it would be to have a great many new plantations of hardwoods dotted around the English countryside; however, any forestry scheme from which the farmer must ultimately make a living inevitably means growing the type of tree which produces the fastest commercial return and the best price and, indeed, the timber that is most needed by this country. This means, in most cases, softwoods which unfortunately tend to be more controversial and therefore to increase the cost of any application for grant aid.

Summary

A Land Use change from farmland to forestry, whether it be upland or lowland, is a potentially contentious issue, particularly where Exchequer aid, whether by direct grant or through taxation reliefs, is being sought. I hope I have been able to demonstrate that farmers and landowners considering such change, whether it is to carry out forestry themselves or to sell the land for others to invest in, are well advised to take advice. Because of the range of issues and land uses involved, such advice is often best obtained from those who have training and experience in rural land management and the integration of the various uses.

Advice — Forestry (1)

A A Rowan

*Director, Private Forestry and Services
Forestry Commission*

Abstract

Following the war, the main source of advice to woodland owners, usually coupled with exhortations to rehabilitate felled woods, was the Forestry Commission. The vehicle was the Dedication Schemes. The Timber Growers Organisation and Scottish Woodland Owners Association, followed by consultants and forestry management companies, developed later, but the Commission still gives advice, now mostly related to grant and felling licence requirements. During the review of broadleaved woodland policy in 1984/85 advice was identified as a key element, but contacts with farmers were limited. The Commission published *Practical Work in Farm Woods* jointly with ADAS in 1986 to fill this gap. ADAS and Scottish Agricultural College advisors are recognised as an important first point of contact with farmers, and FWAG advisers can also help. Co-ordination of the many sources of advice will be important.

In the immediate post-war period, the advice available to woodland owners on forestry matters came largely from the Forestry Commission; I say 'largely' because other bodies had an important role, notably the forestry co-operative societies and the universities, as well as individual forestry consultants and chartered surveyors. This was the period when the principles were established that "rehabilitation of woodlands must proceed with both certainty and rapidity" and "in every case the owner must reach an early decision as to whether he is prepared to proceed with the work of rehabilitation" (Forestry Commission, 1944). The principal means of achieving this were the Dedication schemes and associated grant schemes. A large part of the effort of the Forestry Commission's private woodlands officers at that time went into promoting Dedication, and a great deal of advice on all aspects of woodland management was inevitably given in the course of checking (and in some cases preparing) Plans of Operation. It is doubtful whether Dedication would have proceeded as fast as it did without this advisory input. This effort was not always to the liking of the forestry consultants who sought to make a living by doing for a fee what the Commission provided free.

The Watson Committee identified the absence of a distinctive woodland owners' organisation as a major weakness (Forestry Commission, 1956). The setting up of the Timber Growers Organisation and Scottish Woodlands Owners Association filled this gap, and provided an additional source of technical and financial advice, which has steadily grown in importance. This has been paralleled by more activity by consultant firms, forestry management companies and by the availability of professional advice from local authority forestry officers. Forestry Commission advisory work has declined in extent, partly as a result of staff cuts, but more because of a decision not to compete with those bodies whose business it was to provide advice to private owners. The position today is that Forestry Commission advice is still available, but heavily oriented towards grant scheme and felling licensing requirements. The Forestry Commission's leaflet *Advice for Woodland Owners* (Forestry Commission, 1975) makes it clear that the Commission will give free advice on the general suitability of any scheme, but cannot undertake tasks such as the preparation of Plans of Operations.

During the review of Government policy on broadleaved woodlands in 1984-85 it became evident that advice was a key element in the better management of these woodlands. There appeared to be no lack of advice from a wide range of sources, some of them fairly new in the field such as FWAG advisers and Countryside Commission project officers. Owners of established managed woodlands are fairly familiar with sources of advice on forestry but there was a clear need for better advisory contacts with farmers. As a group they have not figured largely in woodland management, but could potentially do so both in the context of the broadleaved policy and in the development of 'non-food' enterprises on the farm. The need for greater knowledge of forestry by farmers has long been recognised; and the new series of leaflets prepared jointly by ADAS and the Forestry Commission *Practical Work in Farm Woods* (MAFF, 1986) is part of a renewed effort in this direction. There is now a fair range of advice available but if there is a weakness, it lies in the area of timber marketing. Growers, particularly small woodland owners, are still reluctant to obtain independent valuations of timber for sale. It could be said that they have only themselves to blame if their marketing efforts are disappointing in consequence, yet it may be largely a matter of getting a mental yardstick of what is valuable and what is not. The importance of ADAS and college advisers as a first 'point of contact' is obvious; not that they will be expected to give detailed professional advice, but that they are able to alert the client to the importance of doing so, and give information on where this advice may be found.

The first two training courses in broadleaved woodland management, including environment issues, for ADAS advisers were run by the Forestry Commission this spring, and similar initiatives are under discussion for agricultural college advisers in Scotland. The excellent body of enthusiastic advisers employed by FWAG will increase their

effectiveness with knowledge of woodland management, particularly timber growing. Discussions are now under way between FWAG and FC on how this might best be done.

Co-ordination of advice, across specialisms and disciplines, is something which all bodies engaged in the advice-giving business will need to improve: most importantly, the agricultural colleges will have to give greater attention to forestry training, to enable future generations of farmers to be knowledgeable and skilful woodland managers as well.

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Advice — Forestry (2)

G V Darrah
Registered Forestry Consultant

Abstract

Forestry is a new profession. The development of the Institute of Chartered Foresters is briefly discussed, together with the formation of the Association of Professional Foresters. Major sources of advice in the private forestry sector are mentioned.

Discussion

Advice comes in many forms: good or bad, amateur or professional, cheap or expensive. There is no easy way to ensure good value, and the choice of an adviser depends largely upon what kind of advice is required. For a project of any size it is well worth considering getting good professional advice.

Forestry is a relative newcomer to the professions in the United Kingdom, although it is of much longer standing in Europe. Degree courses in forestry were not available until just before the first world war. Between the wars, the demand for foresters was largely from the Indian and colonial forest services and from the newly formed Forestry Commission. The great expansion of private forestry did not take place until after the second world war.

The rate of planting in the private sector reached its peak in the early 1970s. The corresponding rise in the demand for the services of professional foresters took place at a time when professionalism in general was under considerable scrutiny both from the state and the general public. The Monopolies Commission reported to the House of Commons on restrictive practices in 1970, and several scandals, notably the Poulson case, gave rise to doubts about the ability of the professions to ensure that their members adhered to a suitable code of ethics.

It was against this background that the Society of Foresters changed from a learned body to a professional Institute. It produced a list of registered consultants in private practice and required them to comply with a code of ethics. The Institute was incorporated by Royal Charter in 1982 and all corporate members now have to qualify by taking the Institute's professional examinations. A list of members in consultancy practice is published annually and all consultants are required to have a minimum of £100,000 professional indemnity insurance. The list gives the consultants' special interests and the areas where they are prepared to work. It also shows whether or not a consultant is a sole practitioner or is affiliated to a company.

In the early post-war period, when forestry was beginning to become more professionally organised, much discussion centred on the question of whether an adviser could also be a contractor. The Association of Professional Foresters was formed in 1960 to meet the needs of those who were working in the forestry industry but who were either mainly involved in contracting or who lacked academic qualifications. Full membership depends upon a standard of work acceptable to an elected council and includes consultants, contractors, merchants, nurserymen and foresters. The Association of Professional Foresters produces a list of members showing the services they have to offer.

It is only relatively recently that forestry advice has often become separate from advice on general estate management. Professional land agents, now members of the Royal Institution of Chartered Surveyors, have for many years had some training in forestry, and have often gone on to specialise in it. Increasingly, firms of land agents specialising in forestry are employing qualified foresters. The Institute of Landscape Architects, now the Landscape Institute, has widened its scope and includes specialists in land management.

Qualification by examination gives some control over the quality of advice available, but is by no means an infallible guide, and there are many technically unqualified people who are equally capable of giving good advice. This is especially true in forestry, which has never been an exact science and is often pursued for ends other than that of efficient timber production.

Where sporting is important, advice is available from the Game Conservancy. For advice on nature conservation, help is available from the county Farming and Wildlife Advisory Groups and from the county Naturalists' Trusts. Regional offices of Timber Growers United Kingdom often maintain lists of consultants and contractors in their areas and so do many county and district councils, and, of course, the Forestry Commission.

The range of advice available is now considerable and runs from the independent consultant, through the major forestry companies and consultant/contractors to local contractors and landscape gardeners. As always it is important to form clear management objectives, and to assess the scale of the task and level of advice required. Then seek help from published lists, from advisory bodies and from personal recommendation to get the best advice available.

Advice — Environment (1)

E S Carter

Farming and Wildlife Advisory Group

Abstract

'Official' and voluntary sources of advice are reviewed.

- Ministry of Agriculture, Fisheries and Food, via Agricultural Development and Advisory Service (ADAS).
- Department of Agriculture and Fisheries for Scotland, via Scottish Agricultural College advisors.
- Forestry Commission.
- Nature Conservancy Council.
- Royal Society for Nature Conservation.
- Royal Society for the Protection of Birds.
- Countryside Commission.
- Farming and Wildlife Advisory Group.
- Woodland Trust.
- British Association for Shooting and Conservation.

As with most areas of activity there is no shortage of advice on the management of natural resources for the benefit of the environment. The problem for those seeking advice and acting upon it is to decide who to consult and how to balance the various, often conflicting, interests. It will be impossible to satisfy everyone within the confines of the normal farm but given an understanding and an appreciation of the balance between various interests is usually possible to achieve a reasonable compromise and certainly to avoid unnecessary damage. In my contribution I shall confine myself to the 'official' and voluntary organisations leaving Mr Sandels to cover the commercial services.

There are a large number of organisations, official, semi official and voluntary, concerned with various aspects of countryside management, and it is not always easy to decide who does what or where special interests lie. The organisations referred to are directly involved with countryside management, advice and grant aid.

Ministry of Agriculture, Fisheries and Food

Part of the Ministry is the Agriculture Development and Advisory Service (ADAS), which offers free and impartial scientific, professional and technical advice to farmers, growers and landowners. Advice covers not only farming activities but also conservation and socio-economics as appropriate.

Grant aid is available for a range of agricultural/horticultural activities and may also include work associated with the conservation of wildlife and landscape features.

The Welsh Office Agriculture Department is responsible for agricultural functions and for the advisory staff in Wales.

Department of Agriculture and Fisheries for Scotland

This department of the Scottish Office is responsible for promoting agriculture in Scotland and provides technical and financial help for farmers, supervises educational, advisory and research services and the development of crofting. Advice to farmers and growers in Scotland is provided through the three agricultural colleges.

Forestry Commission

The Commission acts in the dual role of forestry authority and forestry enterprise under the Forestry Act 1967. It has a statutory duty to seek a balance between timber production and wildlife conservation. In its role as forestry authority the Commission provides advice to private woodland owners, including farmers, drawing on the experience of its practising foresters.

Nature Conservancy Council

The Nature Conservancy Council (NCC) is the government body which promotes a national policy for nature conservation for Great Britain. The NCC establishes and manages some 200 national nature reserves and also gives

advice about nature conservation to Government Ministers, Departments and agencies, local authorities, voluntary bodies and to individual land managers. The NCC has a statutory duty to notify planning authorities and water authorities of any area other than a nature reserve which it considers to be of special scientific interest.

The NCC seeks to foster an understanding of, and concern for, nature conservation through the production of literature, exhibits, promotion through the press, radio and television and collaboration with local authorities and voluntary bodies.

The NCC makes grants towards the costs of work of any kind that it could itself undertake and in this way it encourages wider participation in the work of nature conservation and in particular the efforts of voluntary bodies.

The Royal Society for Nature Conservation

The RSNCC is a major voluntary organisation active in all aspects of wildlife conservation. The society represents 46 local conservation trusts throughout the United Kingdom.

The RSNCC has a national lead with central funding initiatives and the trust harnesses the skills of staff and volunteers to look after their reserves, to provide information and enjoyment, to give advice and make sure changes to the countryside do the least harm to wildlife.

The Royal Society for the Protection of Birds

The RSPB has developed public interest through education and by maintaining bird reserves and promoting research into their conservation. The Society owns, leases or manages over a hundred reserves, conserving important habitats or protecting rare birds and seeks to ensure that conservation has a voice in planning matters and that the best areas of ornithological importance are safeguarded. It is prepared to make available to individuals the expertise which it has acquired in the management of woodland and large areas of grazing land in the interests of wildlife.

Countryside Commission

The Countryside Commission for England and Wales and the equivalent body in Scotland is the Government's chief advisor on the conservation of landscape beauty and provision for public enjoyment of the countryside. The Commission offer grants for recreation facilities and services such as country parks, picnic sites, long distance routes and ranger services. The Commission promotes the voluntary approach to conservation on farmland through grants for amenity tree planting and hedgerow conservation, and landscape conservation and management. It can grant aid management agreements between local authorities and farmers.

Farming and Wildlife Advisory Group

This is an independent group with individual members drawn from the major organisations concerned with the countryside. Its aim is to improve understanding between farmers and conservation interests and to show that these are not necessarily in opposition but can complement each other, showing that food production, landscape and wildlife are not necessarily in conflict.

There are 64 local groups normally based on a county, having similar composition to the national group. These groups encourage understanding between farming and wildlife conservation interests and support the member organisations in their own efforts with regard to agriculture and wildlife conservation. They provide a forum for informal liaison and exchange of ideas, information and experience. Groups offer practical advice on wildlife conservation to farmers, and collect, exchange and disseminate information on research, experience and techniques relating to wildlife conservation on farmland. Over 30 counties have a Farm Conservation Advisor working full-time and offering free advice to farmers and to landowners.

Woodland Trust

The Trust was formed in 1972 to save Britain's native woodlands for the benefit of future generations. The Trust purchases and maintains woodlands in danger and creates new woodlands by planting. In most cases access is allowed.

The British Association for Shooting and Conservation

This is a voluntary Association which exists to serve as a representative national body for all sport shooting. It accepts special responsibilities for the training and education of those who wish to take up shooting and learn more about specific aspects of the sport. It promotes wildlife conservation and research and safeguards the legitimate interests of members.

Advice — Environment (2)

A J Sandels
Fountain Forestry Ltd

Abstract

An example of a private sector farm woodlands advisory service is given, with special reference to the environmental considerations affecting the farmer, in relation to management of farm woodland. Farm Woodland Services is one way farmers can take advantage of the resources of the private sector for management of farm woodlands.

'Environment' is taken to be the subjectively assessed landscape and conservation value of the farmer's resource: values which can either restrict his objectives or by maintenance and enhancement, be one of them.

By virtue of the private sector's independent position, it is the one which can properly represent the farmer to the public sector, whose dual role is to determine the framework within which the farmer operates and advise him how to operate within it, to his best advantage.

Background

Fountain Forestry's Farm Woodlands Service, was established in April 1985, from the company's South West District. In the Service's first full year of operation 200 farmers have been visited. Fountain Forestry is the first of the 'big four' private forestry companies to aim an advisory service specifically at farmers. The South West District, manages 18 000 acres of broadleaved and conifer woodlands, ranging in size from 15 to 1000 acres. The District (Dorset, Somerset, Devon and Cornwall) has a large concentration of neglected farm woodlands and large areas of often lower grade marginal land, either moorland, impeded drainage clays (Culm Measures) or steep inaccessible valley sides. In addition, the broadleaved woodland is often ancient semi-natural, predominantly poor quality, coppice origin, oak.

The Forestry Commission's broadleaves policy has had considerable impact on the private forestry sector. Management of commercial woodlands has been modified with the virtual cessation of coniferisation of existing broadleaved sites. Commercial management of broadleaved woodlands for owners is looking to bring back even the poorest quality and most inaccessible areas into production. However, the use of broadleaves will not solve the farmers problems, as he searches for alternative sources of income.

Foresters, farmers and farming practice have been greatly affected by the environmental/conservation lobby, over recent years. With farmers planting over 30 million trees over the past 5 years, the concept "trees are a good thing" has taken hold. Farming and Wildlife Advisory Group advisors are to be found in many counties. Farming co-operatives, such as Framlingham Farmers, have taken on their own farm advisors to give on-farm advice on environmental issues often looking at all activities on the farm. Much has been achieved with the threat of statutory planning controls hanging over the farmers head!

However, in the south west with its mixed livestock farming and larger areas of neglected woodland, pressure from falling income is the principle reason for farmers to consider management of existing woodlands. Creating alternative sources of income in the short and long-term, but often with the condition that "it does not cost me anything". Generally, farmers coming to Fountain Forestry do so for commercial forestry advice with costings, but not always with commercial forestry as their main or only objective.

The Service

Fountain Forestry cannot be regarded as a philanthropic organisation and is primarily engaged in management of commercial forests, nationally and internationally. Little concerted effort has been made in the past to exploit the long-term potential of the farm woodland resource. However, with actual and possible future changes in land use and the success of 'small woods projects' a different approach was considered by employing an experienced forester with an environmental background. With the bad press private contractors have had in the past any approach would need to be acceptable to the farmer and should be sensitive to environmental considerations.

The aim of the service, with respect to environment, is to integrate and plan for farmers objectives, often commercial, in a way that is sensitive to landscape and conservation values, but avoiding, or not compounding, the problems of farm woodlands eg small-scale, isolation, poor quality and marketability. Following the general principle that on the right scale diversity of structure and species enhance wildlife values, but within the constraint that marketability and quality are most important to the success of a farm woodlands enterprise.

There is an increasing number of consultants who deal with farmers on a regular basis. Fountain Forestry, the first of the large forestry companies in the field, have a local and national coverage of professional foresters. A principle feature of the service is that the initial farm visit is free, without obligation to the farmer. The farmer can discuss any aspect of forestry (environmental and/or commercial) whether the area is a quarter acre field corner or a long-term farm forestry enterprise, and formulate his objectives based on the range of options available to him. As with the public advisory services the farmer receives a written report. Including recommendations and costed options based on objectives and available resources. The service also recognises that the farmer can undertake a number of the operations himself if required, providing he has a practical guide to help him. Another feature of the service for farmers considering schemes in environmentally sensitive areas is that the advice is independent of grant administering and statutory bodies.

The Questions

Examples of farmers questions the private sector needs to answer, in providing a service, are: "What are the costs of taking specific action in an environmentally sensitive situation?" eg retentions, scale of working, timescale or the consequences for wildlife of commercial operations. "What are the returns of any environmental improvement?" eg thinning to high forest, coppicing and group felling. An order of costs and returns (including cash flow) can be given for operations identified. "What alternatives are open to the farmer?" eg economies of scale, how much to plant each year, what to plant, present and future markets.

What to plant is of particular importance for the farmer when he is considering the environmentally sensitive option. At the extreme the choice between Douglas fir and oak (in the south west) or the choice between faster growing quality hardwoods and conifers. A computerised production forecasting system allows farmers to receive a guide to the future value of timber crops, at current prices, allowing the consequences of alternatives to be assessed more objectively.

The farmer, of course, pays at some stage, but he will be clear about his commitment in time and money, the consequences of his actions and alternatives open to him. The farmer pays for (any or all, as required) planning of operations, grant applications, licensing, valuation, tendering and contracting services. He will also, if required, have the information needed to do the work himself, including supply of material and taking advantage of bulk purchase discounts.

There are now grants available towards the costs of professional advice, under the Broadleaved Woodland Grant Scheme and as a percentage of cost under the Ministry of Agriculture's new Agricultural Improvement Scheme and the Countryside Commission's grants.

Often farmers have asked our advice after encountering problems with Tree Preservation Orders and planting in National Parks. Generally, use of consultants can lead to a more acceptable result for the farmer, especially in environmentally sensitive areas. However the private sector has a long way to go to redress the lack of trust in the farmer, following past exploitation of a resource of which he has little knowledge or experience of management.

The Future

The recently published NFU policy document *Farming Trees* made a number of recommendations on advice available to farmers. It highlighted the "limited specialist manpower" available to the Forestry Commission and to the Ministry of Agriculture, which "is unable to provide the levels of individual attention which will be required if farm forestry is to be expanded", and called for the establishment of help from the private sector in promoting forestry to farmers, and additional government support to help meet the cost.

The future use of conifers as a timber crop is essential to an expanding farm woodland enterprise. The private sector has the experience of afforestation and woodland management that the farmer will need to draw upon if half a million hectares are to be afforested. Our Farm Woodlands Service is an example of the way in which the farmer can take advantage of the resources of the private sector in planning farm woodland management for whatever objective.

A Farmer's Reaction

R Bloomfield
Farmer

Abstract

The perspective on farm woodlands of a typical South-East or East Anglian farmer is given. The long timescale is a psychological obstacle, requiring advice and assistance if it is to be overcome. An integrated source of advice should be developed: ADAS is the obvious focal point, drawing in other agencies as necessary. Agricultural co-operatives might provide a base for woodland development, particularly through dissemination of marketing and product information. Agreement between landlords and tenants will be essential for the latter's participation: the representative organisations for each may be able to help in this respect. It would be helpful if forestry support could be adjusted to reflect the needs of farmers.

Allow me to make clear from the outset that having no woodland to manage, not least because I am a tenant, I believe myself to be the type of farmer that must be reached with the promotional exercises and advice which have been discussed by previous speakers, and eventually by the marketing information which will be addressed later this morning. I am, however, also typical of the large number of farmers, especially in the south east and East Anglia, who are widening their enterprises, and trying, in my case through a pick-your-own enterprise and nature trail, to relate to the wider public, and indeed benefit from this increased contact.

Psychologically, of course, large numbers of us are put off by the long period of time to maturity of our investment in woodlands, and this not only influences our reasons for the planting of more woodlands, but also once established can greatly influence our reaction to their management requirements. When other crops from which we earn our livelihoods require daily and seasonal attention those which we see as part of the landscape do not command our attention. This naivety of view is now being broken by the notice being taken of advice from a plethora of directions about the harm of neglect, and it is easier to accept when the woodlands are nearing harvest and the results of that mis-management can more readily be identified, than in the younger, more crucial stages of their lives. This suggests that in the initial period of new or renovated woodlands, advice may need to be coupled with manual assistance, during which we may learn by looking over the fence.

The hunt for alternatives to crops now in surplus will increase this awareness, especially if and when serious measures to control over-production are taken, and start to hit our farm incomes with more force. Awareness of the potential timber and product values of woodlands and the harm of mis-management may then be seen in a more commercial light.

Therefore an increase in the availability of advice on *all* forms of tree crops is to be welcomed *but* it must be realistic and professional, not only in terms of the crop, but in sympathy with the aims and circumstances of the individual farmer.

We farmers are used to receiving advice from many quarters including ADAS, FWAG, Local Authorities and also, though at times in forestry circles there is little recognition of the fact, from commercial companies. Each has its own expertise and value. Each does, or should, inter-relate; and develop with, rather than at the expense of the others.

Just as in farming matters, so in woodland management advice, it is important not to have a confusion of information sources. It seems to me that the various bodies such as the Forestry Commission, Countryside Commission, County Councils, MAFF, Department of Energy, FWAG and other public agencies should develop an integrated source of farm woodland advice. The Forestry Commission obviously has an important role to play especially on matters for which it is responsible as Forestry Authority, such as grant-aid, felling licences, etc. However, to many farmers it appears perhaps more oriented to the large forest concept and does not appear so much in tune with the needs of small farm plantings. It may be more appropriate for ADAS to provide the immediate contact and information route to farmers, drawing in as necessary, and only when the farmers' enthusiasm is bitten, public agencies and the many professionally-trained and qualified consultants and contractors in the private sector. Accordingly mechanisms will need to be developed to bring in the right advice for the project, and experience with Coed Cymru, and the Gwent Small Woods Project could be beneficial in this respect. Equally though the farming and private forestry communities have important roles to play, and the mechanisms may already exist which, with development work which the NFU is leading and would like to progress, could benefit a variety of parties.

Agricultural Co-operatives, like farmers, are responding to changes in farming circumstances by searching for new enterprises, new services and new sources of income. Given the poor history of woodland co-operatives, and yet their

acknowledged benefits in reducing management costs and increasing the marketability of products, the (relative) success of agricultural co-operatives might be harnessed as a mechanism to bring a new enterprise to the attention of their members, and provide the focus for public and private advisory sources, and the seller and buyer of timber in both a physical and financial capacity.

They may also be the focus, though not the sole source, for a long awaited breakthrough in the forestry industry. This service which I would imagine would be of benefit to both buyer and seller of timber and other woodland products, and their agents, is the publication and regular review of information about the size, location, and other attributes of various timber and woodland products, and ultimately may incorporate information on prices. The non-homogeneity of products, the localised nature of some of the markets, and the relative inexperience of the farmer as seller of these products of course poses barriers to the development of the service. Farmers, have however benefitted from, and indeed come to rely upon this form of information for most agricultural products. The NFU through its Marketing and Parliamentary divisions is prepared to take a lead, and realises that it will face an uphill task, but we trust that with the help of all sides, the benefits to farmers, foresters, and agents acting for timber merchants, of this regular exchange of understandable information may be released.

Further information needs to be provided about the possibility of farmers adding value to their timber products on the farm. For instance rather than selling relatively small quantities of poor grade timber, when is it economically preferable to harvest and saw it oneself, and sell to a local domestic fuel wood market? Alternatively, if one could chip it in the woodland what other outlets are thereby reached? How much of the timber could realistically be used in a farm situation for buildings fences, etc? How much should be left to degrade on the site as a reminder to other owners and other generations of the lack of profitable markets?

I am conscious that the answer to these and many other questions may very well be known to foresters and the like, or may be available in their professional journals and other literary sources. One of the roles, surely, of any new farm forestry advisory service, public or private, is to draw this information to the attention of us potential users, and even circulate it in an understandable form.

Finally I would turn my attention to an area of advice important to me and many fellow farmers who occupy our farms as tenants — namely the provision of legal advice relative to the development of woodland enterprise. The NFU President yesterday referred to the need for tenants to be allowed to participate in the expansion of new woods, and the improved management of existing woodlands, and in this he has the support of many of my colleagues. However, whilst as with other enterprises we recognise the need to protect the landowner's interest, it appears that greater movement is required from the landowners and their representatives so that any woodland option is open to all farmers. Terms of agreements will need to be carefully drawn up to protect the interests of all parties, and will need to reflect the type of woodland crop envisaged. For instance there is a wide difference of interest between coppice which may be grown for fuel-wood or chipping, and a long-term deciduous woodland. Questions of who owns the timber, payment of grants and management responsibilities, quite apart from security of tenure for land under timber all indicate the need for clear unequivocal advice. It is in this area that the farmers and landowners organisations would have a most important role to play. It may well be that new legislation will be required to rationalise the whole subject, but initially it strikes me that a 'meeting of the minds' might achieve the same results with less potential conflict and acrimony. These organisations, used to advising on many aspects of the law relating to agricultural businesses and holdings, may then continue to provide a service beneficial to woodland owners and foresters alike.

We are still left with the worrying fact that the form of support for the UK forestry industry is not related to the concerns and needs of small woodland owners, who in landscape, environmental and employment terms may greatly benefit local rural economies and communities. The provision of grant-aid and marketing assistance more related to farmers' circumstances and the need for regular income could, if developed and promoted correctly, not only encourage improved management of existing woodland, but also the expansion of planting in all farming scenes. To promote such planting, advice and information from a host of sources, and assistance through a variety of mechanisms, will be required. Undoubtedly a lot of sorting out needs to be done by all the various organisations and bodies to provide an integrated and easily understood approach for farmers on the whole subject. If this is done benefits will accrue not only to ourselves but to the advisers also. Furthermore I believe farmers will respond with enthusiasm to a new challenge as they have always done in the past to provide for the country's needs in a most efficient and effective manner.

Discussion

Q: *Dr A Mowle (Nature Conservancy Council)* — Mr Stirling-Aird spoke of the need to adopt a coniferous approach to farm woodlands for economic reasons. But Dr Mutch yesterday warned of the dangers of extrapolating from large scale commercial forestry experience in the uplands. We have also been reminded of the

difficulties facing farmers trying to market small areas of softwoods. Will economics inevitably be the dominant factor in farm woodlands? From my own experience I have grave doubts that softwoods can be an economic proposition in small farm woods.

- A: *Mr A Sandels* — My approach is to deal with the whole range of objectives — some to provide economic benefits, some environmental. But in south west England conifers will play a major role.
- A: *Mr D Mithen (Chairman)* — I question whether we need a different regime in the lowlands.
- A: *Mr R Stirling-Aird* — Commercial aspects will be of prime importance to farmers. The Minister in his speech referred to an important role for softwoods which are more profitable than broadleaves. Smaller areas might be possible because farmers could go for more intensive management than in the uplands.
- A: *Mr A Rowan* — Scale is important. In the uplands large areas might be most suitable, but so far as the lowlands are concerned consultants have considerable experience when managing small woods (for example dedicated estates in England with a scatter of small to medium sized woods) and I see no difficulties for farmers seeking advice.
- Q: *Mr D Hughes-Hallett (Scottish Landowners Federation)* — Only one of the speakers made reference, with figures, to the cost of advice to the individual farmer. One of the first things a farmer is going to want to know if he is considering establishing a small woodland on his farm, is the order of cost of advice. Would the speakers comment.
- A: *Mr D Mithen* — Mr Rowan did cover this aspect from the Forestry Commission point of view.
- A: *Mr E Carter* — FWAG advice is free. There are two levels of advice:
- a. Initial advice to assess farmers' attitudes and wishes.
 - b. Expert advice on specific projects. Few organisations can afford to provide the latter free, so it is likely that consultants will come in at this stage, and will have no alternative but to charge.
- A: *Mr G Darrah* — Costs can be alarming in relation to a small area. Consultants' rates suggested by ICF are £20-30 per hour depending on experience. The Countryside Commission does allow 15 per cent of its grant to go towards consultants' fees.
- A: *Mr D Alexander* — ADAS will be charging as from next year, but initial advice will be free. Thereafter if the farmers objective is a commercial one a charge will be made.

Comment: Mr E. Todd (East of Scotland College of Agriculture)

In Scotland the first point of contact for advice is the general agricultural college advisor, and this differs from the situation in England and Wales where ADAS Land and Water Service takes the lead. The college socio-economic advisors give conservation and alternative enterprise advice. They co-operate with other organisations such as FC, NCC, Countryside Commission for Scotland, and private consultants and may refer cases to them depending upon the expertise required to meet the farmer's need.

Comment: Mr R Williams-Ellis (Royal Forestry Society/TGUK, and member of Snowdonia National Park Forestry Panel)

Scheme after scheme submitted for afforestation is being rehashed with a high proportion of hardwoods, or redrawn and reduced in area, making the whole proposal uneconomic for even tax-based investment. Applications are reducing in number and even forestry investment companies are being discouraged from applying in National Parks. These predominantly grade 4 and 5 areas were earmarked by Government for forestry expansion long before the present moves to take land out of agricultural production.

- Q: *Mr B Howell (Abbey Forestry)* — The conference needs to address whether:
- a. farmers will bring forward small areas for woodland planting — but note that the effect of small areas on surplus production will be limited;
 - b. the Government will encourage a move into productive forestry as a means of bringing better quality land out of farming and so reducing the surplus problem?
- Q: *Mr P Downing (Dartington Institute)* — Mr Stirling-Aird referred to the sheer scale of the problem: the number of farmers who will seek advice if farm woodlands catch on. Mr Carter also referred to the ease with which advisors acquire a waiting list. It is likely that some farmers cannot or will not pay for advice from a qualified consultant, whatever his profession. There will probably be considerable recourse to 'off the shelf' model

approaches — from booklets or from contractors. Does the panel have any view on this practice and its implications?

A: *Mr E Carter* — I am not in favour of the book solution, but we may have to resort to it in desperation. It can work but one needs to be very careful in constructing the model. Farmers are used to working in groups and it would be a better use of resources to adapt the group approach for common problems.

A: *Mr R Bloomfield* — I agree that groups are a good idea. Another possibility is the use of videos.

A: *Mr D Alexander* — Promotional events can serve as a useful means of reaching large audiences.

Q: *Mr E Harris (Royal Forestry Society)* — We have all seen disastrous woods where the timber production potential has not been realised. Forestry is becoming a very technical and sophisticated business. During the conference there have been several references to farmers carrying out forestry operations themselves but it needs to be recognised that, for example, chain saws can be very dangerous tools in untrained hands. We need to recognise the need for training as well as for good advice.

A: *Mr D Mithen* — That is a very pertinent point.

Q: *Mr A W Hewitt (Tree Lands)* — I would like to advise caution on the part of advisors as there are clearly marketing problems for small woodland owners. Would Mr Bloomfield tell us whether or not he believes existing agricultural co-operatives could be used for timber marketing, as I feel co-operatives will be necessary if successful marketing is to be achieved?

A: *Mr R Bloomfield* — I believe that in East Anglia existing co-operatives could take on a timber dimension.

Q: *Mr J Fletcher (Forestry Commission)* — In withdrawing agricultural land from food production and seeking afforestation as the alternative, is it not almost invariably implicit that advice given with a commercial objective would inevitably have conservation advantages?

A: *Mr G Darrah* — An advisor will, of course, normally respond to an owner's wishes in this respect.

A: *Mr D Alexander* — This is where the generalist has a role to play: drawing the threads together.

A: *Mr E Carter* — There will be circumstances where narrow advice is needed. But I hope that the specialists will keep other interests in mind.

Comment: Joyce Tait (Open University)

I would like to draw delegates attention to a major Open University project on practical conservation for land managers which is being funded by NCC. This will produce books and audio visual material that can be used to help bring trainers and advisors to a common level of expertise, and also to provide back-up material to leave with clients to re-inforce the advice given. It will take account of a wide range of commercial management objectives and conservation options on particular stretches of land.

Q: *Mr R E Thompson (Soil Survey of England and Wales)* — On the theme of the need for co-ordination in the advice given to farmers, co-ordination needs a common denominator. I would like to suggest that the land is the most obvious candidate. Co-ordinated land planning and management based on the nature and ability of various land and soil types on a farm is, I suggest, the most likely route to success. Does the panel agree and does it see any other common links?

A: *Mr R Stirling-Aird* — The productive capability of land is certainly a very important factor.

A: *Mr R Bloomfield* — I can imagine, for example, that tenants and landlords might have different views about the best location of new woods.

A: *Mr A Rowan* — In marginal areas there is often very little flexibility over use.

Marketing Your Timber

G.L. Venables
Henry Venables Ltd

Abstract

The paper examines markets, interpreted as the customer's needs, and draws conclusions for the pattern of planting and marketing practice for hardwoods. In international terms, British hardwood production is of little significance, and dominated by low grade wood. Only 20 per cent of UK timber consumption is hardwood, but of this half is domestically produced. Ash, beech, sycamore and oak — the principal hardwood species — are reviewed: the market for quality timber is secure, but outlets for poorer material are limited. Proportionate timber values are described, and marketing techniques outlined, with practical suggestions for the site and for paperwork.

Introduction

By definition, marketing is "isolating the customers' need and organising the business to meet this need", not "make something and then try to sell it" or, in the context of forestry — "grow a tree and then try to find someone to buy it."

By looking at the markets, the customers' needs, I hope to influence the pattern of your planting and advise you on the sale of existing woodland so that in both instances you derive the maximum return in the market place.

This paper will concentrate on the marketing of broadleaved woodland (hardwoods) with only passing reference to softwood which is more the subject of large volume harvesting and production in the upland regions of Scotland and Wales. However, a mixed plantation with a softwood nurse crop to the broadleaved species is an important part of timber growing in lowland areas.

Has British Timber got a Commercial Future in World Terms?

The international timber scene

Timber is a world commodity so that any assessment of the UK market must be seen in international terms and by comparison with our European neighbours. The annual UK consumption of hardwood is about two million m³ compared with the world output of industrial hardwood of some 400 million m³.

Table 1 *World production of industrial hardwood and softwood timbers*

	Million cubic metres				
	1958	1963	1970	1975	1980
World output of industrial wood	946	1056	1275	1282	1393
— of which hardwood	963	286	364	374	426
— hardwood as proportion of total	24.9%	21.1%	28.5%	29.2%	30.6%
World output of sawlogs and veneer logs	597	670	757	752	841
— of which hardwood	156	173	207	210	241
— hardwood as proportion of total	26.1%	25.8%	27.3%	27.9%	28.7%
— of which tropical hardwood	44	69	102	110	131
— tropical as proportion of all hardwood logs	28%	40%	49%	52%	54%

Source: FAO yearbooks

The figures in Table 1 show a steady growth in supply and an increasing proportion of hardwoods in world consumption of industrial wood. It is estimated that over 50 per cent of present hardwood consumption comprises tropical hardwoods. The growing awareness of the 'tropical rain forest crisis' may have a significant influence in coming years but it must be noted that less than 10 per cent of the annual cut is exported to the developed countries (over 50 per cent goes in 'fuelwood').

Table 2 *Hardwood supply in Britain*

	Thousand cubic metres (roundwood)			
	1955	1960	1970	1980
British grown production	1455	1580	1326	1210
Import of logs	556	587	279	114
Import of sawnwood	1407	1517	1337	1057
Total supply	3418	3684	2942	2381

Sources: FC, FAO Yearbooks

Table 2 shows that the supply of hardwood into the UK market has steadily declined since 1955, reflecting the pattern of consumption. There is no reason to suppose that this decline will be reversed for it can be fairly assumed that consumption will remain fairly stable. The main interest is in the balance of supplies from British sources and by imports.

An outline comparison with a European neighbour completes this brief survey of the timber scene. France, an industrial and agricultural nation with a temperate hardwood landscape, has a similar population to the UK but roughly twice the land area. In France the woodland cover is 25 per cent of the land area; in the UK it is 9 per cent. The spread of species is not dissimilar. The French forestry sector produces 7½ million m³ of hardwood sawmill logs per annum compared with a UK figure of approx 1 million.

British hardwood production appears to be of little significance in world terms and its fortunes are influenced by the level of demand for temperate hardwoods, exchange rates and the international economic and political scene. At home the major influence is the market for low grade wood.

Who Uses British Timber?

The market place

Only 20 per cent of UK timber consumption is hardwood yet half of that is grown in Britain. However, as much as 72 per cent of this homegrown hardwood is low grade and only suitable for fencing, mining timber and pallets. The lower grades of the timbers we import are used in the country of origin (Table 3). This table shows us that the markets for quality timbers are furniture and joinery.

Table 3 *UK markets for hardwoods, comparing imported and British grown, 1980-85*

	% Imported	% British
High value		
Joinery	55	8
Furniture	31	16
Construction	3	5
Total	89	28
Low value		
Transport, packages, pallets	7	27
Mining	0	29
Fencing	0	10
Total	7	66
Others	4	6
TOTAL	100	100

Various sources

With the demise of the elm we are left with four main commercial broadleaved species: oak; ash; beech and sycamore (Table 4).

Table 4 Comparison of British hardwood species into UK sawmills 1980

Oak	26%
Ash	8
Beech	13
Sycamore	6
(Elm	39)*
Others	8
	100%

* Elm 50% in 1977, reducing to nil by 1988

The range of the world's commercial timbers is dominated by the tropical hardwoods which are red or dark brown leaving the temperate hardwoods to fulfil demand for light coloured timber finishes. Ash in particular is light in coloured yet shows the interesting grain pattern caused by the variation of seasonal growth in temperate climatic zones. In spite of imports of North American grown ash and the resources of our European neighbours the demand for UK grown ash outstrips the supply.

Beech continues to be the basic material for chair frame construction and again UK supplies only fulfil a small proportion of British furniture makers' requirements. The balance is made up by supplies from Europe. The furniture maker is able to use lower grades of hardwood beech, ash and sycamore for components which are not seen, thereby facilitating a greater utilisation of the tree.

It is worth noting that an ash tree will grow to maturity in 60-80 years compared with an oak tree which may be 120 years old. However, English oak is part of our heritage and will always have a place in traditional building, restoration work and quality reproduction furniture. In new buildings where the highest quality and standards are required English oak is used in the joinery finishes. Apart from fencing oak the lower grades have a very limited market as the pallet makers and mines do not like using oak as it has a tendency to split and is difficult to work.

There is a market for the other hardwood species, in particular sweet chestnut, but supply is limited. Quality logs of cherry, yew and walnut are scarce and when available they find a ready market for cutting into veneers. Lumber requirements for cherry and walnut are satisfied from American sources.

Demand for quality hardwood is assured. This view is reinforced by the comments of a leading London architect, Mr Hulme Chadwick FRIBA, ARCA, PPSIA, HonDA, ARAs, who told the London Hardwood Club:

"I think that most architects and designers will agree, there is nothing like a good piece of hardwood. It breathes, it often has beautiful figure, it is more workable than aluminium or plastic. It is easier to repair, to add to, or subtract from. The sheer delight of a lovely wood surface must nearly always be preferred to the hard shine of metal or the shiny plastic surface. Hardwood has the in-built appearance of being a natural product."

So the market for the best hardwood grown is secure and, at a price, low grade wood competes with alternative materials in mining and packaging but these outlets are limited. Many other traditional functional uses for native hardwood have been lost to plastic and steel. To be sure of a market for hardwood, quality timber is essential.

The large scale softwood operations mainly in Scotland and Wales, both Government and private, are now supplying a continuity of sawmill logs for the cutting of a building construction timber to British standard grades. There is a useful saving in imports and demand outstrips supply as long as the home producers can more than match imported prices. Smaller lots of softwood throughout the UK are in demand by local mills for the cutting of fencing and timber for farm buildings, and general construction.

What is a Tree Worth?

Growing for value

Research within my own company showed that the bottom 12 foot length (the butt log) of all hardwood valued in one year (1 million cubic feet) contained 80 per cent of the total value.

The variation in value and volume between grades of the three most important species; oak, ash and beech, is shown in Table 5.

Table 5 *A comparison between quality, quantity and value for average parcels of standing timber*

	Value scale	% volume	% value
<i>OAK – an average parcel</i>			
Veneer butts	A x 10)		
1st quality butt	A x 6)	20%	53%
Beam quality	A x 2.1/2	30%	20%
Fencing quality	A x 2	35%	23%
Mining/pallet timber	A	15%	4%
<i>ASH – an average parcel</i>			
Veneer butts	A x 5.1/3	5%	10%
1st quality white	A x 4)		
1st quality coloured	A x 3.1/3)	55%	74%
2nd quality	A x 1.1/3	15%	7%
Mining/pallet timber	A	25%	9%
<i>BEECH – an average parcel</i>			
1st quality white	A x 2.1/2)		
1st quality coloured	A x 2)	50%	66%
2nd quality	A x 1.1/3	30%	23%
Mining/pallet timber	A	20%	11%

Growing for quality must be the objective where the value of any one tree can vary as much as tenfold and where the sale is assured if the quality is right.

There is no doubt that the future of the lower grades of oak is in considerable doubt. As much as 80 per cent of the volume of our current oak stock in this country is going to have a hard job to find a market. The grower will have to rely on the 20 per cent volume which gives over 50 per cent of the value in order to make an oak sale worthwhile.

Small lots of mixed softwoods have a ready market in local areas with sawmill logs down to 7½ top diameter at prices similar to mining/pallet hardwood timber. Small diameter logs will have a use for fencing on the farm.

How Do I Sell My Timber?

Marketing procedure

There are a number of options open to you and your course of action will be determined by the quantity and the quality of timber to be sold.

A small low grade parcel may conveniently be handled by your local sawmill whose business is the sawing of mining and pallet wood in mixed species and oak for fencing. Any quality logs will be accumulated by the mill for selling in to the merchant who specialises in sawing joinery and furniture wood.

A few larger hardwood mills have developed a complete marketing service; for in order to obtain any continuity of supply of quality logs for the sawmill they need to buy mixed parcels and sell off the lower grade wood to local mills. A parcel with quality trees will realise the best price sold this way to operators who know the full potential of the value of logs suitable for export veneers and quality sawmill production (see Table 5). The larger round timber merchants offer a similar service without operating a sawmill.

The larger operators offer assistance with applications for felling licences, and will organise the sale and contract details. This service, together with advice on suitable merchants to invite to tender, is available through selected land agents who have departments that specialise in handling timber.

Timber should normally be offered standing. Once it is felled there is no going back on the sale if the prices offered are not acceptable.

Damage to land, fences and other standing trees can be costly so it is important to select an operator who will adequately supervise the job and who has suitable and reliable tackle for handling the timber.

There is always a shortage of timber between October and January because of shooting. The best prices are paid early in the season.

Notes Giving Guidance on preparing for a Sale

1. The site
 - a. All underwood cleared (if not it can put 10-20 per cent on price offered).
 - b. Trees clearly numbered running along a hillside.
 - c. Area of felling and operation clearly marked.
 - d. Carefully prepared extraction route (good enough to take self-load wagons.)
 - e. Area for assembling logs (enables selection of logs for different markets).
2. The paperwork
 - a. Time allowed for tendering (minimum 4-6 weeks).
 - b. Clearly marked map.
 - c. Circulated information, to include:
 - i. numbers of trees per species (giving numbers where applicable);
 - ii. list trees by breast height quarter girth
 - Under 12 " q.g.
 - 12 "-18 " q.g.
 - 18 "-24 " q.g.
 - 24 " and up q.g.
 - iii. volume is not important — (can be misleading);
 - iv. clearance data negotiable — (not restrictive);
 - v. terms of contract set out clearly (keep to the minimum);
 - vi. terms of payment (if spread over contract period it will increase amount offered);
 - vii. photocopy of felling licence (becoming very important).
 - d. Keep to the tender date in order to avoid suspicion.
 - e. If extension to tender date is given, it must be given to all in writing and no tenders opened in advance.
 - f. Give quick answer once tenders are open.
 - g. Send the result of tender to all those participating without names against each amount.

Adding Value To Low Grade Timber

B. Porter
Woodland Owner

Abstract

The paper is an account of a small family forestry business in south-west England developed by a business executive with no previous forestry experience. Purchasing small woods and improving access and presentation proved to be a profitable formula on resale. Concentration on specialist markets such as sticks, poles and firewood also proved worthwhile. Attention to marketing and presentation paid off well by comparison with basic prices.

I want to give an account of a forestry business started 10 years ago in south-west England, and based on the ownership and exploitation of small woods for low grade timber. The enterprise is a family business, similar in many respects to a family farm but lacking agricultural land as all is under trees. Many farmers are wondering if forestry is a viable alternative for them, and I would like to think that my experience holds some lessons for them.

The business is based on ownership of two woods. I am not a forester by training or experience, but took economics at Bangor where conflicting opinions about forestry matters caught my interest. My career developed overseas working for Ford in marketing and business management. Training in marketing is important: few in the UK can tell one how to do it properly. A factory is quite useless without a good market.

I started off by spending a weekend with a forestry contracting friend, looking round various woods. I was fascinated by what I saw, and particularly interested that we import 90 per cent of our timber consumption. The first wood I purchased was a small 40 acre conifer wood in Devon, one-third Douglas fir, one-third larch, one-third Norway spruce, all 15-18 years old. This cost some £6,000 to buy: with assistance from friends it was brashed, roaded, drained and stacking areas provided to improve presentation of material for sale. This took 2 years following which it was sold for £20,000, which I assess at 55 per cent annual increase in value. Similar figures could be applied to the other woods in which we have been involved. We seek capital gain before operating profit, and usually any operating loss is recouped on resale.

The second wood, though broadleaved, was not purchased for commercial reasons, but rather because I wanted to live in a wood. It was situated on a chalk ridge at 700 ft in a windy exposed position. I had been advised that there was no money to be made from broadleaves. This wood was planted in 1910 with beech, some ash, and some sycamore. Part had been planted with Scots pine in the past, the rest under-planted with western red cedar, with assistance from Forestry Commission grant, but conifers clearly were not happy with either the chalk or the exposure, and had been largely felled or neglected. I concentrated on the broadleaves and worked towards a coppice with standards system. There was vigorous ash regeneration, with saplings wherever the sun broke through to the forest floor. In an area where this was already well established, and around 30 ft tall, we selected all the straight and clean trees for retention and coppiced the rest. On a small area this proved disastrous as the deer ate the coppice regrowth: the solution proved to be shoulder-high 'coppolarding'. Deer were able to graze the lower shoots but could not inhibit regrowth above 4 feet. This produced useful crops of sticks and poles and we began to develop markets for these products. In particular we achieved large orders for poles from nurseries for packing with fruit and ornamental trees, and were soon embarrassed by the level of orders. We also developed the stick market: ash proved to be saleable from finger-size upwards through material suitable for chair production to sawlog sizes. At the outset one man was producing daily some £50 worth of produce, whereas by last winter we had raised this figure to £110-£120 per man day. Next year we hope to reach £120-£130 per man day.

One has to be careful to ensure that this sort of operation remains profitable. It is only carried on for part of the year but for a 6-day week generates income at an annual rate of some £30,000. So broadleaves had proved more profitable than conifers, as a result of attaching importance to marketing and managing for what the public wants. For example, shaping of sticks proved costly and it was cheaper to grow to shape. As an illustration, a chestnut stick nipped with pliers before cutting, then cut, debarked and boiled can add three times to the value of the original article but requires little extra work. There is also scope for adding value if you do the retailing yourself: 15p worth in the wood can be £1.30 at ride side, £2.00 from a wholesaler, and £4.00 from a shop. A blackthorn stick will fetch \$60 in the United States as apposed to £16 in the UK; it is all a question of knowing your market.

An important by product of our coppicing operations proved to be firewood. At the time of the recent coal strike I bought a substantial quantity of thinnings and have Arthur Scargill to thank as a first rate firewood salesman. I was able to sell at 30 per cent above previous rates through concentrating on presentation. The majority of customers

wanted logs that looked good in the living room: logs personally tailored to their length requirements fetched a premium, as did seasoning. We sold £10,000 worth by word of mouth, and could, I believe, have sold as much as £40,000-£50,000 worth had we actively sought markets and had the wood to deliver.

Practical problems for farmers selling timber are that they do so infrequently, generally in small quantities, and frequently it is low value material. The profit lies in *marketing* of these inferior grades. There is never any difficulty in disposing of high quality material. In conclusion I hope that what I have said will encourage you to think that there is money to be made with a little effort.

Markets and Marketing - Joint Tenders

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Abstract

The United Kingdom is a major importer of wood and wood products with a thriving domestic wood products industry which supplies some 11 per cent of total consumption. The domestic industries are largely dependent on wood grown in this country and they have an excellent record of investment in expansion and modernisation against the background of an increasing wood supply. There are a variety of markets for wood, the principal ones being for sawmilling, pulp and paper and wood-based panels. The methods of marketing adopted by forest owners are influenced by the scale of forest ownership. In circumstances where the scale of ownership is small attention must be given to developing methods of marketing which reconcile the scale of wood production with the economies of scale in harvesting and the interests of the wood using industries in larger-scale purchasing. Schemes whereby a number of owners combine their sales in joint tenders have proved to be promising in developing such methods of marketing.

Introduction

The United Kingdom is a net importer of wood and wood products to the tune of some £3.9 billion a year. In terms of wood raw material equivalent, current annual consumption is 40 million m³ of which domestic production accounts for about 11 per cent. However, this figure disguises wide variations in the level of self sufficiency between different wood products. This is shown in Table 1 where the data refer to products which have their origins solely or mainly in British grown wood and exclude any domestic production based exclusively on imported pulp as is the case for example with some newsprint.

Table 1 *Self sufficiency in wood products in the United Kingdom*

Product	% self sufficient
Sawn softwood	17-18
for Mining Timber	100
for Pallets and Packaging	40
for Fencing	45
for Construction	6
Particleboard	30
as Medium Density Fibreboard	73
as Insulating Board	31
as Hardboard	8
Newsprint	10 rising to 14
Coated cartonboard	45
Chemical pulp	Nil

Wood Supply

Estimates of softwood production for Forestry Commission forests and those in private ownership indicate that the volume of wood which will be coming on to the market will double by the end of the century from its present level of 4.2 million m³ and will continue to increase well into the first half of the 21st century.

The position with regard to hardwoods is less easy to forecast because of the effect which complexities of management, ownership and environmental constraints have on what is a somewhat fragmented resource. A recent estimate suggests that annual removals up to the year 2020 are unlikely to change significantly from the present level of about one million cubic metres.

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The Wood Market

The major markets for wood are the industries which manufacture wood products. In Britain there are three main industry sectors — sawmilling, pulp and paper making and wood-based panel manufacture. For sawmilling, wood of larger diameter is preferred, whilst the other two sectors are able to use wood of smaller diameter as well as those wood residues which arise mainly from the production of sawn wood.

Throughout Britain there are some 400 sawmills using both softwood and hardwood timber. Collectively they are very significant consumers and use about 60 per cent of the total wood produced. In the pulp and paper sector there are two mills which process hardwoods and two processing softwoods. In the wood based panel sector there are six mills which process mainly softwoods and a smaller proportion of hardwoods. The scale of production at each plant in both these sectors is very large and these industries consume about 30 per cent of total wood production. There are a variety of other markets on a smaller-scale, including fuelwood, which account for the remaining 10 per cent of production.

The wood processing industry in Britain has an excellent record of new investment both on new sites and in the expansion and modernisation of existing plants. During the last 5 years, in the pulp and paper and wood-based panel sectors, new investments have been made totalling some £300 million. In sawmilling too there has been a consistent record of investment chiefly in the modernisation and expansion of existing mills. The result is that today the demand for wood of all categories is particularly strong and there is every evidence of continuing interest in further new investment as the supply of wood increases. Nevertheless manufacturers of wood products in this country face a very competitive market when the price leaders are overseas producers who supply the UK market.

Marketing in the Forestry Commission

The Forestry Commission sells timber by a variety of methods according to local circumstances and the needs of the market. Between 35 and 40 per cent is sold standing to timber merchants who arrange the felling and marketing of the trees. The balance is felled by the Forestry Commission and then either sold at roadside in the forest, as in the case of sawlogs, or delivered to the customer which is generally the practice for sales to industries using smaller diameter wood. There is however no hard and fast rule and a good deal depends on the requirements of the customers.

Industries using smaller diameter wood are large-scale consumers of wood and residues and their establishment has a far ranging effect in the market place. They require a high level of capital investment and are internationally mobile; that is to say it is necessary to compete with other countries to attract the project to the United Kingdom, for example the newsprint mill at Shotton. The timing and location of new investment is also critical to the orderly development of the market. It is for these reasons that the Forestry Commission often enters into long-term supply agreements.

The bulk of the wood supplied to those industries using smaller diameter wood is sold on long-term contracts. Because these industries require capital investment on a very large scale and because they are internationally mobile the assurance of a proportion of their wood supplies under such contracts has proved a significant factor in the decision of a number of companies to invest in this country. The length of contract varies but for pulp and paper board mills they are usually for 10 years with an option to renew. On the other hand in the wood-based panels industry, where residues form a significant proportion of the wood requirement, there is an advantage in a shorter contract period to allow a greater degree of flexibility so as to accommodate the more fluid wood supply position associated with wood residues.

In order to provide a degree of stability to the market place for both standing timber and sawlogs the Forestry Commission markets its timber at regular intervals throughout the year and there is now a well established pattern of auction sales which are interspersed by tenders.

The majority of sawlogs is classified for sale according to the system agreed with the timber merchants associations. The details are to be found in the Forestry Commission's booklet *Softwood sawlogs – presentation for sale*. This system classifies sawlogs, on the basis of size, straightness, and the extent of knots, into three grades — select, standard or merchantable. This system provides a good description of the article for sale and assists the timber merchant by providing a guide to the quality of timber on offer and hence the likely outturn after sawing.

Marketing in the Private Sector

Approximately 56 per cent of the woodlands in Britain are in private ownership but this varies between conifers at 42 per cent and broadleaves at 91 per cent. The total estate is spread over about 45,000 owners and represents a wide spectrum of ownership and interest. These range from the farm with small areas of woodland at one end of the scale to those estate owners with significant areas of woodland and owners who have become involved in forestry essentially as an investment through management companies. The private woodland owner is faced with marketing his timber from forests which are often relatively small and fragmented. The scale of operations will often not be sufficient to support full-time woodland staff or the machinery necessary to carry out the harvesting. Also, in timber crops harvesting occurs by thinning at intervals of 4-5 years, before the final felling. Thus in small ownerships the supply of wood for the market may not be on a regular annual pattern and the quantity of each lot offered may be comparatively small. These factors argue for selling timber standing but even then the size of lot offered as well as the extended interval between each offer may prove unattractive to the purchaser.

Timber sold standing is harvested and reaches the market through merchants who often have contracts with industrial users and who are able to combine purchases from a number of different owners, including the Forestry Commission. These merchants may themselves be timber consumers such as sawmillers who can utilise a proportion of the tree but who will sell on the pulpwood element. In the past year or two there has been an increase in the direct purchase of standing timber by industries using small diameter wood as they have sought to strengthen their supply arrangements in a situation where there is a strong demand for all types of timber. These companies sell on the sawlog element. Management companies are also active in the standing sales field. They supplement their harvesting and marketing operations on behalf of their clients by buying timber from other sources and in this way increase the scale of operations.

Following the Watson Report in 1956 on the marketing of woodland produce, a number of co-operatives were set up whose objectives were to assist the smaller owner manage his woodlands. These co-operatives employ professional staff and possess modern equipment which is contracted out to members. In addition they enter into contracts with bulk users of wood and arrange sales of smaller quantities of wood on behalf of owners and therefore they have the opportunity to combine small volumes of timber to produce attractive quantities for sale.

Joint Tender Schemes

The structure of harvesting and marketing operations in the private sector today is such that owners with reasonable quantities of fairly uniform quality timber should find ready buyers as a result of the strong demand from domestic industries. It is those owners with small parcels of timber who may still have difficulty in attracting buyers and achieving satisfactory sales.

It was to meet just these needs that joint tenders between the Forestry Commission and private owners were developed. The original idea came from the report of a working party set up by the Home Grown Timber Advisory Committee in 1975. The aim is to promote marketing in areas where woodlands in both private and Forestry Commission ownership are composed of small and fragmented areas where harvesting is on a small-scale. By co-ordinating sales of standing timber in both ownerships through joint tenders in a particular locality larger quantities of timber can be offered on a regular basis. The scheme was first adopted in the Home Counties in 1978 and has grown steadily ever since. There are now joint tender schemes covering the Chilterns, Berkshire/Surrey/Hants, Kent/Sussex, south-west England and north Wales. In each case they are organised jointly by the Forestry Commission and Timber Growers UK.

Experience has shown that the benefits of such schemes are:-

- a. stability for the merchant with the knowledge that a quantity of timber is likely to come on to the market annually in a particular area;
- b. assurance to the growers that a wide range of merchants are informed of the parcels being offered for sale;
- c. the opportunity for purchasers to achieve an acceptable scale of harvesting operations and timber sales.

Setting up a Joint Tender Scheme

The area over which a scheme can be operated will vary from region to region. Thus in south-east England it was found that 30-40 square miles was an area which could be effectively covered, whilst in the south-west a single scheme successfully operates throughout the entire region. Joint tender schemes are most effectively established by building on the sustained interest and support of owners who are having difficulty in selling timber. Timing is important of course, and the early part of the year is particularly important when selling 'white' hardwoods.

The Forestry Commission provides copies of its standard contracts which are easily modified to suit the needs of individual owners. In the initial stages of a new scheme the Commission undertakes to advertise and circulate details of each joint tender to potential purchasers and as the scheme develops this is then undertaken by Timber Growers UK for the owners concerned. However the final decision on which offer is to be accepted and the contract itself are entirely matters for the individual owners concerned.

For joint tenders to be successful there are a number of points which experience has shown are particularly important:

- a. tenders should seek to offer a reasonable volume in any one sale and at least 3 000 m³ is suggested as a minimum quantity. The tender should also avoid being dominated by one owner or by one or two large lots;
- b. each lot, which should be at least 100 m³ should consist of uniform crops as far as possible;
- c. owners should not use the scheme to sell only poor quality timber whilst selling the better quality timber elsewhere. If these joint tenders get the reputation of only consisting of wood of low quality they will quickly lose the interest and support of purchasers; once lost this support will be very difficult to win back;

d. a high and uniform standard of presentation of the sale particulars is essential. These should include as much detail about the crop as possible — species, volume, age, average tree size and average diameter at breast height. In addition other important features include: location with a map showing access; weight/width restrictions on roads/track/bridges; the period of the contract with starting and finishing date; any other constraints such as a restriction on fires or a requirement to dispose of lop and top. If access is over land or routes not controlled by the owner it is of paramount importance that the owner should ensure that all the necessary permissions are obtained so that the successful tenderer is not left to negotiate an access;

e. if low value stands are being offered it is seldom worth carrying out detailed volume measurement and alternative lower cost methods should be considered such as sale for a lump sum or sale by weight;

f. having decided to enter timber into a joint tender it is important not to withdraw the lot at a later date. Timber merchants are understandably disenchanted if they have to spend time inspecting and offering for timber only to find that the lot is removed or sold before the tenders are opened.

Conclusions

There is no doubt that in the past 5 years there has been increasing confidence in the timber industry in the United Kingdom, following a number of major expansions in the processing sector. The supply for timber, both sawlogs and small diameter wood will increase steadily in the future and the processing industry has established a strong base from which to expand and to consume this increasing quantity. It is important that timber marketing is developed in an orderly, regular manner and the Joint Tender Scheme can prove a valuable means of helping to achieve this and assisting the smaller owner to benefit from the strong and growing demand for timber.

References

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GB broadleaves production forecast 1981-2020. *Forestry and British Timber* June 1986.

Report of the Committee on Marketing of Woodland Produce. HMSO, 1956.

Discussion

Q: *Mr P Caton-O'Brady (Tree Trust)* — Why is it necessary to import low grade softwood from Russia to make secondary quality products such as farm sheds? Cannot British softwood cater for this market? Is it a matter of price, demand, quality or a combination?

A: *Mr G J Francis* — In a situation where homegrown timber supplies only a small proportion of the overall market it is imports which dictate the price regime, and meet surplus demand.

A: *Mr G Venables* — Homegrown material is able to meet structural quality standards: my company's softwood division is supplying homegrown sawn softwood for housing construction purposes.

Q: *Mr R T Gray (Institute of Chartered Foresters)* — What is the demand for good quality poplar peeler logs, particularly bearing in mind that poplar is a species which farmers might plant on suitable sites in the lowlands?

A: *Mr G Venables* — I see no market for poplar peeler logs - it would be more sensible to grow ash.

A: *Mr G J Francis* — Following the demise of the poplar matchwood industry, poplar now mainly sells into the firewood market and has no obvious future as a hardwood.

Q: *Mr J F Blyth (University of Edinburgh)* — Is there a case for considering quality Scots pine timber as an 'honorary' hardwood?

A: *Mr G Venables* — There is a good market for high quality Scots pine logs in small quantities.

Q: *Dr C Lukehurst (Countryside Research Unit, Brighton Polytechnic)* — Sycamore appears to grow with great rapidity and is ubiquitously distributed. Is there any possibility of capitalising upon its rampant growth rate for commercial purposes?

- Q:** *Mr G Venables* — Sycamore is coming back into favour, since introduction of a new polish which prevents discoloration. Small sizes could be used for things like bread boards.
- Q:** *Mr J Fletcher (Forestry Commission)* — What is the overall potential for expansion of added value markets for low grade hardwoods?
- A:** *Mr Porter* — I managed to sell 10 000 m³ of firewood within a 7 mile radius in a single year. The secret with low value products is to market intensively in a small area.
- Q:** *Mr B Howell (Abbey Forestry)* — Timber transport is a major consideration: should British Rail not be encouraged in taking a more positive attitude?
- A:** *Mr G Venables* — We might consider export of logs to the continent by rail.
- Q:** *Mr R T Gray (Institute of Chartered Foresters)* — Is there any hope of improved markets for low grade oak?
- A:** *Mr G Venables* — I see no prospect of a better market in the foreseeable future. The mining industry is not keen on oak. Restoration of timber buildings might offer limited scope.
- Q:** *Mr J Kreysa (European Commission)* — Do you think it is possible to produce wood economically in the UK, and sell it to large scale consumers at a competitive world market price?
- A:** *Mr G J Francis* — Recent heavy capital investment in the processing industry is one measure of producers' confidence on this score.
- A:** *Mr G Venables* — British growers are assured of a market, but will have to compete against internationally determined prices.
- Q:** *Mr J Wall (European Commission)* — I support Gwyn Francis in emphasising the importance of scale in wood markets and the fact that 90 per cent of UK timber consumption is bought by large scale buyers. This emphasises the importance of the scale of production required if large total areas of land surplus to agriculture are to be transferred to forestry. Such large areas will require careful planning and analysis, but given that most will come from relatively good quality farm land, the farmers concerned will require interim income of some kind. This conference has not addressed the question of how to provide this but it will be one of the major concerns of the EC farm forestry conference which is scheduled for next spring (probably in April or May 1987*.)

* *In the event postponed.*

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