Results Based Agri-environment Programme

Payment Calculations

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1.0 Summary

There is growing interest in results-based agri-environment schemes as a more effective way of delivering environmental improvement alongside commercial agricultural production. Prescription-based schemes have had problems with implementation and the rigid framework has not delivered the beneficial environmental outcomes which could have been achieved.

Farmer perception is that prescription based schemes have ignored their expertise as environmental land managers and instead dictated a system of management which gave no flexibility. The way that results-based agri-environment schemes operate could redress this imbalance and put farmers back in control of management of their farms. Scheme design can, through training, equip farmers with the knowledge needed to achieve environmental outcomes.

Where results-based agri-environment works best, the farmer recognises and identifies with the environmental commodity which they are being paid to produce. This then focusses their management decision making on achieving environmental outcomes.

Agriculture is a volatile industry and experiences substantial variation in commodity prices. Introducing the sale of environmental goods as a commodity, helps to immunise agricultural businesses against the risk of price volatility. For a results-based agri-environment scheme to work effectively and consistently the payment structure needs to provide the farmer with sufficient reward. This then changes the thinking towards decisions that favour the production of the environmental commodity over the production of meat, dairy products or cereals.

To achieve a position where this works there needs to be a transparent payment structure and method of delivery. The farmer needs a clear vision of what he/she is trying to produce and the scheme administrators need an understanding of how farming practices impact of the habitat in question. Therefore fairly calculated payments and skills transfer in both directions is a fundamental component of any successful scheme.

2.0 Introduction

Under the prescription based schemes, farmers tended to locate options on the areas of the farm that had least agricultural potential. This lessened the opportunity cost of going into the scheme, and because the payment was for compliance with a prescription and not production of an environmental outcome, this made sense. This has not, therefore, been to the benefit of the environment. A results based agri-environment scheme could reverse this mind set. If farmers are paid for the production of environmental improvement, they will need to focus on the parts of the farm with the most environmental potential in order to derive the maximum payment. This will in turn mean that maximum gain is achieved for public money spent.

A results based agri-environment scheme can sustain a higher rate of payment for the best environmental management. Under the prescription based schemes, all farmers who comply with the scheme rules are paid irrespective of outcome. This means that money is going to habitats that are in some cases degrading. With results-based schemes, payments are only made where the habitat is stable or improving. This means that the payment for the best habitats can be higher which incentivises better environmental management.

The results-based system could also be a starting point through which payment for additional ecosystem services could be developed. Environmental land management is widely perceived as being for the enhancement of flora and fauna, but this can be broadened to encompass carbon sequestration, water attenuation and a multitude of other societal benefits.

This report considers in detail the mechanism for delivering payment, and rates of payment, using information available from existing examples from the wider European community. The calculations are prepared for a *'Haymeadows and Species-rich Grassland Option'*, and a *'Breeding Wades Sites'* Option

3.0 Legal Framework

Within the European Union scheme design and payment mechanisms are governed by the European Agricultural Fund for Rural Development (EAFRD). These payments are known as Pillar Two payments within the Common Agricultural Policy. The fundamental rules governing how payments to beneficiaries must be calculated are set out within Article 28(6) of Regulation EU (No. 13/05/2013). This Regulation identifies three main principles for payment which are income foregone by the farmer, additional costs incurred as a result of carrying out specific management practice and a further allowance for transaction costs. Article 28(6) makes a further requirement that where there is an element of "double funding" between the agri-environment scheme (Pillar 2) and existing wider Common Agricultural Policy funds (Pillar 1), then an adjustment has to be made to reflect this.

Article 28(5) places a restriction that agri-environment contracts can only extend for a maximum of seven years, unless there is justification on environmental grounds to extend these contracts. This means that the environmental targets set for the scheme must be achievable within 7 years. It also means that the payment structure needs to allow for sufficient reward within the 7 year period.

Current guidance from DG Agriculture to Member States is that "premiums for result orientated commitments should be based on the additional costs incurred and income foregone as a result of the farming practices which are in general necessary to achieve the results expected from these commitments". This is the approach that has been taken by most of the results based schemes already implemented in the EU. Additionally, the farmers' transaction costs may be covered, where justified, up to 20% of the calculated premium. *Russi D, Maque, Keenleyside C (2014).*

For schemes under EAFRD rules for 2014-2020, the basic principle is that:

- For management based schemes the payment controls verify that the management actions which, are specified in the contract, have been carried out;
- For results-based schemes the payment controls verify that result indicators have been achieved, using the indicator measurement protocol specified in the contract.

The Guidance to Member States on the use of Agri-Environment Climate measures makes clear that, "the monitoring and control checks for results-based payment schemes should concern delivery of the expected results and not the practices undertaken by the beneficiary to achieve these results". *Russi D, Maque, Keenleyside C (2014)*

In a results-based scheme the methodology for measuring the result indicators must be described clearly within the legal Agri-Environment Climate contract, to enable verification by farmers and Control Agencies, using the same methods. The ability to verify results is therefore a major factor in selecting results indicators, designing measurement protocols and setting payment thresholds.

Overlap/Double Funding

Double funding can be an issue that exists between Pillar One and Pillar Two, or between different schemes within Pillar Two. One obvious way to avoid this problem is to make schemes within Pillar Two mutually exclusive. This can however have an environmental cost; some farmers may choose to participate in a more 'bland' farmscale agreement, rather than enter environmentally important, individual sites into a results-based scheme. One way around this problem is to have schemes mutually exclusive at a parcel scale rather than a farm scale. Under these rules farmers can still participate in a more general agri-environment scheme on their ecologically less important sites, and have a higher standard of environmental management under a results-based programme on their environmentally important sites.

It may be possible to have two schemes on the same parcel concurrently. It would however need very precise governance to determine exactly what each scheme was paying for and how the two interacted.

Payment Rates

The uptake and success of any agri-environment scheme is influenced by the payment rates offered and the economic conditions during which the scheme is introduced. Farmer will ultimately make a decision which is based on opportunity cost. For a scheme to have a good level of uptake it needs to be transparent, workable and make a fair payment for the work undertaken and opportunity costs incurred through reformed management. In order to determine an equitable level of payment, it is necessary to link the scheme requirements to market forces. Any owner occupier will be concerned about the effects of scheme participation on the residual value of his assets, and any tenant farmer will be concerned about exposure to a dilapidations claim at the end of his tenancy. Dealing purely with the business constraints, the market forces relevant in determining income foregone are:

1. The value of commodities
2. The stability of commodity prices
3. The cost and availability of finance
4. Input costs
5. Farm fixed costs

The costs of additional management can include:

1. Additional labour
2. Away wintering or winter housing
3. Addition machinery or contract charges
4. Scheme monitoring and training

The attractiveness or otherwise of agri-environment to a farm business will also be effected by the governance of the business. Younger farmers tend to be more production focussed whereas elderly farmers tend to be more inclined towards reduced labour input and increased income stability.

Transaction Costs

Successful agri-environment can deliver significant socio-cultural and landscape values. These benefits are only achieved by scheme participation and so in some cases it may be necessary to incentivise participation. Transaction costs can be a way of making payment to farmers for attending education and training days to facilitate participation in the scheme and time spent monitoring, reviewing and implementing the scheme.

For transaction costs it should be sufficient to provide an explanation of the types of transaction costs to be covered by the percentage to be applied. Transaction costs typically cover the time and effort of the contract holder in activities essential to fulfilling the contract but which are not covered by the main payment calculation. These activities can include, for example

- Attending information and advisory meetings for contract holders
- Meeting advisors on the farm and talking to Helpline staff
- Reading advisory publications and online information
- Learning to use the techniques for measuring results indicators
- Checking weather, vegetation growth, grazing pressure and other information needed to make the day to day farm management decisions that will determine whether or not the result indicator is achieved
- Measuring the result indicator each year (in self-assessment schemes)

Payment Thresholds

The way in which results-based agri-environment schemes tend to work, is that each habitat type is given a score card against which an annual assessment is made. To simplify this process the score card is usually translated to a score out of 10, with 1 being very poor and 10 being excellent. With a results based programme the focus is usually on maintaining or improving an already important habitat. For this reason such a scheme will usually only be interested in those habitats that are at 5 or above to start with. A results based programme is not suited for example to turning intensively managed improved grassland into a hay meadow, it is more suited to improving the species diversity and habitat quality of an existing hay meadow.

Once the income forgone calculations have been undertaken and the additional management costs have been quantified, this sets a payment rate for a score 10. So the calculations are carried out in such a way that assumes that all the necessary management actions are being carried out to deliver a habitat that is in optimum condition. However there will be a variety in the quality of habitats that go into the scheme and there needs to be incentive for those habitats to improve in condition, and there needs to be disincentive for the habitat to depreciate in condition.

The payment thresholds can be progressive and set such that each increment in the score chart attracts an equal increase in payment rate. This encourages farmers to improve their score to attract a higher payment, but also provides quite a safe environment for farmers to operate in. One problem with this simple model is that there is no penalty for sliding back down the score chart and farmers may take a commercial decision that for their land a score of 6 and 60% of the payment is the optimum commercial position and therefore there is no incentive to strive for improvement.

One way to possibly improve environmental improvement is to introduce a mechanism whereby if a score is in continual decline or even declines by more than one place, no payment is awarded. This builds in some protection to habitat quality, but could be unfair on farmers if a succession of seasonal climatic conditions conspired against a certain habitat type.

One way to encourage environmental excellence would be to load the payments heavily towards the higher scores. So for example a score 5 and below may attract no payment, a score 6 may receive only 30% of the payment, a 7 may attract 50% of the payment, but an 8 may attract 80%, a 9 attract 90% and a 10 100%. This would concentrate efforts on getting

habitats into the top 3 scores to maximise payments. This could work successfully in an area where the habitats are already in good condition. It may however be a barrier to farmers who have habitats that have undergone some intensification as the low payments during reversion may be a bar on participating.

It is possible that not all agreement holders on the same score receive the same payment. Under this scenario those farmers who started on a score six but progressed to a score 8 may be on an 80% payment, whereas those farmers who started on a score 10 and have regressed to a score 8 may be only on a 50% payment. This would get over the barrier of entry for farmers who had habitats with potential, but that have undergone intensification.

4.0 Capital Works

In order to enable some of the environmental outcomes to be achieved it is necessary to carry out capital works to improve habitat quality or facilitate changes in management. Some of the capital works items relevant are listed below;

- Erection of temporary or permanent stock proof fencing to control grazing distribution on certain habitat types or exclude access to watercourses
- Control of bracken and rushes
- Dry stone wall restoration. There are two types of drystone walling enclosing hay meadows. Some are boundary walls which are necessary to facilitate management of the land parcels as a separate unit and some are internal walls which just have a function as providing shelter and contributing to the character of the local area.
- Sites of specific works. This may include localised field drainage, rush control, liming and correction of soil nutrient levels
- General environmental works. Tree planting, hedge planting, hedge restoration, introduction of native seed, management and protection of historic monuments and increased visitor access.

5.0 Hay Meadows and Semi-natural Grasslands

The semi-natural grasslands in the Yorkshire Dales that are the focus of this pilot are hay meadows and smaller enclosed pastures. These areas tend to be the most productive parts of the farm, and so have come under most pressure from intensification. The typical seasonal use for these areas tends to be lambing ewes in the spring (March to May), closing for forage conservation in early summer (May to July), aftermath grazing by weaned lambs and often cattle in late summer (August to October), tupping of the ewes in autumn (October and November) and wintering hoggs during the winter (December to March).

This part of the farm is essentially the engine that drives many Dales farms. The forage that these areas can produce determines the stocking density the farm can sustain, the productivity and palatability of the sward determines the number of lambs that can be finished off grass, the number of twins that will be conceived at tupping, and the milk that ewes will give in early lactation. These factors all have a significant impact on the farms productivity and profitability. These areas of the farm are also the most responsive to inputs. The lower altitude and more fertile soils within the meadow enclosures mean that the response to fertilizer application, or reseeding is often good.

A change in management practices that requires a reduction in the intensity of use of the meadow enclosures impacts on the whole farming system. It reduces the number of animals that the farm can carry, increases the reliance on bought in forage, reduces the proportion of stock that can be sold prime, and generates a greater requirement to purchase concentrates to maintain the ME content of diets during late pregnancy and early lactation. When assessing the quality and production potential of a Dales farm the meadowland tends to be a main focus, as this is the part of the farm where there is potential through progressive farming techniques to increase the productivity of the farm. A successful results-based agri-environment programme needs to make the environmental commodity that can be produced from these areas competitive with the agricultural production that can be achieved in the alternative.

Where the economic climate rewards production, these areas can be successfully ploughed out and planted with new ryegrass and clover swards that are good both for forage and grazing. These swards require increased fertilizer inputs to maintain productivity but are much more responsive to fertilizer applications than traditional meadow swards. This level of intensification is undesirable from an environmental perspective, and in the mildest form leads to habitat degradation and in the more extreme example results in habitat loss.

Conservation of wildflower meadows requires harvesting the grass later than is normally done in intensively managed grassland in order to allow the flowers to bloom and set seed before the grass is cut. This late first cut results in fodder with a lower protein and higher lignin content, which is suitable for hay or poorer quality haylage. The possible use for this late cut hay is therefore restricted and the feed value derived is much less than the alternative. If management is orientated towards environmental outcomes these enclosures can be species rich hay meadows with diverse plant communities and form a valuable corridor within the wider habitat range, and therefore these are justifiable grounds for making payments to farmers to reform their management of such areas.

In order to manage areas of semi-natural grassland to maximum environmental benefit, it is necessary to significantly reduce the applications of fertiliser in order to deplete soil nutrient reserves and facilitate greater diversity of species composition. With this comes a requirement to reduce stocking rates as the carrying capacity of the land reduces due to nutrient impoverishment. Because the sward is less productive and slower growing, it is necessary to delay spring grazing and cutting dates and this is also necessary to allow flowers time to set seed before cutting.

On most mixed livestock farms the semi-natural grasslands are meadow areas which are relied upon for the production of conserved forage which then influences the farmer's ability to maintain stock through the winter. Reducing the intensity of the use of the meadows has a knock on effect on the intensity to which the pastureland and moorland is used and this affects the carrying capacity of the farm as a whole.

The additional activities that are required as a result of implementing this system of management are;

- spot treatment of weeds
- the adoption of traditional hay making techniques to ensure that the desired seed rain is achieved
- later cutting
- lower intensity spring grazing
- application of farm yard manure

6.0 Breeding Wader Sites

Management of breeding wader sites needs to focus on achieving the most desirable habitat conditions during the nesting season. Breeding waders need a variety of sward heights, and access to standing water and wet areas, to nest and raise their chicks. This necessitates a reduction in overall stocking density, particularly in spring and early summer.

Lowering the intensity of spring grazing has the effect of allowing some grasses to seed and for the rest of the season the palatability of the sward is reduced. This leads to more selective grazing by sheep and some areas of the sward deteriorating to poorer grass species. Cattle would generally be turned out in spring onto this ground, with calves at foot, at reasonably high intensity to mix graze with sheep. This type of grazing is detrimental to a breeding wader site and so cattle need to be accommodated elsewhere in the farming system during the wader breeding season.

In order to provide a good environment for breeding waders, the management practices need to deliver the following characteristics:

- Availability of suitable, undisturbed breeding habitats throughout April, May and June
- Damp site with high water table and some areas of shallow surface water, no new drains
- Minimum cover of soft rush up to a maximum 30% (when cutting, cut as low as possible and ideally remove cut material or at least graze after cutting with cattle)
- Good vegetation structure with a scattering of rush and a maximum 30% cover of soft rush
- Adequate grazing levels, particularly with cattle, to maintain vegetation structure and achieve specific sward height just prior to the nesting season
- Absence of invasive species, including scrub
- No vantage points for predators
- A diverse plant and invertebrate community
- No negative water impacts

Source; McGurn, P & Moran J (2013).

The main implications for income forgone are a reduction in grazing intensity in spring and a deterioration in the quality of the sward for the remainder of the season. Raising water levels also has implications for livestock performance. Wet ground tends to result in a greater incidence of lameness and contribute to a greater problem with liver fluke. This means that husbandry practices need to be changed and management intervention intensified to ensure that these problems do not compromise welfare or performance.

There is a requirement to avoid disturbance during the nesting season and minimise access with vehicles to nesting sites. To achieve this it is necessary to make a reduction in grazing intensity. This again applies to carry out work cutting and removing rushes which must be done outside the nesting season. In many cases it will be necessary to make capital improvements to the site by creating scrapes, fencing of water courses, installing stock proof fences and in some cases cleaning out ditches.

7.0 Methodology

To determine what constitutes a suitable payment rate under a results-based scheme it is necessary to work within the legal framework. Before carrying-out detailed costed proposals a series of farmer meetings were held within each of the Protected Landscapes to seek farmer input into the Option design and canvass opinion on payment rates. Whilst these did not generate substantive results, there was a general feeling amongst farmers that the payment rates under Higher Level Stewardship for hay meadow maintenance and restoration were too low and that farmers would not enter a further contract period at the same payment rates.

The calculations appended below have been based on a combination of gross margin data taken from the SAC Farm Management Handbook, data from the Rural Business Research (RBR), Farm Business Survey (FBS) and personal experience.

The payment rates under each Option needs to;

- fairly reward the farmer for additional management activities
- fairly compensate the farmer for income forgone
- represent value for public money
- be sufficient to attract participation
- target the areas of greatest environmental potential
- include an element of inflation for the contract period

The research data from the FBS for Less Favoured Area Grazing Livestock farms in Yorkshire and Humber is reproduced at Appendix 1. The figures are calculated at a farm scale and therefore do not account for the difference in land quality across a holding, they are also countywide and so are not specific to the Dales. The figures can however provide some context to the calculations and be used as a general health check. Set out below are the parameters that were referred to before carrying out the calculations for each option;

- Total Output £580.00/ha
- Gross Profit £417.60/ha
- Farm Gross Margin £382.00/ha
- Livestock output £359.00/ha
- Agri-environment £63.00/ha
- Single Payment Scheme £116.00/ha

In considering the opportunity cost of participating in a results-based agri-environment scheme, farmers will look at the above figures and use these to inform their decision making. The output figures for the meadow land and improved pasture will be considerably higher than the farm average, and this is particularly relevant to the figure for livestock output.

At the farmer meetings held within the protected landscapes, farmers were asked *'the level of payment they would need, to consider changing from optimum agricultural management, to optimum environmental management, for a hypothetical 20 hectare block of meadowland'*. There was a range in opinion, from £5,000 to £20,000 with a consensus that £10,000 per annum would be realistic and equitable. The opinion expressed was noticeably influenced by the inherent productivity of each respective farmer's meadow land. Those with flatter more fertile meadows were less inclined toward scheme participation unless the payment rates were high (>£10,000). The more traditional farmers higher up the Dales, who were more familiar with agri-environment participation, were prepared to consider participation at

a lower payment rate (<£10,000). Ironically the most important and best preserved habitats are generally located at the Dale heads.

As a starting point for calculating income forgone, typical stocking densities and gross margins for a non-scheme scenario were prepared. The basis for these calculations was the SAC Farm Management Handbook (relevant pages reproduced at Appendix 2). These figures were then amended to reflect the constraints of scheme participation to give a differential. Costings for the additional management requirements were formed using the Central Association of Agricultural Valuers (CAAV) Costings (reproduced at Appendix 3).

The payment calculation for the Hay Meadows and Species Rich Grassland Options is set out at Appendix 4 and the payment calculation for the Breeding Waders Option is set out at Appendix 5.

8.0 References

Russi D, Maque, Keenleyside C (2014) Results Based Agri-Environment Measures: Market Based Instruments, Incentives or Rewards? The Case of Baden-Württemberg. A Case Study Report prepared by IEEP with funding from the Invaluable Project.

McGurn, P & Moran J (2013). A National outcome-based Agri-Environment Programme under Ireland's Rural Development Programme 2014-2020. Report produced for the Heritage Council November 2013.

Keenleyside C, Radley G, Tucker G, Underwood E, Hart K, Allen B and Menadue H (2014) Results-based Payments for Biodiversity Guidance Handbook: Designing and implementing results-based agri-environment schemes 2014-20. Prepared for the European Commission, DG Environment, Contract No ENV.B.2/ETU/2013/0046, Institute for European Environmental Policy, London.

The Farm Management Handbook (2014)

Appendix 1

Rural Business Research Farm Business Survey Data

Farm Business Survey

FBS Region Reports

Year: 2014/15

Region: Yorkshire & Humber

Farm Type†: LFA Grazing Livestock

Select Report: Table 10 - Detailed Output and Input Costs

Note for time series reports: if you select "England" as the region then all available regions are shown, otherwise select a region and "All" as the farm type for all farm types.

Select Unit: Per Ha

Submit

Table 10 - Detailed Output and Input Costs Yorkshire & Humber LFA Grazing Livestock - Per Ha

Farms In Sample	38	**Farms In Sample**	38
Agricultural output	384	**Agricultural costs**	448
Crop output (excluding subsidies)	15	Variable costs	229
winter wheat	2	Crop specific costs	36
winter barley	1	seed	3
spring barley	3	fertilizers	27
other cereals	0	crop protection	3
oilseed rape	0	other crop costs	3
peas and beans	0	Livestock specific costs	162
potatoes	0	purchased feed & fodder	94
sugar beet	0	home grown feed & fodder	3
other crops	0	veterinary fees & medicines	26
by-products, forage and cultivations (excl. set-aside)	9	other livestock costs	40
Disposal of previous crops	0	Contract costs	21
Livestock output (excluding subsidies and payments to agriculture)	359	Casual labour	10
milk and milk products	7	Miscellaneous variable costs (including for work done on other farms)	0
dairy cattle	-0	Fixed costs	219
other cattle	102	Regular labour	7
sheep and wool	249	Machinery: fuels and oils (a)	26

pigs	0	Machinery: repairs and other (a)	22
eggs	0	Machinery depreciation	53
broilers and other poultry	0	Depreciation of glasshouses & permanent crops	0
other livestock (including horses)	0	General farming costs	53
Subsidies and payments to agriculture	0	Bank charges & professional fees	10
		Water, electricity and other general costs	30
		Share of net interest payments	13
		Write-off of bad debts	0
		Land and property costs	55
		Rent paid	44
		Maintenance, repairs and insurance	2
		Depreciation of buildings and works	10
Miscellaneous output (including agrcultural work done on other farms)	10	Miscellaneous fixed costs (including for work done on other farms)	4
Output from Agri-environment activities and other payments	63	**Costs of Agri-environment activities and other payments**	11
Agri-environmental schemes	63	Variable costs	0
Hill Farm Allowance	0	Fixed costs	11
Project based schemes	0	Labour costs	0
Other grants and subsidies	0	Machinery costs	0
		General farming costs (including share of interest)	2
		Land and property costs	9
Output from diversification out of agriculture	18	**Costs of diversification out of agriculture**	11
Food processing and retailing	2	Variable costs	1
Tourism	2	Fixed costs	10
Recreation	2	Labour costs	0
Rental income	7	Machinery costs	2
		General farming costs (including share of interest)	4
Other diversified output (including non agricultural hirework)	5	Land and property costs	4
Output from Single Payment Scheme	116	**Costs of Single Payment Scheme**	17
		SPS Fixed Costs (of which):	17
		SPS: labour costs	0
		SPS: machinery costs	0
		SPS: general farming costs	2
		SPS: land and property costs	15

a) " Machinery: fuels and oils" was only divided separately from "Machinery: repairs and other" - in 2007. Hence those data are only available for the years 2007/8 onwards (and the figures are missing for years before 2007).

Date: **10/3/2016** †NB: Change of type coefficients (Standard Outputs) from 2010/11 and onwards, and again from 2012/13. Excel Download (.xls)

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Farm Business Survey

FBS Region Reports

Year: 2014/15
Region: Yorkshire & Humber
Farm Type†: LFA Grazing Livestock
Select Report: Table 9 - Business Output, Input Costs and Income
Note for time series reports: if you select "England" as the region then all available regions are shown, otherwise select a region and "All" as the farm type for all farm types.
Select Unit: Per Ha
Submit

Table 9 - Business Output, Input Costs and Income Yorkshire & Humber LFA Grazing Livestock - Per Ha

	Cost Centre				
	Agriculture (j)	**Agri-environment and other Payments**	**Diversification out of Agriculture (k)**	**Single Payment Scheme**	**Farm Business**
Farms In Sample					38
Total Output	384	63	18	116	580
Variable Costs (b)	229	0	1	0	230
Total Gross Margin	155	63	17	116	350
Fixed Costs	*219*	*11*	*10*	*17*	257
Total Costs	*448*	*11*	*11*	*17*	487
Profit/(loss) on sale of assets (d)					3
Farm Business Income (e)	*-61*	*51*	*7*	*99*	96
Adjustment for unpaid manual labour (f)	*177*	*4*	*7*		188
Farm Corporate Income (g)	*-238*	*48*	*-0*	*99*	-91
Interest payments on borrowing (net of interest received) (c)	*13*	*0*	*0*	*0*	14
Farm Investment Income (h)	*-225*	*48*	*0*	*99*	-78
Holding gains not included in farm income:					93
Stock Appreciation (BLSA)					12
Revaluation of machinery, permanent crops, glasshouses, quota					2
Revaluation of land					80

Derivation of Net Farm Income:

(h) minus Imputed rent (i)	40
plus Directors remuneration	1
plus Ownership charges	14
minus Non-agricultural output historically not accounted for in Net Farm Income (k)	
plus Non-agricultural input costs historically not accounted for in Net Farm Income (k)	
plus Unpaid labour of principal farmer and spouse	167
***equals* Net Farm Income**	64

Footnotes:
(b) Includes casual labour costs which have been allocated between costs centres in proportion to total costs
(c) Interest payments have been allocated between cost centres in proportion to costs, and interest received in proportion to output.
(d) Assumed to be attributable entirely to agriculture
(e) Financial return to unpaid labour (farmers and other unpaid partners in the business) and to their capital invested in the farm business, including land and buildings. For corporate businesses it represents the financial return on shareholders' capital.
(f) Manual labour of farmer, spouse (if unpaid) and unpaid business partners.
(g) Represents the return on own capital invested in the farm business, to risk and to entrepreneurship.
(h) Represents the return on all capital invested in the farm business whether borrowed or not, to risk and to entrepreneurship.
(i) Net of imputed rent receipts.
(j) Within the results presented for 08/09 onwards, some of the fixed costs are notional for the four cost centres (italicised), being dependent upon allocation and apportionment of total farm business fixed costs across the four costs centres. Because of revisions to methodology, data from years preceding 08/09 are not directly comparable with 08/09 results. For more details refer to Appendix 2 (Item VI) of the (2008/09 Farm Accounts in England Defra statistics (http://webarchive.nationalarchives.gov.uk/20120118082040/http://www.defra.gov.uk/statistics/foodfarm/farmmanage/fbs/publications/farmaccounts/farm-accounts-2009/)). "Agriculture Output" Includes "Agricultural Contracting" (and costs for agriculture similarly include agricultural contracting).
(k) Excludes "Agricultural Contracting".

Date: **10/3/2016** †NB: Change of type coefficients (Standard Outputs) from 2010/11 and onwards, and again from 2012/13. Excel Download (.xls)

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Appendix 2

SAC Farm Management Handbook Gross Margin Data

UPLAND SUCKLER COWS - MAINLY SILAGE DIETS

PHYSICAL DATA

Breed: Commercial cows bred to a range of bulls, mostly continental.

Calving period	**Feb-Apr**	**May-Jun**	**Aug-Oct**
Calves weaned	92%	92%	92%
Month of weaning	October	February	July
Days to weaning	220	270	300
Month of sale	October	April	October
Lwt of calves: at weaning (kg)	260	310	340
Lwt of calves: at sale/transfer (kg)	260	350	400
Herd life of cows (years)	7	7	7
Herd life of bulls (years)	4	4	4
Cow mortality (%)	1	1	1
Calf mortality (%)	4.5	4.5	4.5
Cow:bull ratio (:1)	35	35	35
Feeding/cow and calf (winter days):	180	180	200
silage (t)	5.4	6.4	7.5
straw (t)	0.6	0.5	0.35
calf concentrates (kg)	100	500	350
cow concentrates (kg)	100	150	200
Grazing fertiliser (kg N/ha)	125	125	125
Silage & aftermath fertiliser (kgN/ha)	200	200	200
Silage:			
yield (t/ha from 1-cut)	23	23	23
DM quality (g/kg)	220	220	220
ME quality (MJ/kg DM)	10.5	10.5	10.5
Overall forage area (ha):			
silage and aftermath grazing	0.23	0.28	0.33
grazing	0.30	0.30	0.34
	0.53	0.58	0.67
Housing system: In cubicles*			
Straw for general use incl. calving pens	0.33	0.33	0.42
Straw bedding (t)	1.25	1.75	1.50

Cost @ £80/t bought in - adjust if home grown.

*Amend bedding costs for cows outwintered or housed on straw.

Assumptions:

Mainly grass farm either buying in all straw and concentrates or growing small amount of cereals. May/June calves weaned in February when on silage diets.

UPLAND SUCKLER COWS - MAINLY SILAGE DIETS

GROSS MARGIN DATA

Calving period			**Feb-Apr**	**May-Jun**	**Aug-Oct**
OUTPUT			**£/cow**	**£/cow**	**£/cow**
Calf sales (lwt - 92% crop)					
Steers		Heifers			
280 kg @ 220 p		240 kg @ 217 p	523	-	-
370 kg @ 220 p		330 kg @ 217 p	-	704	-
420 kg @ 220 p		380 kg @ 217 p	-	-	804
Scottish Beef Scheme			45	45	45
			568	749	849
Less: Replacement -	cow		108	108	108
	bull		30	30	30
			430	611	711
VARIABLE COSTS					
Cow concentrates @ £205/t			21	31	41
Calf concentrates @ £210/t			21	105	74
Vet & medicines			27	27	27
Straw feeding & bedding @ £80/t			74	66	62
Commission, haulage, tags & levies			42	49	52
			185	278	256
Gross Margin before forage			245	333	455
Forage variable costs:					
silage @ £197/ha			46	55	64
grazing @ £174/ha			52	52	59
			98	107	123
Total Variable Costs			283	385	379
GROSS MARGIN £/cow			147	226	332
GROSS MARGIN £/ha			274	390	498

Sensitivity-Change ±	**Change in Gross Margin/head (£)**		
10 p/kg in lwt sale price	24	32	37
Sale weight ± 10kg	20	20	20
Herd life ± 1 year	21	21	21

Replacement Cost prices:

Cull cow	£910	In-calf heifer (purch.)	£1,600
Cull bull	£1,080	Replacement bull	£5,250

IMPROVED HILL

PHYSICAL DATA

Breeds	Hill breeds inc Blackface hill type, NCC
Breeds of rams	Bluefaced Leicester, Border Leicester, North Country Cheviot, Texel, Suffolk
Lambing period	Assumed to commence 2nd week April.

		Lambs reared (%)		
		110%	**120%**	**130%**
Ewe hoggs wintered		Home	Home	Home
Lamb crops per ewe		4	4	4
Ram flock life (seasons)		3	3	3
		/100 ewes tupped		
Rams (no.)		3	3	3
Lamb numbers:	marked	113	123	133
	sold/retained	110	120	130
	sales: ewe lambs	10	20	30
	finished lambs	10	20	30
	store lambs	62	52	42
	flock replacement	28	28	28
Ewe numbers:	draft/cast	14	15	16
	mortalities	10	9	8
Ewe hoggs purchased		0	0	0
Wool sales (kg)		250	250	250
Concentrate feeding (kg)		2,500	3,000	3,500
Hay feeding		2,000	2,000	2,000
Hay reserve (/annum) (kg)		1,500	1,500	1,500
Bedding straw (6-wk period) (kg/day)		80	80	80
Rotational grazing assumed (ha)		2	2	2
Improved permanent pasture assumed (ha)		10	10	10

Basis of data:

1. Estimate of stock prices autumn/early winter 2014.
2. Finished lambs – assume 36 kg liveweight (16-17 kg carcase weight).
3. Ewes are first tupped as Gimmers.
4. Mortality in ewe is assumed to be 3%.
5. Ewe concentrate feeding – ideally a balanced compound CP 180g/kg.
6. The level of concentrate feeding, the quality of hill land, the availability of improved or inbye grazing, the system of management and their combined effects on performance can vary greatly from farm to farm.

IMPROVED HILL

GROSS MARGIN DATA

				Lambs reared (%)		
				110%	**120%**	**130%**
OUTPUT				**£/100 ewes tupped**		
Ewe lambs:	10	@	£75	750	-	-
	20	@	£75	-	1,500	-
	30	@	£75	-	-	2,250
Finished lambs:	10	@	£61 (36kg lwt)	612	-	-
	20	@	£61	-	612	-
	30	@	£61	-	-	612
Store lambs:	62	@	£46	2,852	-	-
	52	@	£46	-	2,392	-
	42	@	£46	-	-	1,932
Draft/cast ewes:	14	@	£55	760	760	760
Wool sales 250kg @ £1/kg				250	250	250
				5,224	5,514	5,804
Less: ram replacement (net)				450	450	450
				4,774	5,064	5,354
VARIABLE COSTS						
Sheep feed @ £230/t				575	690	805
Vet, medicines & dips				435	442	448
Bedding straw @ £80/t				269	269	269
Commission, levies, haulage, shearing, scanning & tags				619	658	699
				1,898	2,059	2,221
Gross margin before forage				2,876	3,005	3,133
Forage variable costs:						
0.5 ha hay @ £139/ha				70	70	70
rotational grazing @ £128/ha				256	256	256
improved permanent pasture @ £50/ha				500	500	500
				826	826	826
Total Variable Costs				2,724	2,885	3,047
GROSS MARGIN				2,050	2,179	2,307

Sensitivity-Change ±	**Change in Gross Margin/100 ewes (£)**		
10 p/kg lwt in finished lamb price	35	658	1,282
£5/hd in all lamb sales	410	1,072	1,734
£5/hd in cast ewe price	69	69	69

DRAFT BLACKFACE EWES

PHYSICAL DATA

Breeds: Draft Blackface to a terminal or crossing sire
Lambing period: Commencing mid-March

		Lambs reared (%)		
		130%	**140%**	**150%**
Ewe flock life (seasons)		1.5	1.5	1.5
Ram flock life (seasons)		3	3	3
		/100 ewes tupped		
Rams (no.)		2.5	2.5	2.5
Lamb numbers:	marked	133	143	153
	sold/retained	130	140	150
	sold: store	32	27	22
	finished	65	70	75
	breeding	33	43	53
Ewe numbers:	sales	64	64	64
	mortalities	3	3	3
	purchased	67	67	67
Wool sales (kg)		250	250	250
Concentrate use:				
Ewe concentrate: ME 12.5 MJ/kg, 18% CP (kg)		3,500	4,000	4,500
Forage: hay-12,600 kg and aftermath grazing (ha)		1.8	1.8	1.8
grazing (ha)		8.0	8.0	8.0
Total forage (ha)		9.8	9.8	9.8
Bedding straw (6-wk lambing period) (kg/day)		80	80	80

Basis of data:

1. Breeding stock prices, autumn 2014.
2. Estimate of finished and store lamb prices, summer and autumn 2014.
3. Hay yield and quality 7 t/ha; ME 8.5 MJ/kg DM.
4. Hay and aftermath grazing fertiliser level 125 kg N/ha; grazing fertiliser level 125 kg N/ha.
5. Liveweight of lambs at sale: 36 kg, 32 kg store or sold as ewe lambs for breeding.
6. Straw bedding based on 80 kg/day for 100 ewes housed over a 6 week lambing period.

DRAFT BLACKFACE EWES

GROSS MARGIN DATA

			Lambs reared (%)		
			130%	**140%**	**150%**
OUTPUT			**£/100 ewes**		
Ewe lambs:	33 @ £80		2,640		
	43 @ £80			3,440	
	53 @ £80				4,240
Finished lambs:	32 @ £61	(36 kg lwt)	1,958	-	-
	27 @ £61	(36 kg lwt)	-	1,652	-
	22 @ £61	(36 kg lwt)	-	-	1,346
Store lambs:	65 @ £46		2,990	-	-
	70 @ £46		-	3,220	-
	75 @ £46		-	-	3,450
Cast ewes:	64 @ £45		2,865	2,865	2,865
Wool sales 250kg @ £1/kg			250	250	250
			10,703	11,427	12,151
Less: ewes purchased - 67 @ £70			4,690	4,690	4,690
ram replacement (net)			375	583	583
			5,638	6,154	6,878
VARIABLE COSTS					
Ewe concentrate @ £230/t			805	920	1,035
Vet, medicines & dips			458	465	471
Bedding straw @ £80/t			269	269	269
Commission, levies, haulage, shearing, scanning & tags			1,135	1,189	1,244
			2,667	2,843	3,019
Gross margin before forage			2,971	3,311	3,859
Forage variable costs:					
hay @ £139/ha			250	250	250
grazing @ £166/ha			1,328	1,328	1,328
Total Variable Costs			4,245	4,421	4,597
GROSS MARGIN			1,393	1,733	2,281

Sensitivity-Change ±	**Change in Gross Margin/100 ewes (£)**		
10 p/kg lwt in finished lamb price	111	94	77
£5/hd in store lamb price	325	350	375
£5/hd in breeding stock value	165	215	265
£5/hd in cast ewe price	318	318	318
£5/hd in ewe purchase price	335	335	335

Appendix 3
CAAV Costing Guide

			IMPERIAL				METRIC		
			£/acre				£/ha		
	Ref	acres per day	total cost	ex-labour	depreciation deduction	ha per day	total cost	ex-labour	depreciation deduction
F. HAYSEL AND HARVESTING									
F1. Silage making (cutting, harvesting, clamping)	F1		65.25	47.40	23.85		161.20	117.10	58.95
Big bale silage (cutting, baling, wrapping; excl. carting/stacking)			98.10	77.05	26.95		242.40	190.40	66.60
F2. Cutting and conditioning	F2	35	12.85	9.55	4.00	14	31.80	23.65	9.95
F3. Turning	F3	50	6.05	3.75	1.90	20	14.95	9.25	4.75
F4. Forage harvesting (excl. carting and camping)	F4	50	20.80	18.45	11.20	20	51.35	45.60	27.65
F5. Baling									
(a) Small bales, hay, 1500/day, per bale	F5(a)	10	0.35	0.25	0.10				
straw, 2000/day, per bale		20	0.25	0.20	0.05				
(b) Big round bales, net wrapped, hay, 360/day, per bale	F5(b)	40	2.90	2.55	1.00				
straw, 360/day, per bale		48	2.90	2.55	1.00				
silage (excl. plastic wrap), 220/day, per bale		22	4.35	3.85	1.65				
(c) Square bales, 80x90, twine, hay, 277/day, per bale	F5(c)	40	6.05	5.65	2.65				
straw, 257/day, per bale		48	6.55	6.10	2.85				
(d) Bale wrapping (big round bales, 300 bales/day), per bale	F5(d)	33	3.90	3.50	0.50				
F6. Carting off and stacking (straw, hay and silage)									
(a) Conventional small bales, per hour	F6(a)		93.50	50.15	25.90				
(b) Big round bales, per hour	F6(b)		73.60	44.70	17.35				
(c) Big square bales, (80x90 section), per hour	F6(c)		73.85	44.95	17.45				
F7. Combining cereals (including carting corn but exclusive of drying and dressing)									
(a) On smaller farms (add 10% if autocasting)	F7(a)	50	31.45	26.55	12.45	20	77.75	65.65	30.80
(b) On larger farms (add 10% if autocasting)	F7(b)	75	30.75	25.95	12.90	30	76.00	64.10	31.85
G. TRIMMING AND TOPPING									
G1. Hedge cutting and/or ditch flailing, per hour	G1		41.85	27.40	11.35				
G2. Topping	G2	30	9.10	5.25	2.70	12	22.45	12.95	6.60
H. IRRIGATION									
Application costs excluding source and Environment Agency charges.									
H1. Irrigation from supply, per acre inch. 0.4 acre inches per hour	H1		45.35	36.30	19.30		112.05	89.70	47.70
H2. Filling a reservoir, per 100m³	H2		18.65	16.85	6.05				
J. LIVESTOCK REARING									
J1. Feeding stock with feeder wagon, per hour	J1		49.95	35.50	7.15				
J2. Manure carting (formerly Labour to Manure), cost per 8 hour day	J2		612.40	381.15	129.65				
Cost per tonne can vary: £1.50 - £3.00/tonne									
J3. Manure spreading, cost per 8 hour day	J3		484.20	368.55	170.00				
J4. Slurry spreading, cost per 8 hour day	J4		377.20	261.55	98.75				

Appendix 4

Payment Calculation for Hay Meadows and Species Rich Grassland Option

OPTION: Management of Hay Meadows and Species-rich Grassland

Changes to Management Practices

Reduced stocking density
Reduced fertilizer input
Re introduction of traditional haymaking
Spot treatment of weeds
Application of farmyard manure
Additional time to monitor and score
Additional time to manage stocking levels

Economic Implications

Reduced crop yield
Reduction in feed grazing/feed value
Increased labour input
Capital cost of machinery/contract charges

Income Forgone

1	**Enterprise Gross margin (baseline) 1.4LSU/ha**	£/head	£/ha	Forage
1.1	Hill suckler cow (spring calving)	£350.00	£227.50	-£65.00
1.2	Hill breeding sheep (swaledale pure or x with blue faced leicester)	£30.00	£281.25	-£75.00
			£508.75	£368.75
1	**Enterprise Gross margin (RBAPS) 0.85LSU/ha**	£/head	£/ha	Forage
1.1	Hill suckler cow (spring calving)	£350.00	£140.00	-£40.00
1.2	Hill breeding sheep (swaledale pure or x with blue faced leicester)	£30.00	£168.75	-£45.00
			£308.75	£223.75
	Income forgone		*£145.00*	

Additional Costs

2	**Management activity**	Baseline £/ha	RBAPS £/ha	Difference £/ha
2.1	Weed control	£17.70	£44.00	£26.30
2.2	Purchased concentrate (to compensate for reduced ME content)	£0.00	£35.00	£35.00
2.3	Purchased forage (to compensate for reduced forage yield)	£0.00	£150.00	£150.00
2.4	Fertilizer cost	£140.00	£0.00	-£140.00
2.5	Haymaking Costs (exclusively contract)	£0.00	£458.00	£458.00
2.6	Silage making costs (exclusively contract)	£245.00	£0.00	-£245.00
2.7	Additional shepherding time to achieve optimum grazing	£0.00	£25.00	£25.00

2.8	Time spent monitoring and scoring habitat	£0.00	£20.00	£20.00
				£329.30
	Addition costs		*£329.30*	

Additionality/Transaction Costs

3	**Incentive Payment**		£/ha	
3.1	Training days and soil testing		£30.00	
3.2	Management of walls and barns as historic features		£50.00	
	Incentive payment		*£80.00*	

Option Payment ***£554.30***

E & O E

Capital Works/Additional Actions Supplement

4	**Additional Activity**	£/ha	£/m	
4.1	Introduction of native seed	£200.00		
4.2	Dry stone walling		£35.00	
4.3	Riparian fencing		£7.50	
4.4	Hedgerow planting		£25.00	
4.5	Field drainage			75% cost
4.6	Control of rushes	£120.00		
4.7	Site specific works including liming			75% cost

Appendix 5

Payment Calculation for Breeding Waders Option

OPTION: Management of Grassland for Wading Birds

Changes to Management Practices

Reduced stocking density
Reduced fertilizer input
Spot treatment of weeds
Application of farmyard manure
Additional time to monitor and score
Additional time to manage stocking levels
Management of rushes

Economic Implications

Loss of spring and winter grazing
Reduction in grazing value
Increased liver fluke
Increased labour input
Capital cost of machinery/contract charges

Income Forgone

1	**Enterprise Gross margin (baseline) 1.30LSU/ha**	£/head	£/ha	Forage
1.1	Hill suckler cow (spring calving)	£350.00	£210.00	-£60.00
1.2	Hill breeding sheep (swaledale pure or x with blue faced leicester)	£30.00	£262.50	-£70.00
			£472.50	£342.50
1	**Enterprise Gross margin (RBAPS) 0.60LSU/ha**	£/head	£/ha	Forage
1.1	Hill suckler cow (spring calving)	£350.00	£105.00	-£30.00
1.2	Hill breeding sheep (swaledale pure or x with blue faced leicester)	£30.00	£112.50	-£30.00
			£217.50	£157.50
	Income forgone		*£185.00*	

Additional Costs

2	**Management activity**	Baseline £/ha	RBAPS £/ha	Difference £/ha
2.1	Weed control	£12.00	£32.00	£20.00
2.2	Rush control	£0.00	£30.00	£30.00
2.3	Ditch management	£0.00	£10.00	£10.00
2.4	Fertilizer cost	£40.00	£0.00	-£40.00
2.5	Additional livestock husbandry	£0.00	£25.00	£25.00
2.6	Extended spring housing of suckler cows	£0.00	£18.00	£18.00

2.7	Additional shepherding time to achieve optimum grazing	£0.00	£25.00	£25.00
2.8	Time spent monitoring and scoring habitat	£0.00	£20.00	£20.00
				£108.00
	Addition costs		*£108.00*	

Additionality/Transaction Costs

3	**Incentive Payment**		£/ha	
3.1	Training days		£20.00	
3.2	Management of historic features		£30.00	
	Incentive payment		*£50.00*	

Option Payment ***£343.00***

Capital Works/Additional Actions Supplement

4	**Additional Activity**	£/ha	£/m	
4.1	Creation of scrapes		£10.00	(m2)
4.2	Dry stone walling		£35.00	
4.3	Riparian fencing		£7.50	
4.3	Hedgerow planting		£25.00	
4.4	Management of drains			75% cost
4.5	Control of bracken or dense rush	£120.00		
4.6	Site specific works			75% cost