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**The Role of Environmental Payments in Sustaining Farm Incomes: A
Four Year Study of Farm Businesses in an Upland Area of the UK**

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**THE ROLE OF ENVIRONMENTAL PAYMENTS IN SUSTAINING FARM
INCOMES: A FOUR YEAR STUDY OF FARM BUSINESSES IN AN UPLAND
AREA OF THE UK.**

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Abstract

A representative sample of both participant and non-participant case study farms was examined over a three-year period in the Shropshire Hills Environmentally Sensitive Area of the UK from 1997 to 2000. The effects on farm business viability were monitored and results compared with two relevant sub samples of Farm Business Survey recorded farms. The study showed that farming profitability declined sharply over the study period but that participant case study farm profitability exceeded that of non-participants by an average of £4024 per year. This was attributable to a combination of factors which included larger average farm size, the ESA premium and more intensive farming operations.

Subsidies received by both types of farms were almost totally on the 'per head' basis and averaged £270 per hectare. Without these both classes of farms would have been highly unprofitable. The status of the ESA premium compared with these figures was an average of 4.5 percent of business turnover or £2358 per farm, well below that of headage based subsidies. Return on capital invested in land was consistently low, suggesting that even with these levels of subsidies the long-term future of these farms could be uncertain. The results achieved were consistent with those obtained from the Farm Business Survey data provided for the two relevant sub-samples.

1. Background

The UK Agriculture Act of 1986 and EU regulation 2078/92 together provided the basis for the establishment of Environmentally Sensitive Areas (ESAs) in the UK with similar measures having been introduced in other member nations of the European Union. Farmers within a designated ESA, of which there are 22 in England designated in four Stages, can choose whether to participate in 10 year land management agreements. In return they are eligible for a series of payments, largely assessed on an area basis, to farm in a way that has less impact on the land than more modern farming methods (see Tate, Park and Stansfield 1999 for details).

In a study on the impact of ESA's on lowland farming (Froud 1994) five Stage I ESA's were examined. It was determined that some of the income effects, whilst still positive were very small. For example in the Stage II Suffolk River Valleys ESA, where in Tier 3 although the payment was £200 per hectare, the contribution to farm income was determined as £15 per hectare. It was felt that these already modest sums of money could be eroded further as the ESA scheme continues and develops a more profound effect on the productive capacity of the farm.

An earlier study in Wales (Hughes and Sherwood 1992) examined payments to producers by visiting 139 participant farms in the Cambrian Mountains ESA and 80 participant farms in the Llyn Peninsular ESA. Non-participants were surveyed by a sample of farm visits in the former ESA and a postal survey in the latter. The researchers concluded that there was a strong positive effect on farm incomes in both ESA schemes. The Net Farm Income (NFI) benefit in the Cambrian Mountains ESA was of the order of 60 percent of the ESA payment or around £2300 per participant. As the level of payments was lower at approximately £1000 in the Llyn Peninsular ESA the contribution to NFI was found to be lower but virtually 100 per cent of the average payment.

The results of a more recent National Audit Office (NAO, 1997) study on the contribution of the ESA scheme to farm incomes is at odds with some of the aforementioned research into the contribution of ESA schemes to farm business profitability. The business effects of ESA's and their potential contribution to farm profitability were examined from the point of view of its statutory responsibility of reporting to Parliament on the economy, efficiency and effectiveness of public sector

expenditure. Examination of income foregone data in 110 main Tiers in the 22 English ESA's led the NAO to conclude that in 84 of the 110 Tiers payment levels were less than income foregone and in 19 Tiers payment levels exceeded income foregone measures. In 63 of the group of 84 Tiers the payment rate was more than 20 per cent lower than income foregone. Further, in assessing the effectiveness of ESA's MAFF was recommended to:

"consider whether the inter-relationship between the various aspects of the scheme could be usefully demonstrated at a practical level by the use of farm case studies which would be monitored within each ESA."

It was felt by the NAO that these could usefully complement existing compliance checks and socio-economic monitoring. Further, it was recognised that farm *conditions* and income can vary greatly from year to year. Thus in this study the impact on incomes of entry into an ESA agreement is investigated over three years. Seven representative farms in the Shropshire Hills Environmentally Sensitive Area (SHESA) were monitored and used to evaluate on-farm income effects. These were subsequently compared to national data generated as part of the UK Farm Business Survey (FBS), itself part of the EU wide Farm Accounts Data Network (FADN).

2. Research Methods

Selection and details of case-study farms

Case-study farms were selected as a sub-sample from an earlier survey sample (see Tate, Park and Stansfield 1999). The first objective of the study was to monitor a representative sample of farms from the SHESA to discover any farm business effects of participation. Farms for longitudinal study were selected on the basis of farm size, a predetermined farming intensity factor and whether or not they were ESA participants.

Following discussions and subsequent approval of the farmers involved seven businesses were monitored over a period of three financial years from 1997 to 2000. There were four participants within the SHESA and three non-participants. Each was

predominantly a beef and sheep producer with permanent pasture as the main form of land cover. The mean area occupied was 66 hectares, although there was some difference in terms of the land area occupied by participants and non-participants, these being means of 81 hectares and 46 hectares respectively.

In order to study the development of the case study businesses a method was devised to accurately monitor the farm business and to gather financial data. Care was taken not to intrude unduly on the privacy of the survey participants and thereby discourage participation with the research. By collecting data over a period of three financial years with an identical sample of case studies and through the ability of identifying individual farms and their production practices the link between farming inputs and financial outputs remained unbroken.

The second research objective was to make a valid comparison between the case-studies and the UK FBS data. This required the derivation of a measure of farm income that was comparable with the FBS from only limited knowledge of each individual farmer and a maximum of three visits per year or a total of no more than nine visits to each case study farm over the research period.

These regular visits to the case study farms enabled the recording of changes in the business such as land ownership, improvement or tenure, changes in farm management practices, stocking, cropping and the payment for labour and other farm inputs. The supply of bought feeds and services provided by contractors was monitored, together with the potential for participation in other environmental schemes being offered in the area that might impinge on the farmers' participation in the SHESA scheme.

To enable comparison with FBS data the three aspects of business viability; profitability, cash flow and the return on capital (Turner and Taylor 1998) were considered. The measure of return on total capital employed was beyond the scope of this study as was the ability to access detailed and financially sensitive information, such as debtor and creditor data and business bank account balances. However it was possible to measure the return on capital invested in the land occupied by the farm. In this way the return to the chief capital asset employed was assessed.

For comparative purposes data was acquired for two farm sub-samples defined from the University of Manchester FBS database (University of Manchester 1999) for a period of five financial years up to 1998/9. This consisted of five FBS recorded farms located in and participating in the Clun ESA and five Shropshire farms, not farming in the SHESA but located in the Severely Disadvantaged Area of the LFA in other parts of the county. The data was in the standard FBS format as presented in the annual FBS reports such that measures of Net Farm Income (NFI), Management and investment Income (MII), gross output, overhead costs and variable inputs would be readily accessible.

The farm visits

The farmers were visited for three consecutive years with at least two visits per year. The most important visit took place towards the end of February or in early March each year. The objectives of this visit were:

- To review the sales of livestock the previous autumn;
- To confirm the numbers, value and classes of stock that would be on the premises at the close of the financial year at the end of March;
- To evaluate production possibilities and intentions for the ensuing grazing season;
- To confirm the numbers of stock declared for subsidy purposes as the retention periods for the two main schemes were both imminent.

The second visit made to each was often more of a social call to keep in touch with developments and to maintain and build contact and confidence between the researcher and the participants.

The capital invested in land was taken as £4000 per hectare (£1600 per acre) after consultation with local auctioneers (Benson and Rogers Coltman, personal

communication, 1998) and was accepted as an overall estimate that might have been improved by the valuation of the individual farms concerned. This approach would have been beyond the scope of this research. The overwhelming majority of the capital employed in the sampled farm businesses was invested in land. This was expressed in terms of MII, as a percentage return to capital invested in land, a close relation to the return on capital employed expounded as a measure of business viability (Turner and Taylor 1998).

Data from each case study farm was collected and compiled in a series of spreadsheets from which it was possible to derive financial management data for each of the participating farms over the study period. This was used in conjunction with the FBS data for comparative purposes.

3. Results

The Shadow Net Farm Income (NFI) data produced from the case study spreadsheets and calculated using the same method for all of the three financial years showed that the average Net Farm Income for the seven case study farms for the years 1998-2000 was £6375, £3337 and £1281 respectively. As might be expected, due to the downturn in livestock farming profitability during the case study period, the results illustrate a sharp decline in NFI over the period of the study. Table 1 illustrates the NFI per hectare.

Table 1: NFI (£) per Hectare Occupied for Case Study Farms

	Financial year 1997/8 (NFI ha ⁻¹)	Financial year 1998/9 (NFI ha ⁻¹)	Financial year 1999/0 (NFI ha ⁻¹)
NFI Mean £ha ⁻¹	83	29	2
Participant mean	91	63	28
Non-participant mean	71	-17	-33

The case study farms were examined for the effect of removing all subsidies from their accounts over the three-year period and to express this on the basis of NFI. The

data is displayed in Table 2. The effect of the removal of all subsidies was to give average NFIs for participants and non-participants respectively of -£15,949 and -£7980 over the three-year period, a difference between these two figures of £7969.

Table 2: NFI (£) Without Subsidies for SHESA Participants and Non-Participants

Case study group	Financial year 1997/8 (£ farm ⁻¹)	Financial year 1998/9 (£ farm ⁻¹)	Financial year 1999/0 (£ farm ⁻¹)
Participant group	-14802	-16127	-16917
Non-participant group	-5894	-9400	-8647

The proportion of subsidies paid to the case study farmers made on the basis of headage was assessed. The reliance of both participants and non-participants on headage payments was 84.7 percent and virtually 100 percent respectively. All farms were receiving a similar level of subsidy per hectare over the three-year case study period. This was £259 and £282 per hectare for participants and non-participants respectively. Analysis of SMII was performed as the percentage return to capital invested in land occupied and the results shown in Table 3. All the returns were negative.

Table 3: SMII as the Percentage Return on Capital Invested in Land

Case study group	Financial year 1997/8 (%)	Financial year 1998/9 (%)	Financial year 1999/0 (%)
Participant group	-0.5	-1.4	-1.9
Non-participant group	-1.1	-3.8	-3.6

These show that once the value of unpaid farm labour was removed, in line with the convention for calculating MII, the mean results give losses for the proprietors concerned, illustrating declining farm business viability.

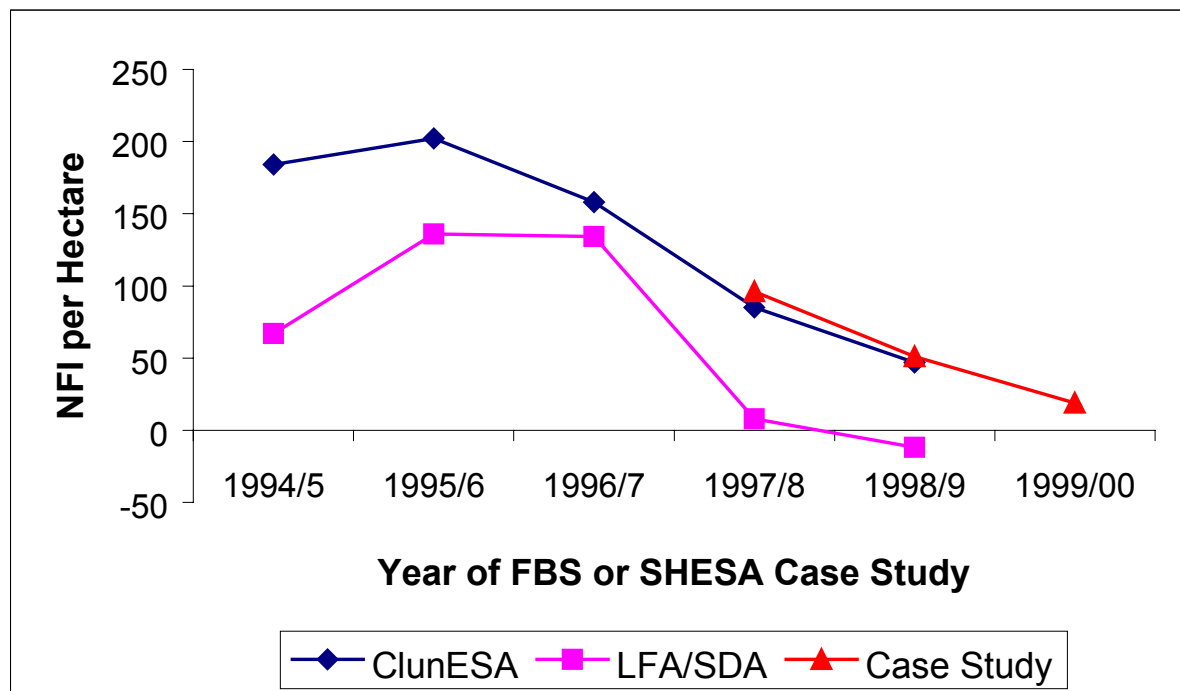
The four ESA participant farms were analysed as a separate group to demonstrate the importance of the ESA premium payments to the participants in relation to other

receipts of importance to the farmer and the farm business. Declining farm turnover due to depressed farm output prices and income from subsidies, coupled with stationary ESA payments, led to a slight increase in the importance of the premium, but over the whole case study period it averaged only 4.5 percent of turnover.

Data was also gathered to demonstrate the relative importance of the premium paid to farmers for participation in the ESA scheme relative to the level of NFI calculated from the farm business case studies. This showed that on average ESA premium made up about 30% of NFI at the start of the study and doubled to an average of 60% during the study period. However, ESA premiums never made up more than 20% of the subsidy support on any of the farms over the study period.

Figure 1 shows FBS and SHESA case-study data. The graph shows a predictable decline in NFI for the FBS data from the Clun ESA sample of five farms and the Shropshire SDA/LFA sample of five farms for 1994/5 to the most recently available data from financial year 1998/9. The participant case study farm data is also displayed for comparative purposes for the three years 1997/8 to 1999/00 showing NFI.

Figure 1: NFI (£) per Hectare - Data for Three Farm Samples



4. Discussion

The results for NFI for the sample of seven case study farms as one group were presented. These results indicated declining NFIs from a mean of £6375 per farm in year one to £1281 per farm in year three. This appeared to be consistent with the other farm samples from the Clun ESA and Shropshire SDA LFA taken from FBS Manchester. The decline in NFI noted from the above exceeded the general decline in farm incomes seen in FBS data nationally (MAFF 2000a) which showed a 67 percent decline in NFI between 1994/5 and 1998/9 for LFA Cattle and Sheep producers. This data also showed a high level of dispersion, such that whilst the mean NFI for the LFA Cattle and sheep sample in 1997/8 was £11,631 per farm, 33 percent of the sample had NFIs of less than £5000.

The level of NFI per hectare declined over the period of the investigation from £83 per hectare to £2 per hectare, however the results were different for the participant and non-participant groups. In the first year of the case study period, 1997/8, the participant group had a £20 per hectare greater NFI than the non-participant group, but this gap had widened to £61 per hectare in favour of the participants by year three. Apart from the superior farm size of the participants there were other factors at work in giving the participant group rather better results. For example as participators in the SHESA scheme they had shown a willingness to deal with the administrative and regulatory matters associated with the scheme. It is possible that as a result of developing the necessary skills SHESA participant farmers saw other income opportunities from working within the grants system, such as maximising potential grant claims by farming at higher stocking rates.

Regional data from the FBS for 1997/8 (University of Manchester 1999) for the upland livestock rearing farms was examined for the purpose of making a comparison. This showed that the high profit group of seven farms was characterised by being a similar farm size to the average group but with substantially greater levels of output per hectare and per farm and similar overhead costs. It was shown from the

data that the larger farmers were not necessarily more profitable from those extra hectares. If higher profit was pursued it had more to do with achieving greater outputs per hectare whilst containing both fixed and variable costs per hectare. This was reflected in this research as the large farms were not particularly intensive and may have boosted their profitability from a similar approach.

Examining the SHESA data for differences between participants and non-participants a substantial 'participation effect' is apparent. The participant group returned positive NFIs throughout the three-year period of £5389 per farm against an average for the non-participating group of £1365 per farm. This resulted in the participant group returning a mean increase in NFI against the SHESA non-participant group of £4024 across the three-year case study period. The SHESA participants appear to be able to return higher incomes per farm, although this effect had begun to tail-off towards the end of the three-year period, in line with the deepening agricultural recession. This appears to agree with the recent official five year evaluation of the SHESA which showed that a positive income effect associated with participation was the greatest incentive to take part in the scheme (CEAS 1998).

The results for the data that examined the effects of the present system of subsidies showed that all of the farm case studies would be substantially worse off if the present system of support was removed. The figures for NFI would be substantial and negative in all years, whether or not the farmers were participants or non-participants in the SHESA. Nevertheless the results show, due to a decline in returns over the case study period, an increased reliance on subsidy income even though that too was declining. The financial effect of removing the present subsidy system meant an average NFI for non-participants of -£7980 and one of -£15,949 for the participants, a difference of £7969 per year throughout the case study period.

The results for the contribution of headage subsidies to the overall subsidy income of the farms in the research were examined. The only two payments not linked to headage were the SHESA premium and Extensification Premium. It was not surprising therefore to find that virtually 100 percent of subsidies paid to non-participants were in the form of headage payments. The mean figure for the participants was lower throughout the case study period at an average of 84.7 percent.

This was still a reflection of how the overwhelming proportion of subsidy income, even for those who had decided to participate in an environmentally based scheme, was based on headage payments. This relative position will alter slightly with the new Hill Farm Allowance as it replaces the old Hill Livestock Compensatory Allowances Scheme with effect from 2001.

Throughout the case study period the contribution to business turnover made by the SHESA premium was quite consistent, however due to both a decline in livestock output prices and subsidies other than the SHESA premium its relative importance increased. In the first year of the study it was an average of 3.7 percent of turnover and this became 4.9 percent in year three, averaging 4.5 percent throughout.

A contrary figure was noted from the official five year SHESA evaluation (CEAS 1998) that reported ESA premium averaging 9 percent of farm revenue for all of the Stage IV ESA's. With the SHESA farms of less than 50 hectares this figure jumped to 27.7 percent. Upon examination of the sample size for this study, a total of 9 farms were surveyed in the SHESA in this size band and the methodology was not stated.

The SHESA premium was not one of the major subsidies receivable by the participant group. Out of the seven typically receivable subsidies the major ones were Beef Special Premium Scheme (BSPS), the Sheep Annual Premium Scheme (SAPS) and the Suckler Cow Premium Scheme (SCPS). This finding was reflected in the West Midland Regional Development Plan (MAFF 2000a) that showed regional expenditure in 1997 on SAPS, SCPS and BSPS to total £43.5m against £3.1m for ESAs. However, the case studies did reveal that the value of the SHESA premium was found to be increasing relative to other subsidies. These results indicate a growing importance of the SHESA premium that is likely to continue or increase in future years as a number of supplements are added to the basic scheme for wet areas, de-stocking, commons etc.

The compilation and analysis of FBS data provided a useful confirmation of the steep decline in profitability, through the measure of NFI, that has been a clear feature of both Clun ESA and Shropshire Hills LFA farming. Output levels in the Clun have been higher than either of the other two samples of farms and one contributory factor

to this will have been the Clun ESA premium. A further factor may have been the 'ESA participation effect' which seems to have been a feature of this research, namely that participating farms exhibit greater levels of profitability compared to farms that do not participate, even though both lie within the ESA and the SDA. The data has not been available to this study for non-participants within the Clun ESA and so it is not possible to say whether the same findings apply in that ESA as have been shown to be the case in the SHESA.

5. Conclusion

Conclusions can be summarised:

- SHESA participant farms were more profitable than non-participant holdings by more than the premium paid for participation;
- Other factors appeared to benefit participating farms including a larger average farm size and more intensive operations;
- The SHESA premium was not one of the major premiums received by the farmers in the study and without the other subsidies all of the farms monitored would have been consistently unprofitable throughout the case study period;
- The return on capital invested in land was consistently negative throughout the study, suggesting that in the medium to long term, in spite of the current high level of subsidy payments, the lack of viability of the farms in the study could mean some farm re-structuring;
- The data collected was in line with that obtained for other samples of SDA LFA and Clun ESA farms in Shropshire from the FBS.

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