

A South West Perspective on the Report of the Policy Commission on The Future of Farming and Food

WORKING PAPER NO. 1 Modulation and Agri-Environment Schemes: Potential Impacts on the South West

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*The research on which this paper is based was grant aided by the
Regional Assembly and by the SW Regional Development Agency*

Preamble

This paper offers some independent analysis and reflection on possible implications and opportunities of selected Curry Report recommendations specifically for the south west region. It is a working paper designed to stimulate discussion and comment within the region.

The *Policy Commission on the Future of Farming and Food* (2002), chaired by Sir Donald Curry (hereafter known as the Curry Report), reported in January 2002. Subsequently, in March, the Government responded to the report with a further paper opening up a consultation period to run to June. The Government has committed itself to producing a Strategy for Sustainable Food and Farming in England by the Autumn of 2002 (DEFRA 2002). The strategy will include an action plan of measures taken in response to the Curry Report, some of which will already be in place, and a Government response to each of the Curry Report recommendations.

As part of the consultation, regional events were held to discuss the document with stakeholders, including one in the south west on May 10th 2002. Discussions have been held in various forums within the region and a range of papers from regional stakeholders has been submitted to central government in response to the consultation, although the majority of submissions will have been from national players.

In conducting our work we have been mindful of two other significant policy debates which have opened up during the short period in which this research has been undertaken. First, the publication in May 2002 of the White Paper, *Your Region, Your Choice*, signals the prospect for greater regional discretion and devolution of powers from central government. Secondly, a debate on the future of the Common Agricultural Policy has re-emerged in anticipation of the European Commission's proposals for the mid-term review of CAP. This brings home strongly the fact that the Curry Report cannot be debated in isolation either at a regional or a national level. The implementation of Curry recommendations on modulation, for instance, will inevitably be greatly influenced by the outcome of the mid-term review.

In order to identify particular opportunities for the South West arising from the Curry report we conducted a series of telephone interviews with experts in the region¹, held a seminar with experts² and attended a discussion on the topic as an agenda item of the SWERDA's Rural Sub-Group chaired by Jonathan Porritt, as well as consulting relevant literature and data sources.

¹ Tim de Winton (Environment Agency), Gavin Saunders (Devon Wildlife Trust), Sarah Manning (Countryside Agency), Peter Morris (NFU), Steve Smith (Devon County Council), Steve Jarvis (IGER), Julian Hoskins (English Nature), Chris Short (University of Gloucestershire), Steven Wright (Gloucestershire Rural Community Council), Dudley Coates (ex-MAFF).

² Geoff Bateman (Environment Agency), Anthony Gibson (NFU), Matt Lobley (University of Plymouth), Tim Render (GOSW), Mark Robbins (RSPB), Dianne Roberts (SWRDA).

Modulation and Agri-Environment Schemes³

Relevant Curry Recommendations

Recommendation 63: SHIFT CAP SUPPORT TOWARDS PILLAR II

Government should aim to secure a progressive transfer of resources in Europe towards wider social and environmental objectives under the so-called Pillar II of the CAP. Public funds should be refocused on public goods, rather than subsidising overproduction. The Community's budget for environmental programmes in the countryside should be substantially increased, helping to encourage best practice and pay for environmental benefits which the market will not provide.

Recommendation 68: INCREASE MODULATION TO 10%

Government should increase rates of modulation to 10% from 2004. If substantial CAP reform is not delivered in 2006-07, Government should give serious consideration to a further increase in modulation at that point to the maximum 20%. The devolved administrations and UK Government are urged to go forward together on this. Extensification premia should be left unmodulated in recognition of their positive environmental effect. Government should fully match fund the modulated resources at a rate of 100% from the Exchequer.

Recommendation 69: AG-ENV SCHEMES/WHOLE FARM AUDITS

DEFRA should bring in management consultants to look at planned investment in IT, and whether enough is being done to simplify application procedures and to reduce stewardship scheme administration costs.

A new whole-farm audit and plan should be grafted on to this existing system where it applies to minimise the need for new procedures. IACS will need to be paired with Geographical Information System (GIS) capacity to fit it for this role. Many elements of the plan would be consistent year on year, minimising the annual burden on farmers of maintaining it.

The audit programme should be rolled out as soon as possible. Its roll-out should not be restricted only to those involved in or immediately intending to enter the stewardship scheme. The aim should be to provide all farmers with basic information about their environmental obligations and opportunities. This would help build up a better picture of the environmental assets and compliance gaps across the country as a whole and could signpost farmers not in schemes to participate to their advantage. In particular there is a case for rolling audits out as soon as feasible to the intensive pig and poultry sectors, where there have been significant resource pollution problems in the past.

Recommendation 70: INCREASED SPEND ON AG-ENV SCHEMES

Government should increase the level of spending substantially on agri-environment schemes, through modulation in the short term, and Community-wide 'degression' of direct payment after 2006. The existing agri-environment schemes should be merged to become the upper tiers of a new single stewardship scheme. The same scheme should in due course incorporate other existing land management grants, for example for woodland and flood protection.

³ It is unfortunate that this work has been trailed in the local press as an assessment of the economic implications of the Curry report. It was never the intention to conduct predictive economic analysis in this work other than in an indicative manner for the modulation proposals.

3.Modulation and Agri-Environment Schemes cont/

Recommendation 71: NEW BROAD/SHALLOW AG-ENV SCHEME

The bulk of the new resources made available for agri-environment programmes by further modulation should be spent on a new, broad and shallow 'entry level' stewardship tier, open to as many farms in England as possible, and accessed through a whole farm plan. This tier must be kept as simple and easy to administer for farmer and Government as possible, with payment on a flat rate basis per hectare. There should be as light a touch in compliance monitoring as EU rules will permit.

The existing Hill Farm Allowance funding, along with receipts from modulation, should be combined in upland areas to become a single 'broad and shallow scheme' for hill areas. Taking the two streams of funding together would produce higher payments in hill areas. As in the lowlands, the existing more bespoke schemes above the new tier would be rationalised into steps of a single ladder, ascending through more demanding tiers that are increasingly aimed at particular areas, habitats and species. Upland areas will continue to be targets for these upper tier schemes because of their special environmental character.

Our main focus in this section is on the possible impact of modulation. However, it is important to make some remarks regarding the other elements of the CAP reform proposals. As indicated in the introduction, there is currently much debate over the European Commission's proposals for the mid-term review of the CAP published in July. The plans are radical and include the following elements⁴:

- Direct payments on a farm-by-farm basis calculated as an average payment from previous years, irrespective of future levels of production. This would cover arable, beef and sheep payments. The payments would be area rather than headage based.
- Payments to be conditional (cross-compliance) on environmental, animal welfare and food safety standards and a compulsory audit.
- A new long-term environmental set-aside programme to replace current rotational set-aside.
- Compulsory Modulation of direct payments to CAP second pillar at 3% per year levelling off at 20% after 6-7 years. The money will be allocated across the whole EU by the EC rather than by individual countries.
- Small farms receiving less than 5000 Euros p.a. in direct payments will be exempt from modulation, with some additional exemptions for those employing labour.
- Aid capping – an absolute upper limit of 300,000 Euros per farm.

However, these radical proposals have to be put into their correct context. They are a negotiating position and heavily influenced by the reforming zeal of Franz Fischler who has had major set-backs in achieving radical CAP reform in the past. Alongside the mid-term review, the Commission published its "Prospects for Agricultural Markets 2002-2009", which offers a far less radical interpretation of the need for reform. Milk, beef, sheep and cereal markets are all seen as improving modestly. More importantly a reformist alliance of Denmark, the Netherlands, Germany, Sweden and the UK, still represents a minority of EU states, with countries such as

⁴ Source: Agra Europe.

France and Ireland already voicing serious objections to the reform proposals. Moreover, even this group is not entirely united with Sweden, for example, voicing serious concerns in its response to the proposals. It is highly likely that some of the more radical elements in the proposals will be watered down in the months to come.

Determining the Impact of Modulation

Ideally in determining the impact of modulation on the South West we would need more information than is currently available. It is proposed in the Curry Report that the modulated finance should be put to a broad and shallow agri-environment scheme (BSS). However, it is also the case that some of the money may flow into other existing schemes funded under the Rural Development Scheme. As the BSS will be discretionary, as with other schemes, any prediction of impact depends on assumptions made about take-up rates for the schemes. Further, we do not yet know the details of a BSS. The details will be crucial not only in terms of take-up but also the enterprise costs associated with the scheme. It cannot be assumed that the monies released by modulation will flow into agriculture without some associated costs.

Another critical issue is whether or not co-financing will be forthcoming from the Treasury. It has been assumed, thus far, that further modulation will unlock co-financing, but this is by no means certain. The Chancellor's Spending review statement of July commits the Government to fully funding the Curry proposals. However the precise implications for modulation await clarification.

Consequently, at this stage the assumptions built into any model of the impact of modulation are crucial and it is important to stress that modelling is essentially speculative. It would be a mistake, at this stage of uncertainty, to claim too much for our predictions⁵. However, they do point to some of the key issues in the current debate. In short, the assumptions are as important, more so perhaps, than the results. And one of the lessons of this exercise is to identify the characteristics that might be desirable in a BSS.

It is also important to point out that future commodity markets are uncertain as well and unexpected commodity price fluctuations would impact on the results to a significant extent. This occurred in the immediate aftermath of the 1992 CAP reforms when unexpectedly buoyant world commodity prices led to a situation whereby farmers were over-compensated under commodity payments with the knock-on effect that the new suite of agri-environment proved less financially attractive to farmers than had been anticipated (Winter and Gaskell 1998). Of course, all this was radically reversed after 1996 but it serves as a salutary reminder of the uncertainties that beset any efforts to make predictions.

Scenarios have been modelled for different rates of modulation. This reflects the potential co-financing from the Treasury. If co-financing is less than the Curry Commission suggests (a minimum of 10%) it can be assumed that the rate of modulation will be less. Therefore, modulation rates of 3% to 10% have been modelled on the base year of 2000/01.⁶

⁵ The appendix to this report provides further detail on the methods used in this section.

⁶ Financial data were provided by the University of Exeter's Farm Business Survey.

Tables 1 to 4 show the impact of different modulation rates for cattle and sheep farms in the south west prior to any modulated monies returning via an agri- environment scheme. These are important figures because although we would expect a substantial volume of modulated money to return to the region, there will be individual farms who, for various reasons, do not enter into 2nd pillar schemes. The figures in this first set of tables provide an indication of the kind of losses such farms would expect to sustain under a range of modulation scenarios.

Table 1. Modulation Rates and NFI for average Lowland Cattle and Sheep farms.

Rate of Modulation	2000/01	3%	4%	5%	6%	7%	8%	9%	10%
NFI / ha	-5	-8	-9	-10	-12	-13	-14	-15	-16

Table 2. Modulation Rates and NFI for average SDA Cattle and Sheep farms which are less than 120 ha.

Rate of Modulation	2000/01	3%	4%	5%	6%	7%	8%	9%	10%
NFI / ha	100	95	93	91	90	88	86	84	83

Table 3. Modulation Rates and NFI for average SDA Cattle and Sheep farms which are more than 120 ha.

Rate of Modulation	2000/01	3%	4%	5%	6%	7%	8%	9%	10%
NFI / ha	91	87	86	84	83	82	81	79	78

Table 4. Modulation Rates and NFI for average arable farms.⁷

Rate of Modulation	2000/01	3%	4%	5%	6%	7%	8%	9%	10%
NFI / ha	54	47	45	42	40	38	36	33	31

These figures are broadly consistent with the findings of research undertaken for the RICS (Cowap et al 2002) which report a potential 22% drop in farm incomes arising from a modulation rate of 10% prior to any recycling of payments through agri-

⁷ Data for arable farm (under 200 ha) is taken from Farm Business Data, University of Reading as these are assumed to be more representative arable farms in the east of the SWERDA.

environment schemes. Unfortunately, this is the figure that has been picked up by the press (the Financial Times and Farmers Weekly for instance). This interpretation is hardly surprising, given that the RICS press release asserts that “the financial support to the environment will not reach the pockets of many farmers”. For reasons that are not entirely clear, the RICS team did not choose to conduct any serious analysis of the effect on net farm incomes of re-using recycled funds.

The key findings of the RICS report are as follows:

- Average farm incomes might fall by £132m or 22% if modulation was raised by 10%.
- Each 1% increase in modulation will reduce the agricultural land value by 0.6% for arable land and 0.85% for grazing land.
- Mixed farms will experience a 1.6% decline in gross revenues and dairy farms will be little affected.
- Greater mono-cropping. Oil Seed Rape production substituted entirely by cereals if modulation exceeds 8%.
- With 6-8% modulation mixed farms will shift beef production to more extensive sheep production.
- Declining farm incomes will have a knock on effect on agri-supply industries and rural services that depend upon them.
- Match-funded modulation revenue in 2002 accounts for only 2.6% of the UK net income from farming.
- The availability of a broad and shallow agri-environment scheme may “yield a small marginal positive benefit in aggregate” but would be focussed mostly on mixed farms and LFA livestock farms.

The RSPB has critiqued the report as follows:

- Contradictory statements within the report suggest that whilst mixed farms may be worst affected by modulation they are most likely to benefit from a broad and shallow scheme and could thus recoup the ‘lost’ funds. However, in the conclusions they state that as mixed farms are already eligible for agri-environment schemes a BSS has less marginal value than other activities and “would not be a viable alternative for this farm”.
- Mono-cropping would emerge and OSR would be replaced by cereals is based entirely on 1 case study of a cereal farm in Shropshire. Direct payments make up a higher proportion of the total gross margin of OSR than winter wheat, and thus modulation will adversely affect both crops, but more so OSR. However, this assumes that farm decision-making is based entirely on growing the crop with the largest profit margin. In reality, this is not the case as OSR has agronomic

benefits and is an important break crop. This is reflected in current growing practices.

- Declining farm incomes will have knock on effects on related sectors. However, this was based again on the assumption that modulation funds were not recycled through rural development and the BSS. This also ignores the fact that increased spending (up to £0.6bn from 2002-2006) through the Rural Development Regulation will create benefits to farming and other sectors through work to contractors, supply industries etc. The headline that 'jobs would be lost' was based on one case study of a larger than average farm size, which predicted that labour requirements would fall by 5%. This is again simple analysis that does not account for recycling of modulated funds and the associated benefits of this. The report does not acknowledge that modulation with match funding will result in a net increase in the agriculture budget in the UK.

Source: Shiel, 2002.

We would go along with these criticisms and the following analysis suggests that the impact of modulation may be far more positive than the RICS suggests. Thus Tables 5 to 10 show possible impacts if modulated finance is used to implement a Broad and Shallow Agri-Environment Scheme.

While the details of a broad and shallow scheme are limited, it has been modelled using an illustrative outline provided by the Agri-environmental Schemes review Team set up by DEFRA. Clearly, the results from this modelling should be treated as *only* illustrative. The assumptions made when modelling the broad and shallow scheme include:

- The modulation rate is increased to 10% except for dairy farms which have no modulation.
- 12% of grassland is managed less intensively. This does not however, lead to a 12% loss in production since grass growth can still be utilized.
- No Fertilizer is applied to 12% of grassland, which leads to a reduction in the availability of dry matter ha^{-1} . According to the Institute for Grassland and Environmental Research (IGER) intensive grassland has at least a fertiliser application rate of 200 N kg ha^{-1} , which produces $7.5 \text{ tonnes ha}^{-1}$ of Dry Matter. If fertiliser application is reduced to 0 N kg ha^{-1} that produces 3 tonnes ha^{-1} of Dry Matter, then this is only 40% of the original production is available. This means that production is reduced by only 5% *not* 12%.
- Compensation for reduced production is $\text{£}14.40 \text{ ha}^{-1}$ and a payment for management is $\text{£}30 \text{ ha}^{-1}$, in accordance with those suggested by the agri-environmental schemes review team.

The tables illustrate how various uptake rates of a broad and shallow scheme effect NFI of cattle and sheep farms and dairy farms.

Table 5. NFI for different uptake rates from a broad and shallow scheme as applied to average Lowland Cattle and Sheep farms.

Uptake Rate	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
NFI / ha	-5	-2	0	2	4	7	9	11	13	15	18

Table 6. NFI for different uptake rates from a broad and shallow scheme as applied to average SDA Cattle and Sheep farms which are less than 120 ha.

Uptake Rate	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
NFI / ha	100	102	105	107	110	112	115	117	120	122	125

Table 7. NFI for different uptake rates from a broad and shallow scheme as applied to average SDA Cattle and Sheep farms which are more than 120 ha.

Uptake Rate	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
NFI / ha	91	122	119	116	113	110	107	103	97	100	94

Table 8. NFI for different uptake rates from a broad and shallow scheme as applied to average dairy farms under 60 ha.

Uptake Rate	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
NFI / ha	62	66	69	73	77	81	85	89	92	96	100

Table 9. NFI for different uptake rates from a broad and shallow scheme as applied to average dairy farms over 60 ha.

Uptake Rate	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
NFI / ha	132	134	137	139	141	144	146	148	151	153	156

Table 10. NFI for different uptake rates from a broad and shallow scheme as applied to average arable farms.

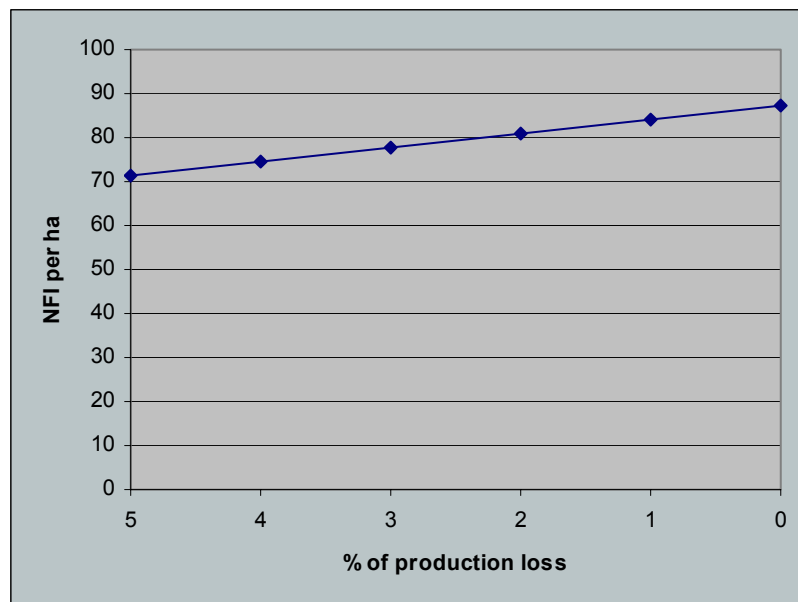
Uptake Rate	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
NFI / ha	54	46	44	42	41	39	37	36	34	33	32

Assuming different rates of production loss

Figures 1 – 6 look at the possible variations resulting from different levels of lost production for different farm types. It is assumed that the loss of production from implementing a BSS could vary between a 5% loss and no loss. The figures for each farm type also assume that the take up rate of a BSS is 60% as this reflects a realistic possibility. Clearly, the less production lost from implementing a BSS then the more NFI is gained per hectare. However, some farm types do better than others. For instance, the loss of production to dairy farms is greater than in other sectors.

Dairy Farms up to 60 hectares

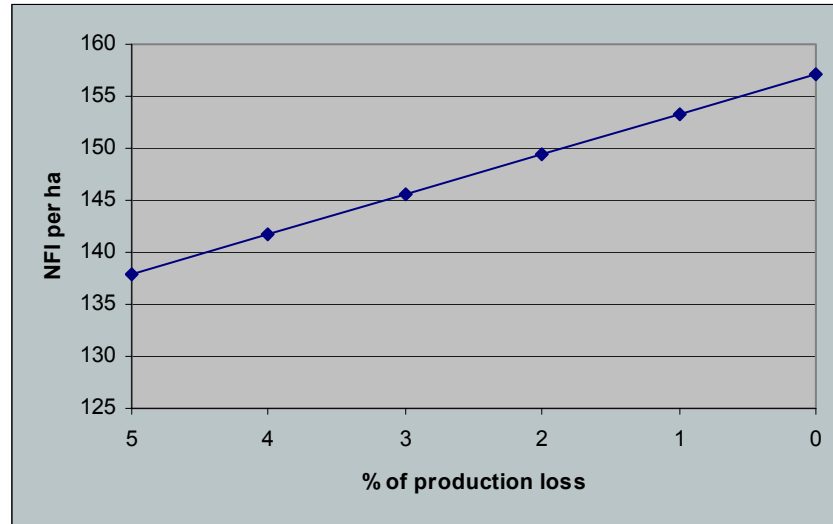
Figure 1. NFI at varying production losses from implementing a BSS with a 60% uptake rate.



At a 5% loss of production NFI is £71/ha, while if there is no production loss then NFI is £87/ ha.

Dairy Farms over 60 hectares

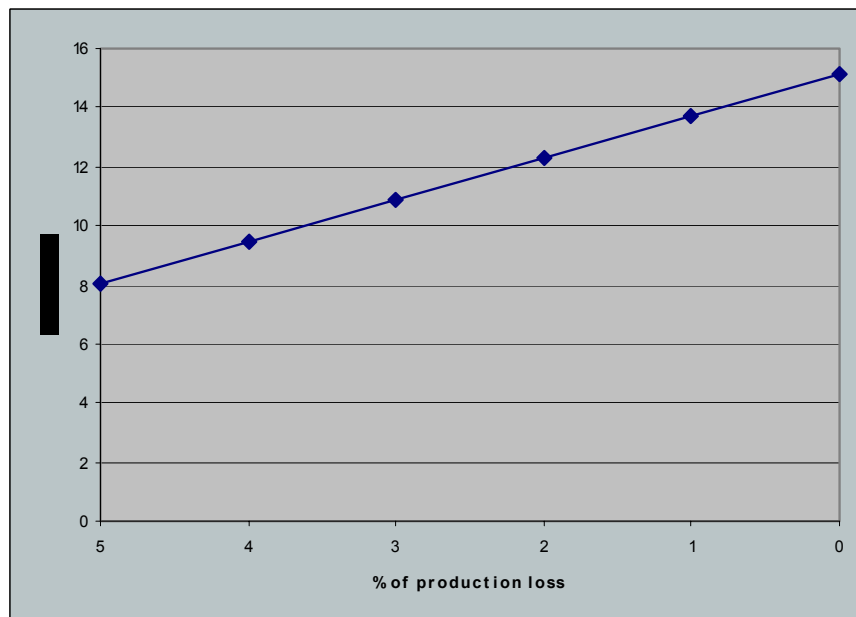
Figure 2. NFI at varying production losses from implementing a BSS with a 60% uptake rate.



At a 5% loss, NFI is £138/ha, while if the implementation of a BSS results in no production loss then NFI is £157/ha.

Lowland cattle and sheep Farms

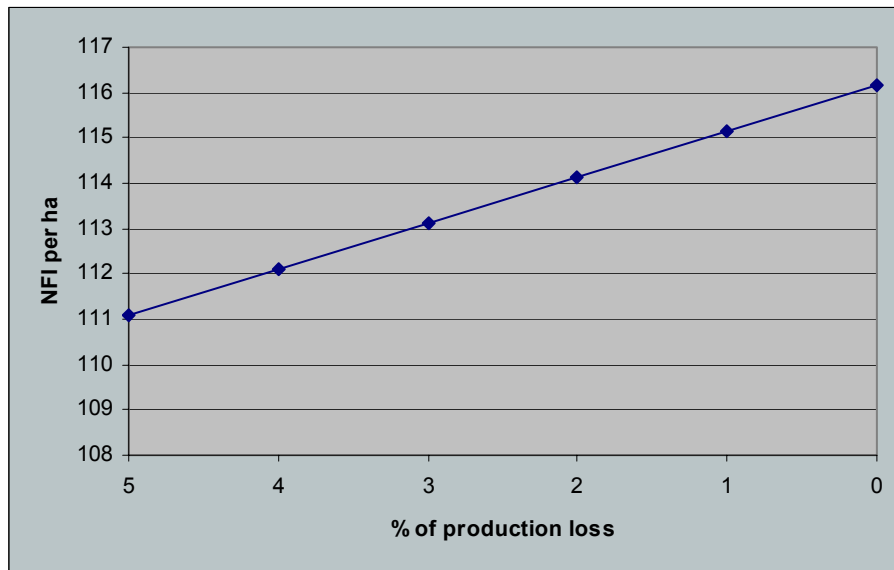
Figure 3. NFI at varying production losses from implementing a BSS with a 60% uptake rate.



At a 5% loss NFI for is £8/ha, while if the implementation of a BSS results in no production loss then NFI is £15/ha.

SDA Farms up to 120 ha

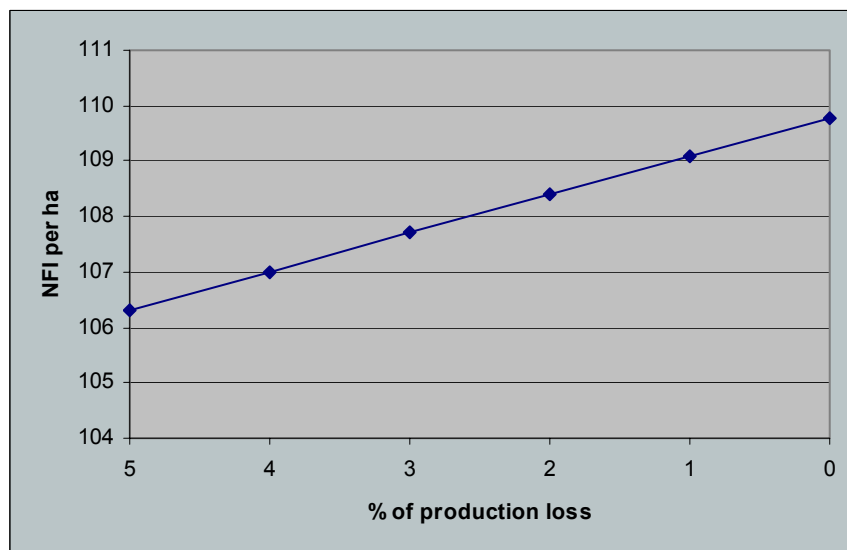
Figure 4. NFI at varying production losses from implementing a BSS with a 60% uptake rate.



At a 5% loss NFI is £111/ha, while if the implementation of a BSS results in no production loss then NFI is £116/ha

SDA Farms over 120 ha

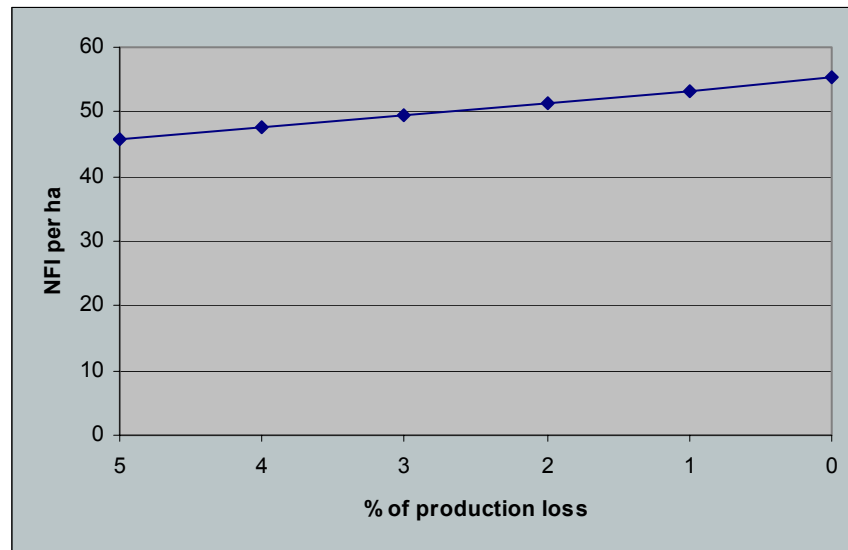
Figure 5. NFI at varying production losses from implementing a BSS with a 60% uptake rate.



At a 5% loss NFI is £106/ha, while if the implementation of a BSS results in no production loss then NFI is £110/ha.

Arable Farms

Figure 6. NFI at varying production losses from implementing a BSS with a 60% uptake rate.



At a 5% loss NFI is £46/ha, while if the implementation of a BSS results in no production loss then NFI is £55/ha.

Regional Impact

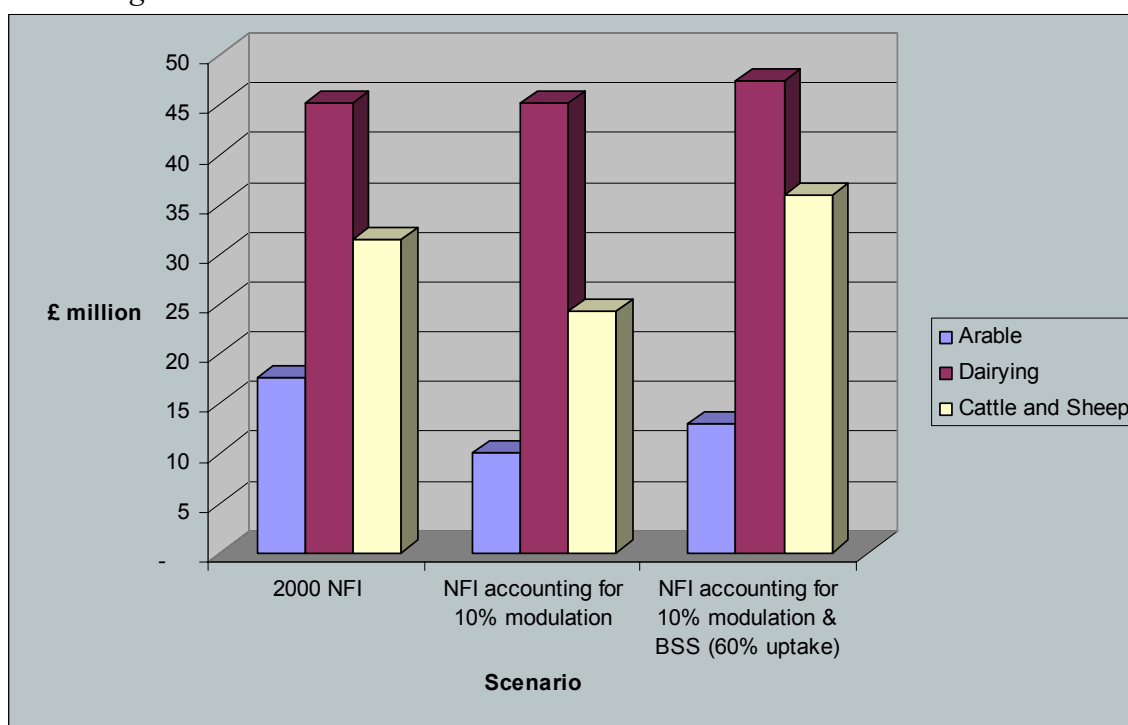
We turn now to a consideration of the possible regional impact. A critical assumption made here is that the modulated money will be distributed nationally and is not ring-fenced regionally, in other words, that regions will be able to make gains (or losses) in aggregate terms. We acknowledge that current EC modulation proposals suggest a single European pot with allocations to specific regions within the EU, including accession states, based on need. However, our view is that this proposal is highly unlikely to survive in such a form.

The estimates were calculated using the results from modelling modulation and a broad and shallow agri-environmental scheme in combination with data from DEFRA's June Census Statistics for 1999 for South West England. However, the categories of the farm business survey data and the census data were not wholly compatible. In particular, no divisions in the area of cattle and sheep farming to classify SDA, upland and lowland holdings were identifiable in the census data. Therefore, a weighted average of the Net Farm Incomes per hectare for the SDA and lowland cattle and sheep farms was calculated before multiplying by the area of cattle and sheep farming as given by the census data. This gave an aggregate regional NFI figure for the South West for all cattle and sheep farms. A clear weakness in this was that the relative areas of SDA and lowland sheep farming are unknown and cannot be accounted for in the weighted average. Weighted averages for NFI per hectare for the dairy and arable sectors were also calculated and multiplied by their respective census data areas to give an aggregate regional NFI value.

Modulation at 10 percent

If modulation is set at 10% then it is estimated that the SW region could benefit from a £2.1 million boost to its rural economy. However, this will have different impacts on different sectors. Indeed, the cattle and sheep will be the major beneficiary, while the arable sector will be the loser. This is illustrated in Figure 7. It is estimated that at the rate of 10% modulation and with the implementation of a BSS⁸ that the arable sector would lose £4.5 million, while the dairy sector⁹ would gain £2.2 million and the cattle and sheep sector¹⁰ would gain £4.4 million. In the case of the cattle and sheep sector, it is evident from Figure 7 that the implementation of a BSS compensates adequately for losses from modulation and from reduced production¹¹ from the scheme.

Figure 7. *The impact of 10 % modulation and the implementation of a Broad and Shallow Agri-environmental Scheme.*



Modulation at 5 percent

If modulation is set at 5% then it is estimated that it could cost the SW rural economy about £3.5 million. Again there are different impacts on different sectors with the arable sector as the greatest loser (Figure 8).

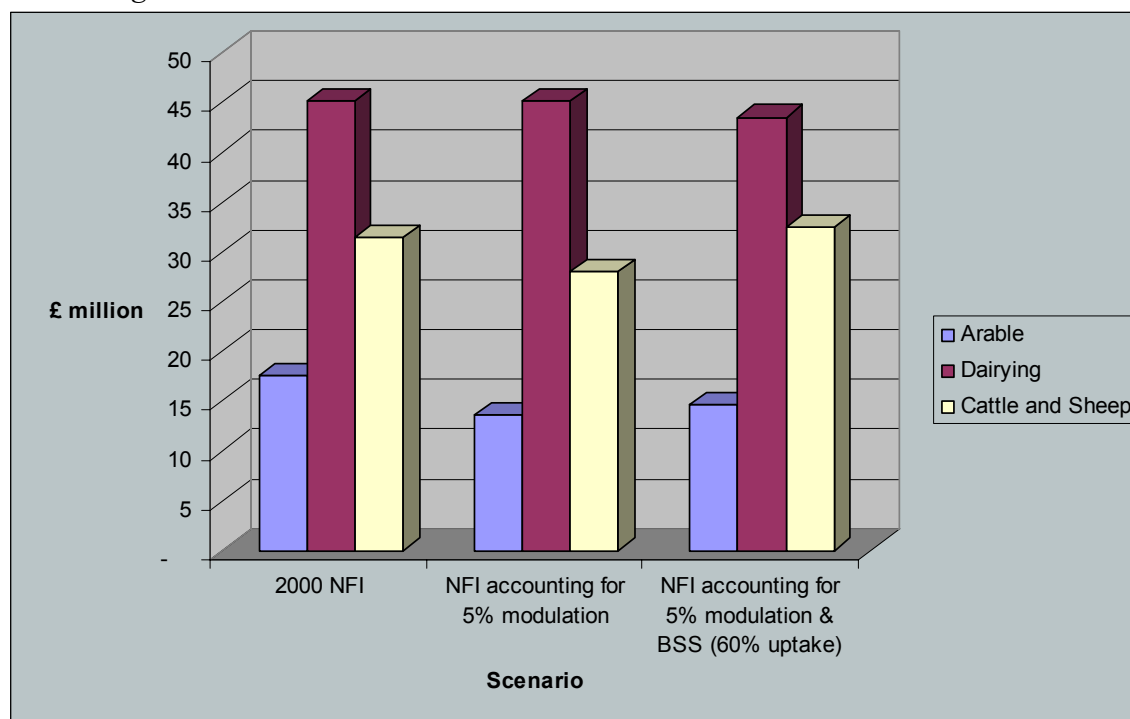
⁸ It is assumed that there is a 60% uptake rate of a BSS. The BSS is based upon that suggested by the Agri-environmental Schemes Review Team.

⁹ It is assumed that dairying is unaffected by modulation.

¹⁰ Both lowland and SDA cattle and sheep are included in this sector.

¹¹ It is assumed there is a 5% loss of production from reducing the intensity of grassland management.

Figure 8. *The impact of 5 % modulation and the implementation of a Broad and Shallow Agri-environmental Scheme.*



It is estimated that at the rate of 5% modulation and with the implementation of a BSS¹² that the arable sector would lose £2.9 million, the dairy sector would lose £1.6 million while the cattle and sheep sector would gain £1 million. In the case of the cattle and sheep sector, it is evident from Figure 8 that the implementation of a BSS compensates adequately for losses from modulation and from reduced production from the scheme. However, the loss to the dairy sector from participating in a BSS is likely to lead to a poor uptake rate if adequate compensation for changing production methods is not paid for.

Conclusions & Recommendations

If the south west is to be benefit from modulation two things are vital:

- The broad and shallow scheme should be designed in such a way that it will maximise uptake amongst the smaller livestock farmers of the region. The scheme should be easy for farmers to access, compliance rules should be transparent, and outputs measurable.
- Modulation should not be ring-fenced by region. National modulated finance should be recycled to where farming systems are most well suited to benefit from the a Broad and Shallow scheme. As we have seen, there is considerable potential for this to benefit the south west region. This might be seen as special pleading

¹² It is assumed that as modulation is reduced then the rate of payment to farmers for participating in a BSS will also be reduced. A 50% reduction in payments is assumed.

based on a rather crude assertion of regional self-interest. It is, therefore, important to make this case on the basis of both equity and evidence. On the equity side, the region's farmers, being so strongly livestock based and with farms smaller than the national average, have clearly borne the brunt of many of the recent difficulties besetting the industry. There is a strong ethical case for allowing some resources to flow from more prosperous regions. Secondly, the importance of agriculture, through its contribution to the maintenance and management of the natural environment, to the region's economy both with regard to tourism and business location, has been well made (Rayment 1997, Rayment and Dickie 2001, Tourism Associates 1999) and is currently the subject of further research for the RSPB and the RDA. Thus there is a powerful economic case that stacks up in national as well as regional terms, for allowing flows of modulated resources across regions.

References

Cowap, C., D. Oglethorpe, B. J. Revell, and G. Tate (2002) *The Impact of Modulation*. RICS.

DEFRA (2002) *Sustainable Food and Farming: Working Together*, DEFRA, London.

Rayment, M. (1997) *Working with Nature: Case Studies of Nature Conservation, Employment and Local Economies*, RSPB, Sandy.

Rayment, M. and I. Dickie (2001) *Conservation Works ... For Local Economies in the UK*, RSPB, Sandy.

Shiel, A. (2002) *The impact of modulation*, Internal Paper RSPB.

Tourism Associates. (1999) *Valuing Our Environment*, Report to National Trust.

Winter, M., Gaskell, P., Gasson, R., & Short, C. (1998). *The Effects of the 1992 Reform of the Common Agricultural Policy on the Countryside of Great Britain*, Countryside and Community Press and Countryside Commission, Cheltenham.

Appendix. Methodology for Calculating the Impact of Modulation

Introduction

On the whole, the analyses in this project have relied upon a partial budget approach. This method had the following advantages:

1. Given the time constraints of the project, it was flexible enough to model possible changes to farm costs and revenues without creating over onerous assumptions regarding all farm inputs and outputs.
2. Given the limited information on the proposed new broad and shallow agri-environmental scheme and its likely affects on farming systems, the information provided by the Agri-environmental Schemes Review Team could be realistically incorporated in the modelling procedure without making unjustifiable assumptions.

However, the obvious danger of using a partial budget approach is that even small changes to farm enterprises might have larger repercussions at the whole farm level. Therefore, the extension of modulation and the introduction of a broad and shallow agri-environmental scheme are likely to make substantial changes to whole farm systems. Nonetheless, in the absence of detailed information on how these changes will occur, a partial budgeting approach offers an insight into the financial implications resulting from recommendations in the Curry Report. Therefore, the results from the analyses in this project should be considered as informative rather than definitive.

Sources of Data

The financial data used in the analyses was provided by the University of Exeter's Farm Business Survey. This included the costs and returns for intensive, extensive and the average farms in the following categories: SDA cattle and sheep farms less than 120 hectares; SDA cattle and sheep farms over 120 hectares; lowland cattle and sheep farms over 80 hectares; dairy farms less than 60 hectares; and dairy farms over 60 hectares. The data for arable farms was provided by the University of Reading's Farm Business Survey since it was regarded that this reflected the crop growing regions of the South West more effectively. All the categories were assumed to represent the broad types of agriculture within the SWERDA region. Furthermore, all financial data pertains to the year 2000.

Specific Assumptions

The assumptions for modulation and a broad and shallow agri-environmental scheme are given below and were used as the basis for all the scenarios modelled.

Modulation

The following assumptions were made to model an increase in the rate of modulation:

- Pillar 1 type subsidies are affected by modulation. Thus, revenue from these sources was reduced according to the level modulation assumed. Therefore, if modulation was assumed to be 10%, the revenue from cattle and sheep subsidies was decreased accordingly.

- Dairy farms and present agri-environmental payments were not affected by modulation.

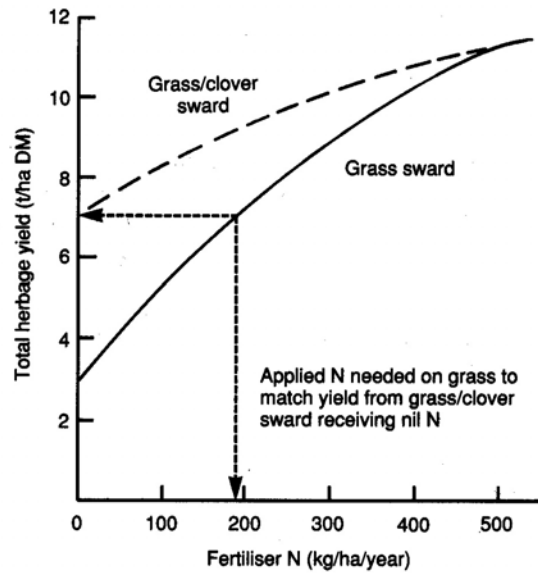
A Broad and Shallow Agri-environmental scheme

While the details of a broad and shallow agri-environmental scheme are limited, it was modelled using an illustrative outline provided by DEFRA's Agri-Environmental Schemes Review Team. The assumptions made when modelling the broad and shallow scheme include:

- Initially, the modulation rate was set at 10%, except for dairy farms which had no modulation.
- According to the agri-environmental scheme review team, 12% of grassland would be managed less intensively. However, it was assumed that this does not lead to a 12% loss in production since grass growth would still be utilised although less dry matter would be available for grazing animals. According to the Institute for Grassland and Environmental Research (IGER), intensive grassland requires a minimum fertiliser application rate of 200 N kg ha⁻¹ producing 7.5 tonnes ha⁻¹ of dry matter. If fertiliser application is reduced to 0 N kg ha⁻¹ producing 3 tonnes ha⁻¹ of dry matter then only 40% of the original production is available (see Figure A1). Given this calculation, it was assumed that changing the management of intensive grassland to an extensive one would lead to a 5% loss of production instead of a 12% loss.
- The five percent loss of production was assumed to affect the variable costs and revenues of all livestock enterprises on the farm, except for pigs, poultry, *etc.* that were assumed to be unaffected.
- Agri-environmental payments paid under present schemes and management agreements were not altered. Instead, it was assumed that under a new broad and shallow scheme these would form its higher tiers.
- On arable farms, the loss of production by creating larger field margins and other environmentally beneficial features was assumed to lead to a 5% loss of crops, in accordance with that proposed by the agri-environmental schemes review team, and was assumed to affect the variable costs and revenues of cereal crop enterprises on the farm
- Compensation for reduced grassland production was £14.40 ha⁻¹, for reduced crop production was £27 ha⁻¹ and a payment for management was £30 ha⁻¹, in accordance with those suggested by the agri-environmental schemes review team.
- If the rate of modulation was set at less than 10% then the income available for any broad and shallow agri-environmental scheme was reduced accordingly.
- The values of costs and revenues for different uptake rates of a broad and shallow agri-environmental scheme were calculated by: $x_{ij} + [u(x_{ij} - x_{ij*})]$; where x_i is the input or output value associated with farm type j ; x_{i*} is the input or output value associated with farm type j when the uptake rate for the broad

and shallow scheme is 100%; and u is the uptake rate, which varies between 0 for no uptake, and 1 for maximum uptake. This calculation enables the average effect on different farm types in the region to be observed.

Figure A1 *Response curve for grass and grass/clover swards.*



Source: IGER (<http://www.gttp.co.uk/fertilisers.htm>)