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REFEREED PAPER

THE HIDDEN COSTS OF LANDSCAPE CONSERVATION IN ENGLAND[1]

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This paper examines the extent of management of features that contribute to the character and appearance of the landscape that farmers in England carry out both voluntarily and under agri-environment schemes. Data on landscape management were collected before the Environmental Stewardship Scheme and the cross-compliance requirements of the Single Payment Scheme began to impact. It was estimated that 90% of farmers spend time on at least one landscape management operation, with most effort being uncompensated by agri-environment schemes. The average English farm business, in 2004/05, is estimated to devote £1,260 worth of labour to uncompensated landscape work, this equating to £215 millions at the national level.

Keywords: Farm landscape management; Voluntary conservation work; Agri-environment schemes.

Introduction and objectives

It could be argued that farmers and landowners perform few, if any, tasks that could be said to improve the visual aspect of the landscape within the farmed environment without being paid to do so. This is because considerable numbers of farmers have entered the various agri-environment schemes made available under the Department for Environment, Food and Rural Affairs' (Defra) England Rural Development Programme such as the Countryside Stewardship Scheme or the Environmentally Sensitive Areas Scheme. These schemes are being replaced by the Environmental Stewardship Scheme, which was launched on 3 March 2005. There are now over 2.7m ha of land covered by more than 21,000 live Environmental Stewardship Scheme agreements, approximately 25% of the farmland in England (Defra, 2006a). The target set by Defra is for a 70% uptake of the Entry Level Scheme on farmland in the lowlands, with an even higher figure for the Less Favoured Areas to be entered into the Environmental Stewardship Scheme by the end of 2007 together with the Higher Level Scheme. This phenomenon is intended to make an increasingly positive contribution toward the UK's objective of meeting its farmland birds, Site of Special Scientific Interest and Biodiversity Action Plan targets (RSPB, 2006).

However, it is also equally believed that farmers and landowners often perform operations on their holdings that improve the visual aspect of the landscape and that these operations are conducted entirely without recompense under any environmental or landscape scheme (Gilder, 1987; McInerney *et al.*, 2000). It has been shown over a period of many years that some farmers are especially interested in conservation in general and that good practice in this respect is an important goal behind their behaviour (see, for instance, Gasson, 1973; Gasson and Potter, 1988; Beedell and Rehman, 1999; and Beedell and

1. An earlier version of this paper was a Contributed Paper at the 2006 Annual Conference of the Institute of Agricutural Management and the British Institute of Agricultural Consultants, 15-16 November 2006, Basingstoke.

Rehman, 2000).

For some 10 years or so, policy makers have recognised what they have termed the 'multifunctional nature of Europe's agriculture' and the part this plays in the rural economy, the environment and the landscape (Commission, 1997; OECD, 2000). Such public goods, such as the provision of landscape and wildlife habitat by farmers, have had, in more recent times, some recompense through agri-environment schemes, but much provision still goes uncompensated. This phenomenon has also attracted the attention of agricultural economists who have started to attempt to value the provision of such public goods and to discuss the issue of the supply of these goods and the slope and position of the supply curve (e.g. Swinbank and Tranter, 2004; Swinbank, 2002; Randall, 2002). Efforts in this regard have been hampered by the fact that there has been very little data available on the quantity of such public goods that farmers will supply in the absence of payment. As a result, the main thrust of the original research that led to this paper was to establish, empirically, the extent to which such operations are performed and to calculate, if possible, a monetary value for those operations which presently go uncompensated. Thus, the joint objectives of the research were:

- to discover what type of landscape management operations were regularly carried out by farmers and how much time was committed by them to those operations; and to

- quantify how much of the landscape management operations carried out were compensated by farmers' membership of environmental schemes and, by extension, how much work is carried out at the individual farmer's own expense.

The research was conducted during 2005-06 on behalf of the Campaign to Protect Rural England (CPRE) and the National Farmers' Union (NFU); full details are provided by Jones *et al*. (2006).

Research materials, method and sample characteristics

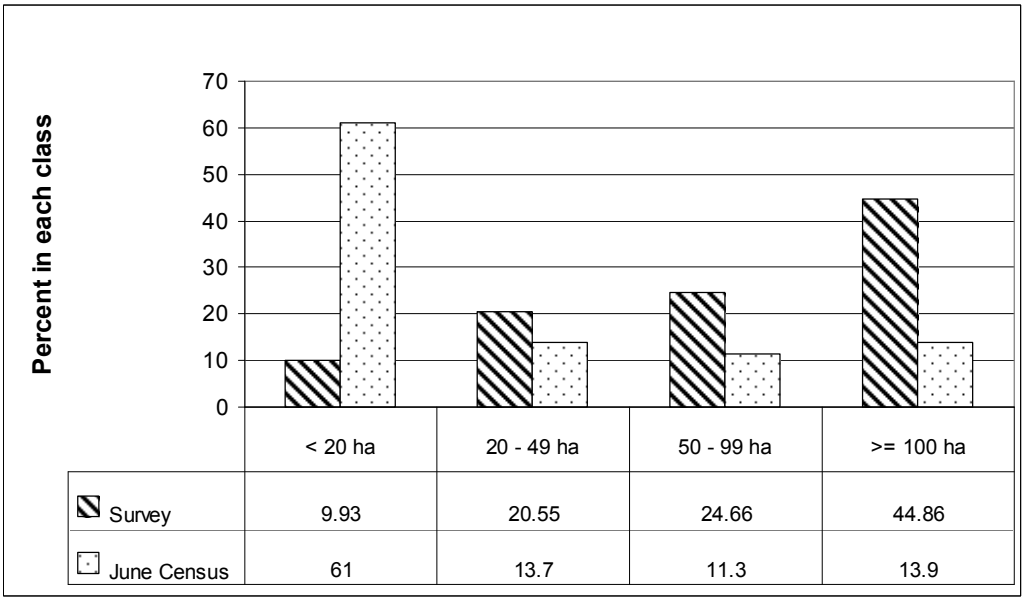
The research was based on data collected from farmers by a questionnaire sent to a randomly selected sample of 2084 NFU members throughout England, representing all farming sectors. The questionnaires were sent out on 26 and 27 May 2005 by the NFU, with a covering letter from the NFU President and the Chief Executive of the CPRE, explaining the purpose of the research. The first response was received on 3 June 2005 and the sample was closed on 13 September 2005. One reminder letter was sent out. The final response rate was 16.8% (355 clean questionnaires). This response rate is somewhat low for postal surveys of this kind but it is, perhaps, understandable in view of the fact that data collection not only took place in the summer, this was also a particularly difficult time for many farmers, coinciding as it did, with the implementation of the Single Farm Payment Scheme.

Respondents returned their questionnaires directly to the NFU to ensure complete confidentiality concerning identity. The NFU then forwarded anonymised questionnaires to the authors for analysis, together with the

addition of basic demographic and farm structure data extracted from the NFU's own membership database.

To test sample representativeness, the distribution of farms over size and farm type categories was compared with the distribution seen in official statistics. As might have been expected, there is some under-representation in the number of farms in the smallest size category and some over-representation in the number in the largest size category (see Figure 1). Medium-sized farms are relatively well represented. Under-representation of smaller farms is a common problem with farm surveys, as smaller farms are much more likely than larger ones to slip through the sampler's net for a number of reasons[2] and, as there is also greater pressure on labour resources on these small farms, surveys and other 'non-essentials' are often just ignored by the farmers.

Figure 1. Comparison of survey respondents' and Defra June Census farm size distributions



To examine the representativeness of the sectoral coverage of the sample respondents, a classification of survey farms was created on the basis of predominant enterprise to approximate to the Defra Robust Farm Type Methodology. The predominant enterprise was identified on the basis of the Standard Gross Margin contribution of each enterprise to the farm total. Standard Gross Margin estimates for each farm enterprise were derived from Nix (2005). As Table 1 shows, the sample is under-represented in terms of the 'Other' farm type category and over-represented in terms of 'Cereals' farms. This effect is linked with the farm size issue, as the under-representation of farms classified as 'Other' is largely due to the absence of smaller farms which

2. Some of these reasons are that: there is often no record of the existence of these farms in telephone and business directories; and these businesses are often managed on a part-time basis by new entrants to farming and are, therefore, less embedded in the rural support infrastructure, such as trade associations, consultancy and advice services etc.

would tend to fall into this category by virtue of their irregular farm management approaches and enterprises, especially where horses are the dominant enterprise. Conversely, cereal farms tend to be larger on average than other farm types. It should also be mentioned here that NFU members might be different from the population of farmers at large in terms of a wide range of farmer and farm characteristics. No definitive figures are available to prove this but, anecdotally, it is believed that NFU members are more likely to be owner-occupiers and to have large farm businesses than the norm.

Table 1. The farm type classes of the survey respondents compared with official national figures

Farm type	Number of survey farms	Percent of survey farms in each farm type category	Actual distribution of farm types as reported in the 2003 June Census (%)
Cereals	107	39.1	11.3
General arable	28	10.2	4.9
Horticulture	4	1.5	5.1
Dairy	37	13.5	7.6
Lowland livestock	37	13.5	18.0
Upland livestock	17	6.2	6.3
Mixed	28	10.2	5.5
Pig and poultry	15	5.5	3.7
Other	1	0.4	37.6

These comparisons reveal that some steps will have to be taken to ensure that the sample data are representative when raising results to the national level. In the results presented below, this has been achieved by, first, estimating results for the different farm size categories separately and, then, weighting these according to their June Census distribution. Because of the interlinking of the size and farm type dimensions, the steps taken to overcome the size bias may be expected to have, to a great extent, simultaneously dealt with the bias in the distribution of farm types. Assuming that farmers in each of the size categories are representative of the populations from which they are drawn, then this weighting should correct the sample representativeness of a whole raft of farm and farmer attributes, including farmer attitudes, where these may differ according to farm size.

Farmers were asked whether they were in receipt of farming subsidy payments before 1 January 2005, that is, before the introduction of the SFP in England. Most respondents (82%) were, with the remaining respondents engaging in agricultural or animal husbandry activities in unsupported sectors of one type or another.

Table 2 reveals that, at the time of survey, the rate of agri-environment scheme membership varies quite considerably between regions, with relatively few farms in schemes in the West Midlands and the North East, and higher rates, around a third of farms, in the South East and South West of England.

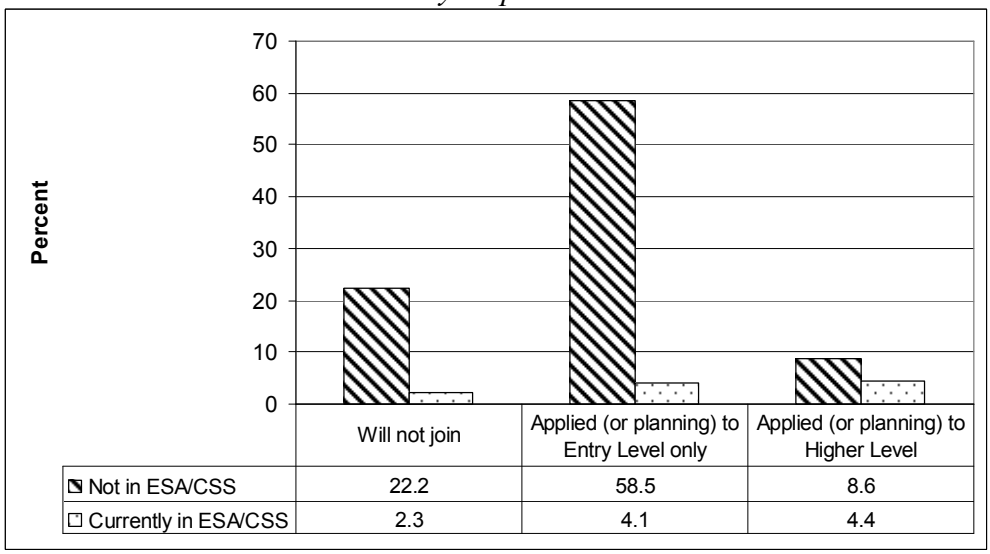
Table 2. The incidence of agri-environment scheme membership among survey farms and their use of labour for these purposes

Government Office Regions	Proportion of survey farms in agri -environment schemes (%)	Av. hours managing landscape under schemes (hours/farm/ year)
East Midlands	19.1	258.3
Eastern England	20.3	317.8
North East	12.5	120.0
North West	25.0	222.2
South East	29.3	146.1
South West	33.0	162.3
West Midlands	12.1	53.8
Yorkshire & Humberside	17.1	249.8

Larger farms were much more likely to be in agri-environment schemes and the rate of membership among the smallest class was very low nationally.

Most respondents (67% of those not currently in ESA or CSS) stated that they had applied, or intended to join, the whole farm 'broad and shallow' Entry Level Scheme options of the Environmental Stewardship Scheme (see Figure 2) with very few advising that they either had, or were, considering applying to enter the Higher Level Scheme (13% of all respondents). Current agri-environment scheme membership significantly affects the pattern of response to the question of ESS membership, with few farmers already in schemes looking to join the ESS. However, since the research was conducted, Defra have relaxed the stipulation that required those already in the Countryside Stewardship Scheme or the Environmentally Sensitive Area

Figure 2. Applications to the Environmental Stewardship Scheme by survey respondents



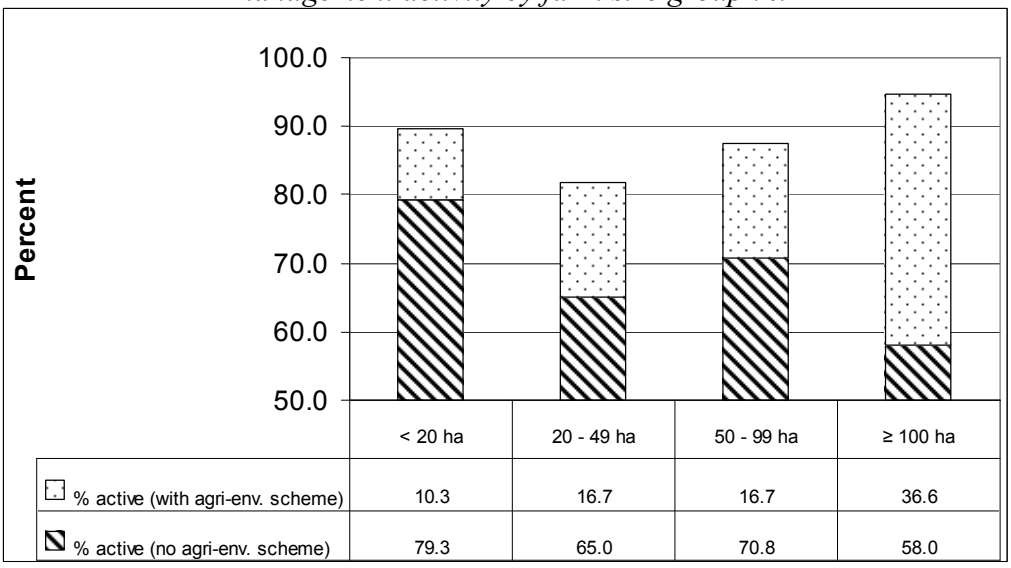
Scheme to complete the remaining term of their current agreements before applying for support under the Higher Level Scheme and 'switching' from CSS and ESA to HLS before the end of the present agreement is now permissible. Of those who stated that they will not join Environmental Stewardship at any level, 64% were in receipt of Pillar I subsidy payments. For these, refusal to join at least the Entry Level Scheme would appear at first sight, in view of the likely increased modulation of Pillar I payments in the future, to be an irrational decision unless these farmers are intending to offset the effects of modulation and degressivity by some other means, e.g. the sale or lease of their holding, diversification into non-agricultural uses, or intensification of existing agricultural production.

Results

The survey revealed that over 90% of respondents carry out some measure of landscape management already, whether within the terms of an agri-environment scheme, or not. As Figure 3 shows, there is only modest variation in this activity rate between farm size groups, with no obvious size-related trend. However, in the largest farm size class, much more agri-environment scheme activity was shown.

Figure 4 shows that there is only minor variation in landscape management activity over farm types, with the highest recorded rate observed for dairy

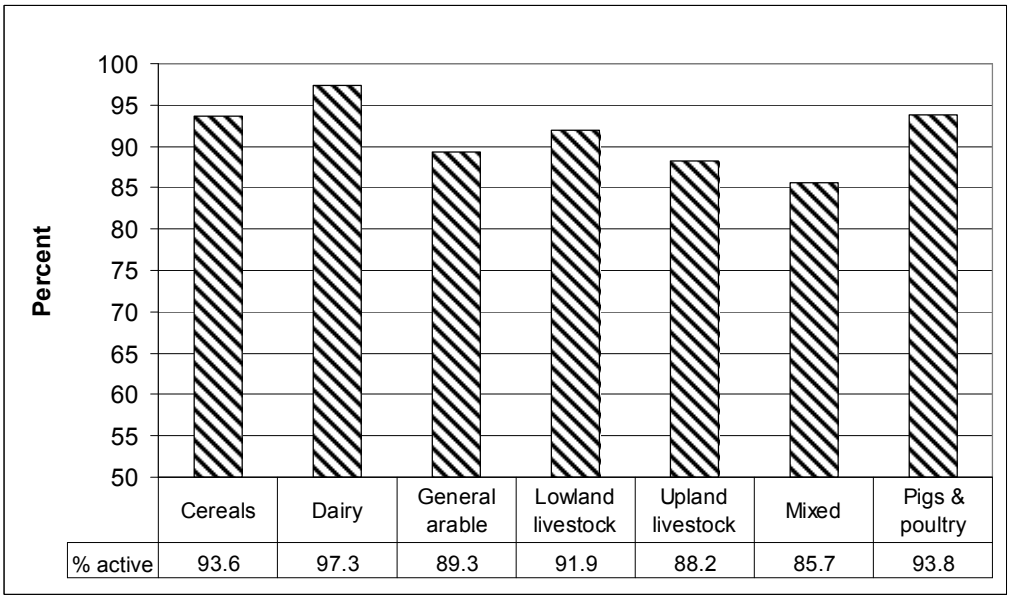
Figure 3. Proportion of survey farmers reporting some landscape management activity by farm size group %.



farms and the lowest for mixed farms. This result implies that farmers operating more intensive and specialist farms value landscape management activity as highly, compared to other farming goals, as their non-specialist counterparts. Operators of non-specialist and mixed farms might be perceived as being more conservation minded, by virtue of their adoption of farming systems that are widely regarded as more environmentally benign than specialised systems. Respondents were asked to state what landscape features

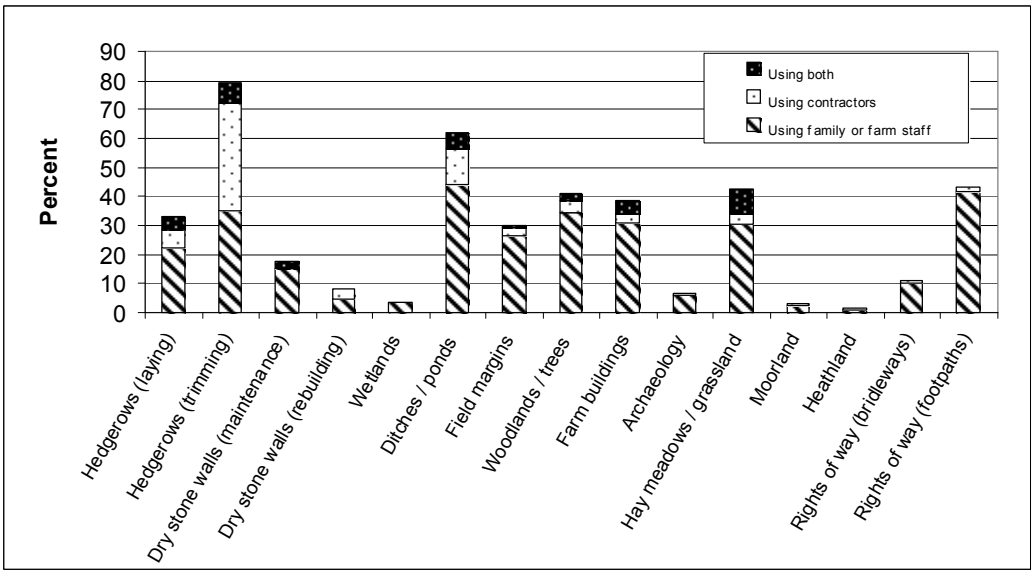
they managed, irrespective of whether they were compensated for doing so. Figure 5 reveals that the four most widely undertaken operations were

Figure 4. Proportion of survey farmers reporting some landscape management activity by farm type %.



hedgerow trimming, followed by maintenance of ditches and ponds, managing hay meadows[3] and footpath maintenance. Other management activities such as dry-stone walling and maintenance of lowland heath or upland moor, while environmentally important, are of more local, regional provenance and thus do

Figure 5. Proportion of respondents who manage countryside features (%)



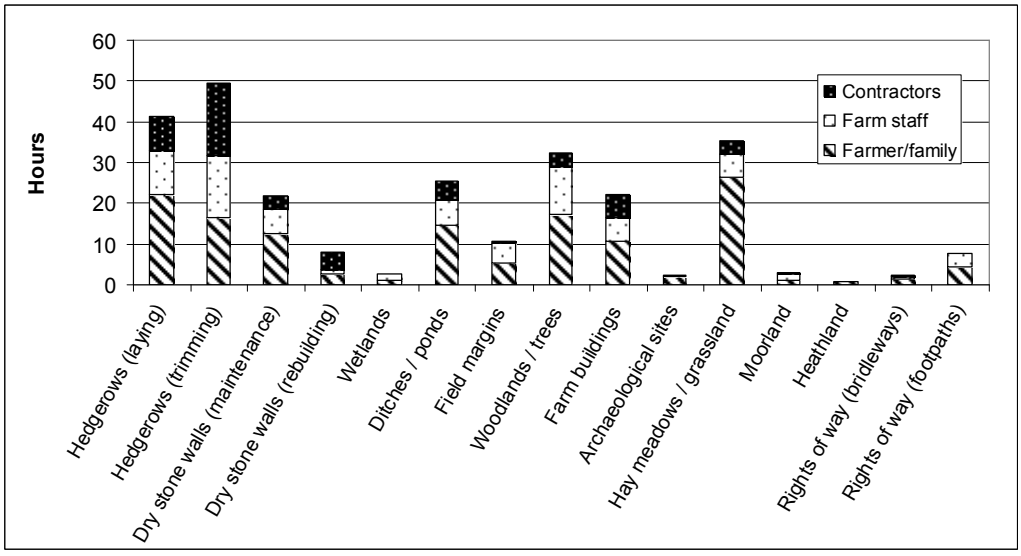
3. Management of hay meadows includes mowing, baling and tedding.

not feature so prominently in the national analysis reported here.

Whilst there appears to be no major undersupply of skills available in the immediate proximity of farms for many of our respondents, the survey revealed that there does appear to be something of a shortage of local craftsmen available for specialist tasks such as work on old farm buildings and dry stone walls even in those areas of England where these features are most often found.

In addition to identifying the range of farmers' countryside management operations, the survey also established the amount of effort (i.e. labour and contractor[4] hours) expended on each of these operations, both compensated by agri-environment schemes and uncompensated. The results reveal that, taking both these types of countryside management operations together, hedge trimming and laying are the major consumers of labour resources (see Figure 6).

Figure 6. Amount of time spent each year, on average, managing countryside features (compensated and uncompensated farm labour plus contractors hours, both within and outside agri-environment schemes)



Management of footpaths and bridleways, which have a high frequency of occurrence, is less important in terms of labour and contractor use than operations directed at management and/or maintenance of farm buildings, or woodland and tree management. Maintenance of these two types of public rights of way also requires relatively light use of contractors. Another labour and contractor intensive operation would appear to be the management of hay meadows. However, this result needs to be treated with a degree of caution, as it is not entirely clear from the responses whether this particular management task should be considered as conservation activity in the same way as the others are. This was intended to capture the management of traditional, low-fertility, species-rich, hay meadows and it is possible that the term 'hay meadow' has been interpreted by some respondents to mean any grassland

4. Contractor costs are the 'actual' rates derived from the survey and are 'whole costs', i.e. they include machinery costs.

from which a grass crop of any type is taken. In view of this, it would, perhaps, be safer to define this activity simply as management of 'grassland'.

There is some variation in activities which make the biggest management demands by farm type, with hedge laying and trimming, ditch and pond maintenance and hay meadow management more common on lowland farm types, while the maintenance and re-building of stone walls were the most important activities, followed by hay meadow management and work on farm buildings, on upland livestock farms. An average of 264.6 hours of work was devoted to landscape management, by all types of labour, on sample farms.

Table 3 shows the proportion of total landscape management work, labour and contractor hours, committed on respondents' farms that is uncompensated i.e. not managed under an agri-environment scheme agreement. This

Table 3. Time (hours) spent managing landscape features (both uncompensated and compensated under environment schemes), together with the proportion (%) of this that is compensated plus comparison with data from an earlier survey

	Total hours worked (both farm labour and contractors)	Environment schemes from: this survey	Environment schemes from: a previous survey[1]
Hedgerows (laying)	41.1	29	n.a.
Hedgerows (trimming)	49.6	16	11
Dry stone walls (maintenance)	21.8	14	17
Dry stone walls (rebuilding)	7.8	37	n.a.
Wetlands	2.7	12	n.a.
Ditches / ponds	25.3	6	8[2]
Field margins	10.6	24	n.a.
Woodlands / trees	32.4	5	4[3]
Farm buildings	22.0	4	4
Archaeological sites	2.4	0	n.a.
Hay meadows	35.3	17	n.a.
Moorland	2.9	37	n.a.
Heathland	0.8	57	n.a.
Rights of way (bridleways)	2.3	5	n.a.
Rights of way (footpaths)	7.6	4	10[4]
Total	264.6		

1.Results represent the proportion of landscape management activities which are associated with agri-environment schemes , and with maintenance activities, but not capital expenditures (McInerney *et al.*, 2000).
2. Ponds only.
3. Casual tree planting.
4. Footpaths and bridleways.

proportion varies considerably between activities, to some extent reflecting the possibilities for support for each under the CSS and ESA schemes (ESA management options vary between the 22 schemes). The highest proportion of work undertaken under agri-environment schemes is seen for activities such as dry stone wall maintenance and heathland management and, to a lesser extent, hedgerow laying. Smaller amounts of compensated work are involved for the activities of maintenance of ditches and ponds, protection of archaeological features and maintenance of woodlands and rights of way. It is instructive to observe that management operations with low potential for compensation from the public purse are by no means the least widely carried out and, indeed, some (e.g. hedgerow trimming and ditch and pond management) are among the heaviest users of labour. Table 3 also shows similar estimates taken from McInerney *et al.* (2000) where appropriate comparison can be made. Comparison of the two data sources reveals that the amount of time spent managing landscape features under agri-environment schemes, as a proportion of total time committed, has not changed very much in the last 5 years in spite of an increase in the number of scheme agreements. This, tantalisingly, suggests a general increase in the amount of environmental management undertaken on farms, perhaps as a consequence of the increasing environmental awareness of farmers.

Deducting hours committed to landscape management under agri-environment schemes leaves the uncompensated body of work. Deducting from this, the hours carried out by contractors leaves the body of uncompensated labour carried out by unpaid family and paid farm staff. For simplicity, we assumed that the ratio of the various types of farm labour deployed does not vary between compensated and uncompensated activity within the same landscape management operation. As no costs are available from the survey for farm labour, it has been necessary to apply a representative wage rate in order to estimate the cost of uncompensated farm labour effort. A variety of published wage rate data were available, produced by different institutions for different purposes and accounting for a variety of labour types and categories of labour costs. For these purposes, an appropriate wage rate was derived from the Defra Earnings and Hours Survey (Defra, 2005a). In the calculations it was assumed that all farm labour effort on landscape management was fully charged. In reality, some of these costs will not have been charged against the farm business i.e. they will have been counted as unpaid farmer and family labour. However, it needs to be recognised that such labour does have an opportunity cost.

According to the Defra Earnings and Hours Survey (Defra, 2005a), the average hourly rate of pay, averaged over all grades of permanent (sometimes described as 'regular') agricultural worker, both male and female, for the 12 months to January 2005, was £6.72[5]. Contractor costs were provided by the survey for each type of landscape management activity.

In view of the skewed size distribution of the sample, together with the survey finding that rates of labour effort expended on landscape management decline on a per ha basis as farm size increases, it was necessary to adjust the sample estimates of average whole-farm labour and contractor costs on the

5. This figure represents gross pay, including overtime and holiday pay, but does not include Employer's National Insurance Contribution (NIC) or Employer's Liability Insurance (ELI). Nix (2005) assumes NIC and ELI to amount to an additional 14% on top of basic salary payments.

basis of the true size distribution, before the figures could be raised to the national level (England). This was done by calculating the average whole-farm cost of uncompensated labour and contractors for the farms in each size group separately, then weighting each of the whole-farm values by the number of holdings in each size class, as revealed in the June 2003 Census (Defra, 2005b). This calculation is shown in Table 4.

After adjusting for the unrepresentativeness of the sample farm size distribution, the average cost of uncompensated labour and contractors is

Table 4. Calculation of a weighted national average cost of uncompensated labour and contractors per farm, based on Defra labour rates

Farm size group	(A) Cost of uncompensated labour - all sources[1] (£/farm)	(B) Number of holdings in 2003 June Census ('000)	(A * B)
< 20 ha	836.2	114.7	95916.14
20 – 49 ha	1681.1	25.8	43372.38
50 – 99 ha	1596.0	21.2	33835.20
≥ 100 ha	2426.3	26.2	63569.06
Total		187.9 (C)	236692.78 (D)
True labour and contractors cost per farm (D / C)			£ 1259.67

1. Estimated cost of paid and unpaid labour plus contractors costs.

revealed as £1,259.67 per farm per annum. Raising these costs to the national level is simply a matter of multiplying the average whole farm cost by the number of farms in England. Unfortunately, official data is only for 'holdings' and farm businesses can contain more than one holding.

No recent official published data exist on the number of holdings on farm businesses, but the authors' own analysis of data from the Farm Business Survey for 2003 suggests that the average farm business is made up of around 1.1 holdings. This implies that a maximum of one in ten farms in the Farm Business Survey are multiple holdings, although the actual rate will be slightly less than this as some of these 'multiples' will be made up of more than two holdings. This estimate equates fairly closely with an estimate provided by MAFF, and quoted by McInerney *et al*. (2000), that one in eight farm businesses recorded in the June Census were made up of multiple holdings. As there were 187,900 holdings of all sizes in England in 2003, this suggests there are 170,818 farm businesses. From this, the farming industry's voluntary, uncompensated labour contribution to the environment each year in England can be calculated at £215m, before other inputs, such as machinery, are

considered.

Table 5 shows how this national total cost is distributed over the various landscape management tasks. As can be seen, more than a fifth of this total is dedicated to hay meadow management, ahead of hedgerow trimming, which is ranked second. Hay meadow management does not, in fact, incur the largest

Table 5. Estimated value of uncompensated labour and contractor time spent on each landscape management task for England

	£m
Hay meadows/grassland	45.3
Hedgerows (trimming)	42.3
Hedgerows (laying)	20.7
Ditches / ponds	24.8
Farm buildings	24.4
Woodlands / trees	22.6
Dry stone walls (maintenance)	11.4
Field margins	7.3
Dry stone walls (rebuilding)	5.6
Rights of way (footpaths)	5.9
Archaeological sites	1.6
Moorland	1.0
Rights of way (bridleways)	1.2
Wetlands	0.9
Heathland	0.2
Total[1]	215.2

1. Column may not sum to the total due to rounding error.

average labour time expenditures per farm (which is for hedgerow trimming) but, when aggregating to the national level, the importance of hay meadow management increases, due to the predominance of this category of work on very small farms (i.e. farms of less than 20 ha) and the numerical preponderance of this class.

Discussion and conclusions

Opportunities for compensation under agri-environment schemes do not seem to determine which landscape management operations are most commonly carried out, or the amount of time devoted to them, as the most commonly reported activities have high rates of voluntary participation by farmers. This fact strongly suggests that public funding is not driving the pattern of landscape management carried out on farms, at least not at present. This pattern may, of course, change to some extent with the introduction of the new ESS.

The greater part of the work time allocated to landscape management is derived from family and farm labour, but there is significant use of contractors for particular management operations, particularly those requiring specialist skills or equipment, for example, modern hedgerow trimmers and excavators for drainage and ditching work. The extensive use of contractors, at a considerable cost, implies that these landscape management operations are not simply an afterthought, or a way of putting slack farm labour to work during quiet periods but, rather, they probably represent effort that farmers see as making an important contribution to their farming goals with these, in turn, possibly being derived from pro-environmental attitudes, values and emotional feelings of duty and care. However, it should not be forgotten that this recent landscape management activity has been carried out over a period of great financial, institutional and policy change for English farmers which has necessitated much social and structural adaptation. In its wake, Lobley *et al.* (2005) have shown that much stress has been caused to farm families.

The research reported here showed that the expenditure incurred annually by English farmers on landscape management that goes uncompensated appears to exceed £215m, which is 132% of the total agri-environment funding in 2004 of £163m. Looking at the landscape management operations being reported in the survey, it is impossible to presume that these are to any great extent being driven by financial incentives, or by regulatory action. This leads to the obvious conclusion that farmers are voluntarily contributing to the public good as a consequence of their own goals and motivations and that the value of this to society, in monetary terms in 2004, was more than the total public expenditure on environmental improvements under the Rural Development Regulation during that same year. Clearly, why farmers are doing this is an issue worthy of further investigation.

The cost of labour (both paid and unpaid) and the hire of contractors would not be the only expenditures incurred by farmers as a consequence of their voluntary landscape management activities. There would, in addition, be use of tractors and other farm equipment as well as fuels and materials of many kinds. For maintenance activities alone (not capital expenditures), McInerney *et al.* (2000) estimate labour and contract costs at some 69% of total costs, meaning that the labour and contractor cost totals reported here would need to be increased by 45% to reflect total costs. It should also be pointed out that, in addition to these expenditures, which contribute little or nothing to agricultural returns, additional financial losses may also be incurred as a consequence of these landscape management activities, in the form of the opportunity costs where labour, capital and land have been re-deployed away from income-

generating farming activities. Assuming that these labour resources cold be put to productive use, on an opportunity cost basis, losses to agriculture as a consequence of landscape management activities may be as much as double the incurred costs reported here.

The choice and scale of landscape management work is not, to a large extent, being determined by the availability of public funding. Rather, it is made possible by the availability of other revenue sources, including enterprise margins and direct payments from the European Union's Pillar I and the willingness of farmers to transfer money from these sources. This evidence, that farmers are already transferring such large sums from their farm incomes to landscape conservation, raises a number of interesting questions. First, 'will landscape management work on this scale be maintained if farm incomes decline?' The obvious suggestion is that, if farm incomes (from whatever sources) decline, resources committed to landscape management will also decline, if they are not replaced *pro rata* by agri-environment scheme spending.

Second, 'how likely are farm incomes to decline?' This is a contentious issue, with differences of opinion on all sides. The CPRE & NFU (2006), for example, argue that proposed cuts in direct subsidies already in the pipeline through the recent CAP reform will depress farm incomes to the extent that negative effects on landscape management will be felt[6]. Of course, this view runs counter to the official Defra line (Defra & H M Treasury, 2005), which argues that loss of support will, in turn, put downward pressure on costs and farm asset values (particularly land), and that farm incomes will then quickly recover. They cite recent examples of cuts in income support from New Zealand, Canada, Australia, South Africa and Sweden and what then happened as examples backing their case.

The reasonableness of the Defra position depends largely on the assumption that the cost of agricultural assets, particularly land, will fall. Current official land market statistics are unreliable indicators, as these relate to the period around the implementation of the Single Farm Payment, at which time the number of land sales was down considerably from recent years. However, largely anecdotal evidence suggests that the recent increased volume of land sales has been accompanied by firm, if not rising, land prices due to scarcity of supply and high demand, particularly from people outside farming.

Third, 'if incomes do decline, will increased spending through agri-environment schemes compensate for lost voluntary investment in landscape management?' A significant proportion of the cuts in direct income would be due to national modulation, where the monies would be transferred into agri-environment schemes, such as the ELS. Therefore, the answer to the question will depend on

- the scale of the cut back in voluntary investment in landscape management and
- the size of agri-environment spend.

6. It might also be argued that significant further declines in NFI might bring some environmental benefits by, for example, reducing the incentive for intensive cultivation of marginal land and limiting land reclamation.

Using 2004 data as a reference, it can be conservatively assumed that a 25% reduction in voluntary landscape management activity would amount to a loss of investment of around £50m in England. Assuming that around half of ESS spending relates to landscape management activities, then ESS spending would have to increase by £100m just to achieve parity. Defra are assuming that *total* ELS spend by 2008/9 will be around £190 millions (Defra and H M Treasury, 2005). The size of the voluntary investment in landscape management relative to agri-environment scheme spending on the same tasks, suggests that even modest percentage declines in the former would not, on the basis of current spending plans, be compensated for by the latter.

Fourth, 'if farm incomes don't decline, will the ELS add to the body of landscape management work carried out and, if so, by how much?' The jury is still out on this, but a recently released statement from Defra (Defra, 2006b), based on an interim assessment of the ELS (the full report is due in June 2007) suggests that 60% of farm conservation work carried out under the Scheme (this would also include work other than on landscape management) was already being done before entry into the Scheme. This echoes the twelve year old findings of Morris and Potter (1995) who found that there was a core of farmers who were largely motivated by conservation issues and not just the financial position of their businesses.

Finally, our conclusions and main findings can be summarised as:

- some 90% of farmers surveyed reported that they expend time on at least one landscape management operation, of which between 71% (hedgelaying) and 100% (archaeological sites) is uncompensated;

- the activities most frequently undertaken by respondents were hedgerow management, ditching, hay meadow/grassland operations and rights of way maintenance;

- most landscape management operations were undertaken by family or direct farm labour;

- around 80% of landscape management work was uncompensated and this figure was fairly consistent over farm size and farm type categories;

- there appeared to be no major undersupply of key landscape management skills within 10 miles or so of most farms with the likely exceptions of dry-stone wallers and specialist builders;

- and the average annual cost per farm business for uncompensated works was calculated to be in the region of £1,260.

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