SAC Consulting

# Impact of woodland creation on farm profitability –

# Financial modelling of farm forestry options

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September 2010

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# Executive summary

1. Scottish Government targets aim to achieve annual woodland planting rates of up to 15,000 ha per year in practice planting rates are barely 1/3 this level. Much of this planting will need to be on agricultural land, so far farmer uptake of tree planting has been limited. A range of barriers have been identified. The Scottish Government have requested SAC to investigate financial barriers to woodland creation on farm.

2. This study models the financial impacts of planting new woodlands on a proportion of agricultural land (25%) on three broad farm types; arable, improved grassland and unimproved grassland. The impact of woodland planting on land values and timber income were also considered in outline. The study does not consider farmer behavioural and attitudinal barriers.

4. Woodland costs and returns were prepared based on standard forestry costs and prevailing grant schemes. Farm costs and returns were based on recorded financial results from the Farm Accounts Scheme (FAS).

5. While all woodland planting options generated positive cash flows over the 15 year time frame, on most farm types this was insufficient to offset losses in agricultural income without restructuring of the farm's fixed costs.

6. On improved land woodland planting can not compete with agriculture unless labour and machinery fixed costs are reduced pro rata with the planted area. The inability of farmers to reduce fixed costs when planting trees is often cited as a major barrier to uptake. However, in the medium to longer term most farms are capable of restructuring and using contractors to reduce labour, machinery costs in line with reductions in farmed area.

7. Where farm labour and machinery costs can be reduced woodland planting on all land types becomes competitive except for conifers on improved land. This excludes any compensation to the farmer for the loss of land use flexibility and any reduction in land values which would be most significant on improved and arable land.

9. Expected reductions in the Single Farm Payment post 2013 CAP reform are unlikely to reduce agricultural incomes by enough on their own to significantly improve the uptake of forestry planting

10. Many family farms remain in business because of unpaid family labour. Once this extra cost is considered then agricultural income is sharply reduced and forestry becomes relatively more attractive financially. However, enabling farmers to recognise this oversight is a major challenge and requires a longer term approach to change perceptions and attitudes and so this option has not been considered as practical in this report.

11. Rising timber prices have the potential to make timber income a significant driver of the planting decision. However, farmers need for cashflow reduces the attractiveness of future income streams and ways to improve cashflow maybe required. On better sites this may include the pursuit of Short Rotation Forestry or the development of some form of annual lease payment funded by investment funds.

11. This study is a modelling exercise and results may vary significantly in practice. A follow up study is proposed to look in detail at actual farm forestry costs and returns using farm case studies. These would fully assess the financial impact on the farm business, land values, timber income, carbon payments and non financial benefits such as shelter. It is suggested that the case studies could be undertaken on the recently announced Climate Change Focus farms as part of the Scottish Government's Farming for A Better Climate initiative.

# 1) Introduction and objectives

### 1.1 Forestry planting targets

The Scottish Government's Climate Change Delivery Plan[1] states (paragraph 6.21) that Ministers have endorsed the Scottish Forestry Strategy target to increase woodland cover to 25% of Scottish land area (by the second half of the century). This will require additional planting levels of up to 15,000 ha/yr, compared with the current average rates of 4,000-5,000 ha/yr.

The *Scottish Government's Rationale for Woodland Expansion*[2] sets out several woodland creation scenarios in order to meet these targets including considerable planting on agricultural land as follows; arable +40,000ha, improved grassland +180,000ha and unimproved grassland +420,000ha.

**Table 1 – Land use scenarios to 2050**

| | **2009** ('000's ha) | **2050** ('000's ha) | **Change** ('000's ha) | **Change** (%) |
|---|---|---|---|---|
| **Grass** | 1,364 | 1,184 | -180 | -13% |
| **Crops** | 587 | 574 | -40 | -7% |
| **Rough grazing** | 3,429 | 3,009 | -420 | -12% |
| **Built-up area** | | | -10 | |
| **Woodland area** | 1,341 | 1,991 | +650 | +48% |

These targets remain highly optimistic given recent rates of planting on private land in Scotland of just 5,400 ha/yr between 2003 and 2008.

Barriers to woodland establishment on farmland include;

- (i) cultural resistance, including concerns over loss of food production potential;
- (ii) lack of awareness of the potential benefits of woodland and
- (iii) the potential impact on the finances of the farm business.

[1] http://www.scotland.gov.uk/Publications/2009/06/18103720/7

[2] http://www.forestry.gov.uk/forestry/infd-7fweq5

This study is intended to address the third of these barriers by providing information that will improve farmers' understanding of the potential impact of wood creation on farm business profitability[3].

### 1.2 Objectives of the study

The purpose of this study is to examine the impact of woodland creation on farm business profitability in Scotland in order to provide guidance for farmers who are considering establishing woodlands.

This study will also provide the government with farm forestry "models" that can be adjusted to gauge the level of forestry incentives required to meet targets.

The forestry estimates include the costs of establishment and maintenance; grants; agricultural income foregone.

The models will incorporate full details of agricultural costs and returns at current values to estimate the agricultural income foregone. These models are based on, as far as possible, "typical" farm types in their land type with details of the enterprises, labour, machinery, rent and other cost elements included. Farm Account Scheme data has been used as a source of recorded benchmark data.

The study has also looked in outline at other benefits to the farm enterprise (e.g. shelter, sporting, wood fuel and potentially carbon sequestration); and potential market value of woodland after 10/15 years.

Wherever possible published datasets have been used, but it is recognised that professional judgement will be required, for example to determine the extent to which woodland creation will reduce agricultural fixed costs and to determine the appropriate time series for farm business survey data that is used.

[3] In 2003 SAC prepared a report for FCS, SNH and the Scottish Executive on *Farm Woodland Design in Scotland* which highlighted potential benefits of farm woodlands. This helped inform a subsequent publication *The creation of small woodlands on farms* – see http://www.forestry.gov.uk/swof.

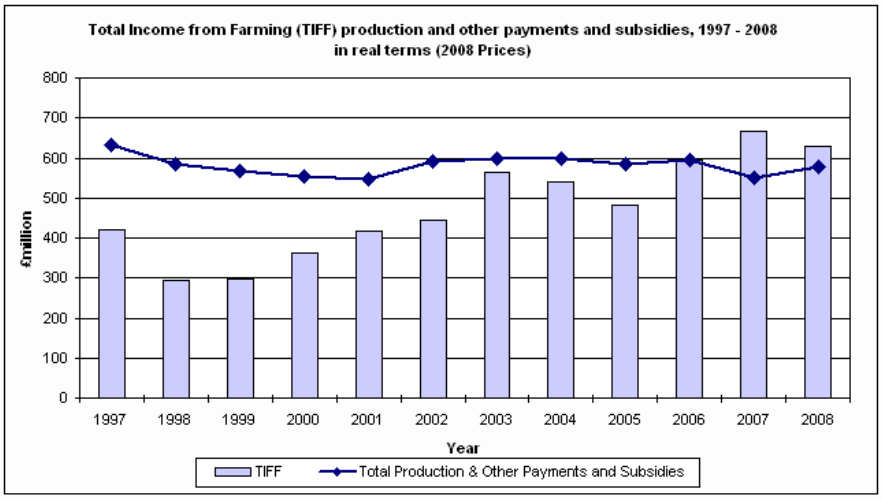
This study is in two parts. The first part is to create these theoretical models for the three farms types and the three planting schemes (native, conifer and mc/bl) and the second is to ‘test’ this model on real farms under the Farming for a Better Climate focus farms programme.

# 2) Background

## 2.1 Farm income in Scotland

Farm incomes in Scotland have risen steadily over the last decade from a low of around £300m in 1998 to a high of around £660m in 2007. Over the same period subsidy payments have been relatively stable with the result that in 2007 Scottish agriculture generated a profit net of subsidies for the first time in over 10 years. The overall conclusion is that Scottish agriculture has increased the level of returns from the market place significantly in recent years but that the sector as whole remains highly dependent on subsidy to generate a net return.

**Figure 1: Total Income from Farming in Scotland**



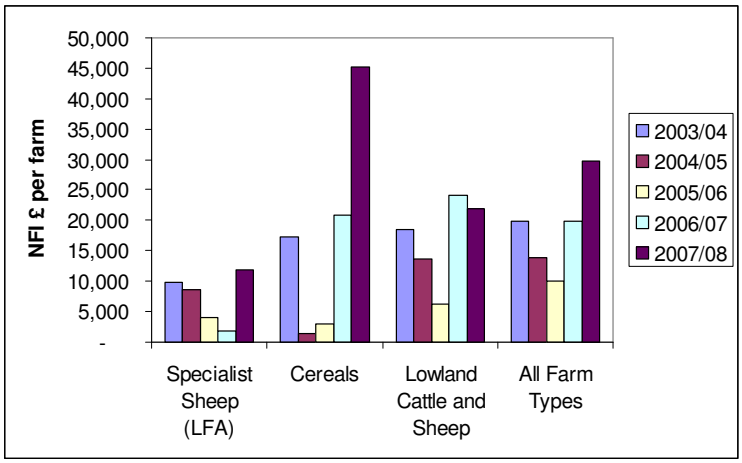

*Source: Scottish Government*

Looking more closely at individual farm types as classified under the Farm Accounts Scheme (FAS) a wide disparity in income levels is seen. Income levels are generally significantly higher in non-Less Favoured Areas particularly in the more intensive sectors such as cereals, general cropping and dairy. By contrast returns on LFA farm types are sharply lower.

While all farm types recorded a rise in net farm income in 2007/08, this was on the back of exceptionally high global commodity prices and a weakening sterling exchange rate and may turn out to be an exceptional year. The chart below shows

Net Farm Income (NFI) on selected farm types in Scotland over the last 5 years. Incomes on cereal farms were exceptionally high relative to the long term trends.

**Figure 2: Net Farm Income by selected farm type in Scotland**




*Source: Scottish Government and SAC*

Looking more closely at individual farm types it is apparent that some farm types are far more reliant on subsidy than others. In 2007/8 LFA sheep and beef farms were the most dependant at over 50% of output provided by subsidies compared to arable and dairy units were subsidies represented less than 20% of output. The financial viability of beef and sheep farms in upland areas without subsidies therefore looks extremely vulnerable. With the downturn in commodity prices since 2007/08, the share of subsidies as a proportion of farm output is also expected to rise in the cropping and dairy sectors.

Historical perspective

The most recent estimates of Net Farm Income produced by the Farm Accounts Scheme are for 2007/08. Given that many agricultural commodity markets have fallen back sharply these estimates may be overstating agricultural income on some farm types at current prices. Farm incomes recorded by FAS in 2007/08 were 60% higher averaged for all farm types than the 5 year average. Within farm types, cereal farm incomes were most inflated at 157% above the 5 year average followed by Specialist sheep + 64% and Lowland cattle & sheep + 29%.

The tables below show how NFI has changed by farm type per farm and per ha over the last 5 years.

**Table 2 – Net Farm Income by farm type in Scotland**

**Average NFI £/farm**

| | 2003/04 | 2004/05 | 2005/06 | 2006/07 | 2007/08 | *5yr av* | 2007/08 vs 5 yr average £/ha | % |
|---|---|---|---|---|---|---|---|---|
| Specialist Sheep (LFA) | 9,894 | 8,644 | 4,053 | 1,900 | 11,900 | *7,278* | 4,622 | 64% |
| Cereals | 17,271 | 1,461 | 3,098 | 20,800 | 45,200 | *17,566* | 27,634 | 157% |
| Lowland Cattle and Sheep | 18,538 | 13,631 | 6,242 | 24,000 | 21,800 | *16,842* | 4,958 | 29% |
| **All Farm Types** | 19,836 | 13,837 | 10,106 | 19,800 | 29,800 | *18,676* | 11,124 | 60% |

*Source; Scottish Government and SAC*

Making comparisons between agricultural land use and forestry using 2007/08 figures may therefore be considered unduly weighted against forestry. Therefore in this study the average of FAS data over the two year period 2006/07 and 2007/08 has been used.

## 2.2 Impact of tree planting on farm profitability

Planting new woodland on agricultural land has a range of impacts on the finances of the farm business. On the downside output falls on lower crop and livestock sales and subsidy payments. On the plus side variable and some fixed costs are also reduced.

**Table 3 - Agricultural costs and returns – impacts of tree planting**

| Factor | Negative | Positive |
|---|---|---|
| Crop and livestock output | Lower income £- | |
| Agricultural subsidies | Lower income £- | |
| Variable costs | | Lower cost £+ |
| Fixed costs - labour & machinery costs | | Lower cost £+ |
| Fixed costs – land costs (rent, maintenance) | Unchanged | Unchanged |
| Farmer & spouse manual work | | Reduced workload £+ |
| Woodland grants | | Additional income £+ |
| Timber income | | Additional income £+ |
| Woodland planting & maintenance costs | Increased costs £- | |
| Shooting income | Depends | Depends |

Woodland costs and returns

Planting woodland entails a range of costs and returns. In the short to medium term, these relate purely to planting and related subsidy payments. For most farmers, consideration of timber value is secondary due to the extended time scales involved.

### Table 4 - Forestry costs and returns

| Factor | Negative | Positive |
|---|---|---|
| Woodland grants | | Additional income £+ |
| Timber income | | Additional income £+ |
| Woodland planting & maintenance costs | Increased costs £- | |

## 2.3 Other farm benefits of tree planting

Shelterbelts

- Planting a shelter belt will reduce the land available for crops and grazing.

- Studies have shown that shelterbelts can increase arable crop yields by between 3.5% and 26%. This is due to decreased wind erosion, improved microclimate and reduced wind damage to crops. Shelterbelt height and longevity, field width and shelterbelt orientation can influence effectiveness.

- Shelterbelts can also improve livestock productivity by increasing pasture productivity, provide shelter and reduce the effects of 'wind chill'.

- The energy stock would normally expend on maintaining their body temperature can then be utilised for meat and milk production as well as increasing body condition and reproduction successes.

- It has also been stated that shelterbelts can reduce the distance an odour travels. This could be an indirect benefit to the farm if they wanted to expand and required planning consent.

Sporting and amenity

Judicious small scale woodland plantings on farm can bring a significant improvement in the shooting and amenity value of agricultural land which can bring short term cash flow benefits through shooting lets and longer term capital benefits from increased land values under certain situations.

## 2.4 Land and woodland values

Potentially one of the largest financial impacts of tree planting is changes in land values. Generally the more productive the land the greater the loss in capital value when tree planting occurs. In some circumstances tree planting can enhance the capital value of the farm as a whole through improvements in amenity, shelter and shooting.

As with other rural valuations there are three underlying influences on the value of woodlands;

i) the value of the land
ii) the value of the timber or potential income and
iii) the desirability of the woodland

Woodland values follow some general trends that can be applied to these models (there are other patterns that woodlands sales follow however these are often geographical and cannot be applied here).

A) For conifer plantations the value increases as the crop approaches maturity

B) For native woodlands, the desirability is often well in excess of the timber plus land valuation and as such can skew the expected difference between native and productive conifer woodlands. For example, a 10ha native or mixed conifer / broadleaved woodland can often sell for over £3,500ha due to the attraction to 'hobby' buyers. As this model is based on planting an arable farm, and as most arable farms are within couple of hours drive of large urban areas, this value is most appropriate for use on the 10ha native woodland. The larger native woodlands may be out of the price range of these hobby buyers and therefore their unit value can decrease with scale.

C) The value of native woodland does not increase in value over time as much as a conifer plantation of the same size.

In practice the impact on land values will be very site specific. A clearer idea of the impact in practice will be obtained in the second phase of the study where woodland planting proposals on case study farms will be assessed.

**Table 5 – forestry and land value estimates**

| Farm | Land Value Pre- planting (£/ha) | Land value after planting (£/ha) | Mid rotation value (£/ha) | End rotation (40 years) (£/ha) |
|---|---|---|---|---|
| 10ha Arable Mixed C /BL | 5,000 -17,300 | 1,500[1] | - | 3,000 – 4,000 |
| 35ha Improved Native | 1,250 – 5,000 | 1,200[2] | - | 2,500 -3,500 |
| 35ha Improved Conifer | 1,250 – 5,000 | 1,500 | 1,300 - 2400 | 3,300 – 4,200 |
| 150ha Unimproved Native | 125 – 1,600 | 500[3] | - | 1,200 – 1,800 |
| 150ha Unimproved Conifer | 125 – 1,600 | 1,500 | 1,300 - 2400 | 3,800 – 4,200[a] |

Source: SAC industry contacts

Notes

[1] A 10ha woodland in a lowland area with good access will attract hobby buyers. A young woodland maybe more attractive than a mature one as keen amateur foresters would be interested in early management works (pruning, creating paths), Also the site will be under obligation from planting grants, and as such will receive the maintenance grants but the new owner will have to ensure successful establishment.

[2] A 35ha woodland in an SDA area will be worth less per ha as it is less likely to be near an urban area and to buy the whole woodland maybe out of range for a lot of buyers.

[3] A large native woodland on an upland site will be out of range of hobby foresters and will also have little timber income potential. It would increase in value as mature woodland due to interest from conservation organisations.

[a] Large coniferous woodlands sell for higher per ha than smaller coniferous woodlands as they attract investment and tax buyers

# 3) Methodology

## 3.1 Introduction

This report incorporates forestry costs and grants, agricultural market and subsidy income forgone and costs saved.

Further assessment of the potential impact of changes in land valuation, woodland valuation and timber values have been excluded from the model.

General assumptions

**-** *Forestry plantings to supplement not replace agricultural activity.*
This is a study of farm forestry, rather than creating forests on farms, therefore a model has been used that retains a viable agricultural operation after a set area has been taken up by tree planting. After looking at farm data sets and average farm size, it was decided that each planting area would take up no more than 25% of the total farm size. This has guided the choice of planted area; 10 ha on the arable unit, 35ha on the improved grassland land and 150ha on the unimproved land.

- *The farmer will always go for the most profitable option.*
    - based on a 15 year timescale

- *Models and assumptions remain to be tested and may change*
- as part of further practical farm case studies

Farm and planting scenarios

Three representative farm types were selected based on data collected by the Farm Accounts Scheme (FAS).

**Table 6 - farm types and planting options used in study**

| Option | Land type | Mixed woodland | Native woodland | Productive conifers |
|---|---|---|---|---|
| 1 | **Arable land (non LFA).** "Scotland - cereal (non-LFA) farms" (FAS) | 10 ha | | |
| 2 | **Improved grassland (LFA).** "Scotland – specialist beef (LFA) farms" (FAS) | | 35 ha | |
| 3 | "" "" "" | | | 35 ha |
| 4 | **Unimproved grassland (LFA).** "Scotland - specialist sheep (LFA) farms" (FAS) | | 150 ha | |
| 5 | "" "" "" | | | 150 ha |

### 3.2 Agricultural income foregone

The decision to plant agricultural land with trees results in the following financial impact on the farm business.

Negative

- loss of agricultural income
- loss of agricultural subsidies
- retention of other fixed costs which result in a higher burden for the remaining land in agricultural production

Positive

- reduction in variable costs
- reduction in some fixed costs

Estimates were prepared of the net loss to the farm business for every hectare of land planted to trees. These estimates were based on the average of the Farm Accounts Scheme data for 2006/07 and 2007/08 for the three farm types modelled. Three farm cost scenario were assessed;

(i) **Full** – where the farm retains the full burden of fixed costs. In the short term a farm may not be able to reduce its level of labour and machinery to match the reduction in productive agricultural area. This is especially the case where a farm relies on supplying its own labour and machinery without the use of outside contractors.

(ii) **Less Operations** – where the farm is able to reduce the level of operational fixed costs (labour & machinery). In the medium to longer term most farms should be able to reduce their labour and machinery costs to match the reduction in productive agricultural area. This is particularly true were the farm uses contractors to supply labour and machinery rather than supplying it in house. Land fixed costs will however be retained such as rent, maintenance etc

(iii) **+ Less Farmer labour** – as above but also with a reduction in the cost of family labour. Most farm types record a considerable level of unpaid farm labour. It is assumed that planting land with trees frees up family labour so lowering these unaccounted for labour costs.

Based on the these scenarios estimates for agricultural income foregone per ha planted with woodland were calculated as follows;

**(i)** **Full** = total fixed costs + Net Farm Income
LESS miscellaneous income (e.g. cottage and shooting lets which are not assumed to be linked to agricultural activity)

**(ii)** **Less operations** = land fixed costs (rent, maintenance) + Net Farm Income
LESS miscellaneous income

**(iii)** **+ Less Farmer labour** = land fixed costs + NFI
LESS miscellaneous income + farmer labour

### 3.3 Costs and returns from woodland planting

As these are theoretical planting sites the study has made a number of assumptions

**Costs**

The original intention was to make a number of assumptions about the requirements for the theoretical planting schemes and apply these to the models, for example fencing costs, professional fees and operational expenditure, whilst at the same time using the Forestry Commission standard costs for the planting (which are themselves based on a number of assumptions such as a certain area for each scheme, bracken sprayed, area for mounding etc).

However, it became apparent that the more assumptions that are made, the less useful the model became. For example, the initial calculations included a fencing element that assumed each planting scheme was based on a square. However in reality not only would it be highly unlikely that a farmer would give over an exact square piece of land for tree planting, especially one as large as 35ha, landscape guidelines and requirements for the SRDP funding prevent tree planting schemes in stark shapes that do not fit into the landscape. Therefore assuming a square planting scheme that would not occur in reality immediately devalues the model.

In addition, professional fees can vary considerably; consultants and forestry companies charges range from £500 - £2,000 for a SRDP application, with additional charges put on for supervising the work (5 – 20%). These charges will also differ for each size of planting scheme, and costs such as EIA's are also an unknown. Again, because there is not a standard charge for a tree planting scheme, attempting to use one will only increase the error margin of the theoretical aspect of this study.

Therefore, the forestry costs are solely based on the Forestry Commission standard costs for each woodland type, multiplied up to each of the model areas. This will give an indication of the level of investment required and will give a reference for the actual costs that are calculated in the second part of this study, which is looking at proposed planting schemes on actual farms. The second proposed applied part of the study will incorporate all the costs associated with the forestry schemes to give a clear indication of the financial commitment required by the farmers in practice.

**Forestry grant income**

The income from forestry grants is calculated using current SRDP Woodland Creation rates, along with the five years maintenance payments. These are detailed in the table below. The arable farm is considered NLFA and the improved and unimproved are considered LFA. There is also a standard £200 payment for the environmental outcome plan.

**Table 7: Forestry establishment grants**

| | £/ha | Maintenance £/ha/yr |
|---|---|---|
| NLFA - Mixed woodland | 2144.10 | 222 |
| LFA - Native | 2241.60 | 218 |
| LFA – Low cost conifer | 1379.20 | 161 |

In addition there is also a Farmland Premium payment for 10 years for the low cost conifer and 15 years for the native and mixed woodlands. The rates of these are in the table below. It is possible to claim Single Farm Payment on areas planted using a recognised financial support mechanism for afforestation (e.g. SFGS, SRDP) however a farmer can only claim one or the other, not both, on the same piece of land. It is not possible to claim LFASS payments on land planted with woodland under any circumstances.

**Table 8: Forestry Farmland Premium payments**

| | £/ha |
|---|---|
| Lowland arable | 300 |
| SDA LFA Improved | 160 |
| Unimproved | 60 |

**Timber income**

The chosen timescale of 15 years has been selected. This is because:

a) It matches the funding window provided under the Farmland Premium Scheme

b) Considering typical farmer age (late 50's), 15 years is likely to be the maximum time frame within which farmers plan their business activities

c) Cash flow for farmers is very different to that of investors,

Farmer's main short term interest is in maintaining a regular income from their land. Longer term they are also concerned about maintaining annual income as well as enhancing the capital value of their land as this acts as their main pension and inheritance fund.

There is too much uncertainty over future timber values to make meaningful long term estimates. The main model therefore does not incorporate any estimate of timber values. However, further analysis was completed in section (6) detailing the impact on commercial conifer planting returns at different timber prices.

**Carbon payments**

A carbon broker was contacted to give estimated figures for each planting scheme. As a wholly voluntary market these values are indicative only. There are certain conditions that have to be met in order to qualify for carbon funding, condition vary by buyer. Therefore carbon income has not been included in the forestry budget.

# 4) Model results

## 4.1 Agricultural income foregone

Estimated agricultural losses for each hectare of land planted with trees were calculated for the three standard farm types modelled. In addition estimates were prepared to reflect the three farm cost scenarios. Results are detailed below.

**Table 9: Estimated agricultural income foregone**

£ per ha

| *Farm type* | | *Farm cost scenarios* (i) Full | (ii) Less operations | (iii) + Less farmer labour |
|---|---|---|---|---|
| **(A) Arable** | **2 yr av.*** | **631** | **270** | **155** |
| **(B) Improved grass** | **2 yr av.*** | **321** | **139** | **26** |
| **(C) Unimproved grass** | **2 yr av.*** | **43** | **11** | **- 13** |

Note - * - average of 2006/07 and 2007/08 FAS data

The level of agricultural income foregone is sharply higher on arable land, reducing on improved grass land and even lower on unimproved grassland.

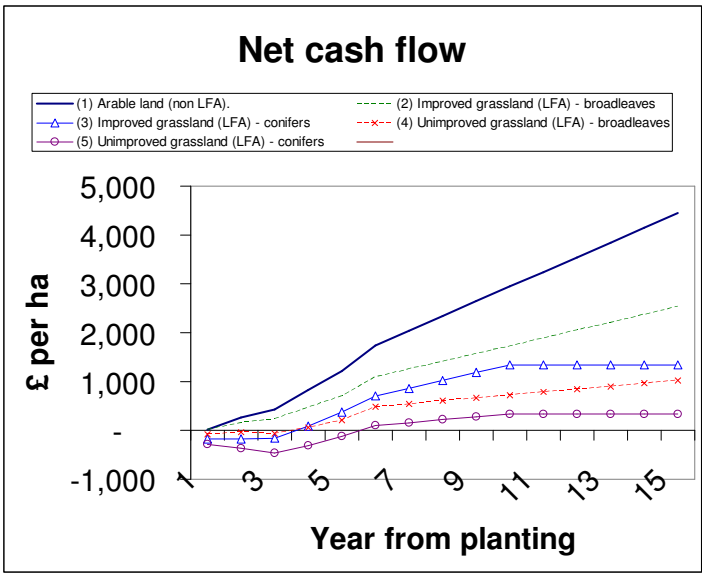
## 4.2 Returns from woodland planting

Cash flows

Detailed costs and return were prepared for the different planting options on the three farm types. The net cash flows on a per ha basis from tree planting alone over a 15 year period are illustrated in the following chart.

While all planting options generate a positive net cash flow there are wide differences with the broadleaved plantings delivering a significantly higher return than the conifer options. This is due to the higher rates of grant, increased allowance for open space and longer payment period for the Farm Woodland Premium.

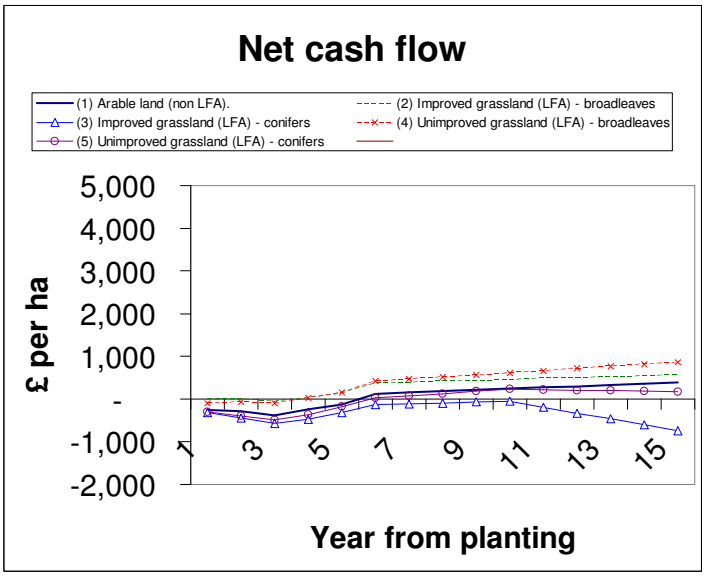
**Figure 3: Forestry net cash flows over 15 years (not discounted)**




### 4.3 Returns from woodland planting – LESS agricultural income foregone

Deducting agricultural income foregone from forestry plantings (before discounting) delivers considerably poorer returns as detailed below.

**Figure 4: Forestry net cash flows over 15 years (not discounted) less agricultural income foregone***




Note – * Farm cost scenario (ii) - LESS operations

Discounting

The financial benefit of forestry planting has been assessed using discounted cash flows and Net Present Values (NPV) which account for the financial value of time. Discounting cash flows at an interest rate of 6% enables the impact of timing to be more fully accounted for. The principle is that costs and incomes in the future are worth less than those incurred in the present.

NPV values for the five different planting options have been compared under the three farm cost scenarios in the following table.

Without deducting agricultural income foregone all forestry planting schemes generate a positive NPV led by the broadleaved planting on arable land.

However once agricultural income foregone is included under the (i) full farm cost scenario then only broadleaved planting on unimproved grassland generates positive cash flows and positive NPV. However where fixed costs can be reduced in line with the fall in agricultural output then all woodland planting options generate a positive NPV except conifer planting on improved land.

On the improved land types this positive NPV must be offset by the potential loss in land value and loss of flexibility to benefit from improving agricultural returns in the future.

The financial benefits of planting broadleaved trees are clearly apparent on all farm types but especially on the unimproved land. Conifer planting is disadvantaged and returns a negative NPV on all land types where full fixed costs are retained.

**Table 10: Net Present Values of woodland options under different farm cost scenarios**

| NPV<br>*Planting options* | *Farm cost scenarios*<br>(i) Full | (ii) Less operations | (iii) + Less farmer labour | £ per ha<br>Trees only |
|---|---|---|---|---|
| (1) Arable land (non LFA). | -5313 | 325 | 2120 | 4541 |
| (2) Improved (LFA) - broadleaves | -2409 | 433 | 2197 | 2603 |
| (3) Improved (LFA) - conifers | -3603 | -761 | 1003 | 1409 |
| (4) Unimproved (LFA) - broadleaves | 215 | 525 | 759 | 632 |
| (5) Unimproved (LFA) - conifers | -397 | 102 | 477 | 274 |

# 5) Discussion and conclusions – the forestry competitiveness gap

## 5.1 The competitiveness gap

As the results section showed, most woodland planting options were not competitive with average agricultural returns under the full farm cost scenario except for broadleaved plantings on unimproved land.

In reality however most farms would be able to reduce operational (labour & machinery) fixed costs over time as agricultural area fell through the use of contractors, shedding labour and reducing machinery. Therefore the most realistic comparison should be made under the central farm cost scenario; (ii) Less Operations.

Under this scenario all planting would become competitive on both improved land and unimproved without further improvements in margin except for conifers on improved land.

The main issues is that many farmers would need a significant extra incentive to encourage a change in behaviour and compensate for any perceived opportunity costs of retreating from agricultural production. This incentive may also have to provide compensation for any loss in land capital values which may occur.

Under the final farm cost scenario (iii) + farmer labour, then planting of both broadleaves and conifers would become competitive without further improvement in relative margins on all land types except arable. The difficulty would lie in making farmers recognise the potential cost savings through reductions in their own labour requirement by planting more trees. For many farmers farming is more of a lifestyle than a business which means that they are often prepared to devote time to the business without full financial recognition for this work. Older farmers and those nearing retirement are most likely to be those most willing to recognise the benefits of tree planting to reduce labour requirements. Due to the practical difficulties in making farmers recognise these cost savings this scenario has not been considered realistic in the short term.

The required relative improvement in margins could come from either an increase in forestry margins, a fall in agricultural margins or a combination of the two.

Increased forestry margins

- reduced planting and establishment costs
- increased planting and annual grant payment
- timber value

Decreased agricultural margins

- reduced market returns
- reduced subsidy payments
- increased costs

It is the relative balance in performance between the two land uses that will drive any change in land owner's decision making.

### 5.2 CAP reform

Reform of the CAP is widely expected to result in a reduction in single farm payments to many Scottish farmers with estimates of cuts of at least 20%. The expected move towards flat rate area payments rather than historic will also have a significant impact on individual farm businesses.

The table below details how SFP and LFASS payments on the three farm types would be affected by different levels of cuts in subsidy payments based on 2007/08 FAS data.

**Table 11: 2007/08 farm subsidy payments and potential future reductions**

| **Subsidy payments in 2007/08** | | | £ per farmed ha |
|---|---|---|---|
| | Arable | Improved grass | Unimproved grass |
| | - cereals | - specialist beef LFA | - specialist sheep LFA |
| SFP | 203 | 178 | 23 |
| LFASS | 1 | 43 | 10 |
| Total | 204 | 221 | 33 |
| **Subsidy reduction** | | | £ per farmed ha |
| 10% | 20.40 | 22.10 | 3.30 |
| 20% | 40.80 | 44.20 | 6.60 |
| 30% | 61.20 | 66.30 | 9.90 |
| 40% | 81.60 | 88.40 | 13.20 |

Assuming a 20% cut in agricultural subsidy payments, all else being equal, this would bring about an improvement in the competitiveness of forestry of around £41/ha on arable land, £44/ha on improved land and £7/ha on unimproved land.

Comparing these changes with the relative shortfall in forestry competitiveness identified earlier, it is apparent that a 20% reduction in agricultural subsidies alone would do little to alter the current situation.

It is also likely that a reduction in Single Farm Payment would be offset at least partially by improved market returns. Much will depend on the sector and the degree to which domestic (Scottish and EU) agricultural production can be replaced by imports.

### 5.3 Impact of timber revenue

The model results so far indicate that conifers are currently uncompetitive with broadleaved plantings due to lower payment rates for planting and the longer duration of annual Farm Land Premium Payments. Conifer planting is also uncompetitive with agriculture in many situations.

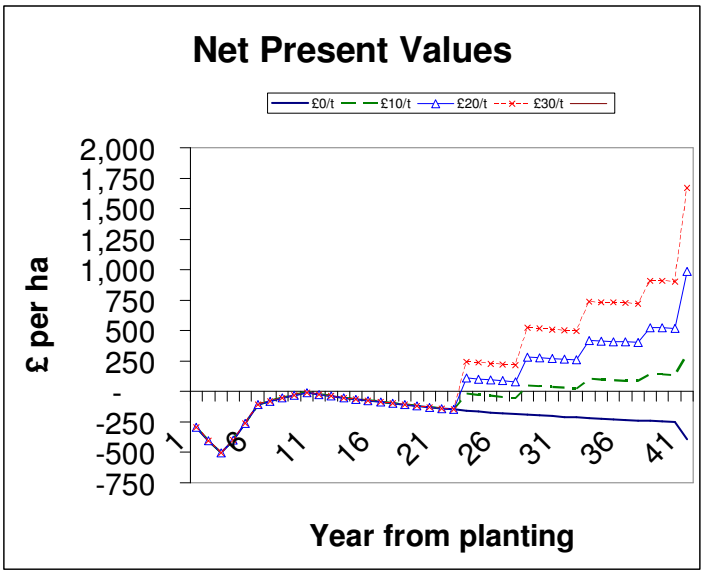
These results however, exclude any revenue from timber. This assumption has been made due to the fact that farmers planting decisions are driven mainly by short term cashflow considerations. This puts the emphasis on grant aid as the main income stream. However timber returns have improved considerably in recent months and future price levels are expected to be sustained by rising demand for both fuel and building materials.

A further calculation has therefore been undertaken to determine the level of timber price needed to significantly improve the competitiveness of conifer plantings.

**Assumptions**

Planting option - (5) 150ha unimproved conifer.
Planting costs and returns – as per base model (see previous section) including income foregone of £11/ha per year
Species – 85% sitka spruce – 112.5ha
Yield class – 16
Rotation – 40yrs
Thinning commencing – 22 yrs

**Figure 5 – discounted forestry cashflows – Option (5) conifers on unimproved land**




Note - timber prices are net standing values £/t across both thinnings and clear felling

**Results**

Timber prices of £10/t standing make little significant difference to the financial competitiveness of conifer planting on unimproved land. A NPV of just £296/ha over 40 years leaves little return for the investment and the risk incurred. It is greater however than the negative returns delivered where no timber income is generated.

Timber prices of £20/t standing start to make a significant difference to the financial competitiveness of conifer planting on unimproved land. A NPV of £983/ha over 40 years represents a modest return for the investment and the risk incurred.

Timber prices of £30/t standing make a significant difference to the financial competitiveness of conifer planting on unimproved land. A NPV of £1,670/ha over 40 years represents a good return for the investment and the risk incurred.

Rising timber prices could start to make timber income a more significant driver of farmer's planting decision. However cash flow remains a major obstacle and some way would need to be found to generate cash flow earlier on.

On favourable sites short rotation forestry may offer the chance to commence thinning and hence generate revenue at an earlier date. Alternatively some form of lease payment from a long term investor such as a pension fund could offer an alternative annual payment albeit at a relatively low level.

# Appendix 1 - references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# Appendix 2 – farm cost and returns

| | 2006/07 (A) Arable | 2007/08 (A) Arable | 2006/07 (B) Improved grass | 2007/08 (B) Improved grass | 2006/07 (C) Unimproved grass | 2007/08 (C) Unimproved grass |
|---|---|---|---|---|---|---|
| Farmed area (ha) | 150 | 157 | 188 | 187 | *614* | 690 |
| Adjusted area | 148 | 155 | 120 | 116 | *614* | 690 |
| | | | | | | |
| Market returns (£) | 94,903 | 133,012 | 60,222 | 60,406 | *21,503* | 18,924 |
| Misc | 12,821 | 15,953 | 3,802 | 3,986 | *6,355* | 8,855 |
| Subsidies - SFP | 31,276 | 31,853 | 33,722 | 33,311 | *15,134* | *15,977* |
| Subsidies - LFAS | 76 | 116 | 5,331 | 7,974 | *4,337* | *6,994* |
| Subsidies - other | 3,206 | 3,692 | 3,310 | 5,357 | *4,231* | *8,194* |
| OUTPUT (£) | 142,282 | 184,626 | 106,387 | 111,034 | 51,560 | 58,944 |
| | | | | | | |
| VARIABLE COSTS (£) | 48,262 | 55,637 | 44,111 | 45,115 | *19,996* | 19,744 |
| | | | | | | |
| *GROSS MARGIN (£)* | *94,020* | *128,989* | *62,276* | *65,919* | *31,564* | *39,200* |
| | | | | | | |
| Fixed costs - operations | 51,568 | 59,253 | 33,699 | 34,542 | *21,644* | 19,453 |
| Fixed costs - land | 21,740 | 24,514 | 14,992 | 14,296 | *8,199* | 7,891 |
| *FIXED COSTS (£)* | *73,308* | *83,767* | *48,691* | *48,838* | *29,843* | *27,344* |
| | | | | | | |
| NET FARM INCOME (£) | 20,712 | 45,222 | 13,585 | 17,081 | 1,721 | 11,856 |
| | | | | | | |
| Less farmer & spouse manual labour | 16,724 | 18,600 | 20,280 | 22,040 | 14,665 | 16,885 |
| | | | | | | |
| M&I Income | 3,988 | 26,622 | -6695 | -4959 | -12944 | -5029 |

**Per farmed ha**

| | 2006/07 (A) Arable | 2007/08 (A) Arable | 2006/07 (B) Improved grass | 2007/08 (B) Improved grass | 2006/07 (C) Unimproved grass | 2007/08 (C) Unimproved grass |
|---|---|---|---|---|---|---|
| Farmed area (ha) | 150 | 157 | 188 | 187 | 614 | 690 |
| Adjusted area | 148 | 155 | 120 | 116 | 614 | 690 |
| | | | | | | |
| Market returns (£) | 633 | 847 | 320 | 323 | 35 | 27 |
| Misc | 85 | 102 | 20 | 21 | 10 | 13 |
| Subsidies - SFP | 209 | 203 | 179 | 178 | 25 | 23 |
| Subsidies - LFAS | 1 | 1 | 28 | 43 | 7 | 10 |
| Subsidies - other | 21 | 24 | 18 | 29 | 7 | 12 |
| OUTPUT (£) | 949 | 1,176 | 566 | 594 | 84 | 85 |
| | | | | | | |
| VARIABLE COSTS (£) | 322 | 354 | 235 | 241 | 33 | 29 |
| | | | | | | |
| *GROSS MARGIN (£)* | *627* | *822* | *331* | *353* | *51* | *57* |
| | | | | | | |
| Fixed costs - operations | 344 | 377 | 179 | 185 | 35 | 28 |
| Fixed costs - land | 145 | 156 | 80 | 76 | 13 | 11 |
| *FIXED COSTS (£)* | *489* | *534* | *259* | *261* | *49* | *40* |
| | | | | | | |
| NET FARM INCOME (£) | 138 | 288 | 72 | 91 | 3 | 17 |
| | | | | | | |
| Less farmer & spouse manual labour | 111 | 118 | 108 | 118 | 24 | 24 |
| | | | | | | |
| M&I Income | 27 | 170 | -36 | -27 | -21 | -7 |

**Agricultural income foregone per ha planted**

| | | | 2yr av | | | 2yr av | | | 2yr av |
|---|---|---|---|---|---|---|---|---|---|
| **(i) Basic** | 541 | 720 | **631** | 311 | 331 | **321** | 41 | 44 | **43** |
| **(ii)+ Operations** | 198 | 343 | **270** | 132 | 146 | **139** | 6 | 16 | **11** |
| **(i) + Farmer labour** | 86 | 224 | **155** | 24 | 29 | **26** | -18 | -9 | **13** |

## Appendix 3 – forestry costs and returns

## (Excluding agricultural income foregone)

THE SCOTTISH AGRICULTURAL COLLEGE
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INDICATIVECASH FLOW FORECAST

## (1) 10ha arable mixed fence

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Area (ha) | 10 | | | | | | | | | | | | | | | |
| | | **ESTABLISHMENT COSTS** | 2010/11 | 2011//12 | 2012/13 | 2013/14 | 2104/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 | |
| | | Stock Fencing | | | | | | | | | | | | | | | | |
| | | Wildlife Fencing | | | | | | | | | | | | | | | | |
| | | Scrub Clearance | | | | | | | | | | | | | | | | |
| | | Ground preparation | | | | | | | | | | | | | | | | |
| | | Drainage | | | | | | | | | | | | | | | | |
| | | Plants and Planting | | | | | | | | | | | | | | | | |
| | | Tree shelters/guards | | | | | | | | | | | | | | | | |
| | | Weeding | | | | | | | | | | | | | | | | |
| | | Replace losses | | | | | | | | | | | | | | | | |
| | | Inter-row mowing | | | | | | | | | | | | | | | | |
| | | Roads & Access | | | | | | | | | | | | | | | | |
| | | Protection | | | | | | | | | | | | | | | | |
| | | WIG Capital works | | | | | | | | | | | | | | | | |
| | | Sundries/ contingencies | | | | | | | | | | | | | | | | |
| | | Supervision | | | | | | | | | | | | | | | | |
| | | Professional Fees | | | | | | | | | | | | | | | | |
| | 270 | **Sub total costs** | 24,504 | 2,757 | 3,472 | 1,208 | 1,357 | | | | | | | | | | | |
| £/ha | | **Loss in farmed income** | | | | | | | | | | | | | | | | - |
| | | VAT (if not registered) | | | | | | | | | | | | | | | | |
| | | **TOTAL COSTS** | 24,504 | 2,757 | 3,472 | 1,208 | 1,357 | | | | | | | | | | | 33,298 |
| | | **INCOME** | | | | | | | | | | | | | | | | |
| | | Planting & maintenance | 21,440 | 2,220 | 2,220 | 2,220 | 2,220 | 2,220 | | | | | | | | | | |
| | | Stock Fencing | | | | | | | | | | | | | | | | |
| | | Wildlife fencing | | | | | | | | | | | | | | | | |
| | | WIG | | | | | | | | | | | | | | | | |
| | | Forest environment payment | | | | | | | | | | | | | | | | |
| | | Restructuring & Restocking | | | | | | | | | | | | | | | | |
| | | Farmland Premium | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | |
| | | Agri-environment payments | | | | | | | | | | | | | | | | |
| | | Sale of timber | | | | | | | | | | | | | | | | |
| | | Misc | 200 | | | | | | | | | | | | | | | |
| | | **TOTAL INCOME** | 24,640 | 5,220 | 5,220 | 5,220 | 5,220 | 5,220 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 77,740 |
| | | NET INCOME(EXPENDITURE) | 136 | 2,463 | 1,748 | 4,012 | 3,863 | 5,220 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 44,442 |
| | | CUMULATIVE INCOME (EXPENDITURE) | 136 | 2,599 | 4,347 | 8,359 | 12,222 | 17,442 | 20,442 | 23,442 | 26,442 | 29,442 | 32,442 | 35,442 | 38,442 | 41,442 | 44,442 | |
| | | Net Cashflow | 136 | 2,463 | 1,748 | 4,012 | 3,863 | 5,220 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 44,442 |
| | | Net Cashflow cumulative | 136 | 2,599 | 4,347 | 8,359 | 12,222 | 17,442 | 20,442 | 23,442 | 26,442 | 29,442 | 32,442 | 35,442 | 38,442 | 41,442 | 44,442 | |
| | | Discounted cashflow | 128 | 2,192 | 1,468 | 3,178 | 2,886 | 3,680 | 1,995 | 1,881 | 1,776 | 1,674 | 1,581 | 1,491 | 1,407 | 1,326 | 1,251 | 27,914 |
| | | Discounted cashflow cumulative | **128** | **2,320** | **3,789** | **6,966** | **9,852** | **13,532** | **15,527** | **17,408** | **19,184** | **20,858** | **22,439** | **23,930** | **25,337** | **26,663** | **27,914** | |
| | | Discount rate | 0.9430 | 0.8900 | 0.8400 | 0.7920 | 0.7470 | 0.7050 | 0.6650 | 0.6270 | 0.5920 | 0.5580 | 0.5270 | 0.4970 | 0.4690 | 0.4420 | 0.4170 | |
| | | | | IRR | | | | | | | | | | | | | | |
| Years - t | 15 | NPV per ha | £4,541.17 | #DIV/0! | | | | | | | | | | | | | | |
| Interest rate | 0.06 | Annuity factor | £0.10296 | | | | | | | | | | | | | | | |
| | | EAE (margin) per ha | 467.6 | | | | | | | | | | | | | | | |
| | | Av margin | | | | | | | | | | | | | | | | |

THE SCOTTISH AGRICULTURAL COLLEGE
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## (2) 35ha improved native broadleaves

| | | | 35 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **ESTABLISHMENT COSTS** | 2010/11 | 2011//12 | 2012/13 | 2013/14 | 2104/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 | |
| | | Stock Fencing | | | | | | | | | | | | | | | | |
| | | Wildlife Fencing | | | | | | | | | | | | | | | | |
| | | Scrub Clearance | | | | | | | | | | | | | | | | |
| | | Ground preparation | | | | | | | | | | | | | | | | |
| | | Drainage | | | | | | | | | | | | | | | | |
| | | Plants and Planting | | | | | | | | | | | | | | | | |
| | | Tree shelters/guards | | | | | | | | | | | | | | | | |
| | | Weeding | | | | | | | | | | | | | | | | |
| | | Replace losses | | | | | | | | | | | | | | | | |
| | | Inter-row mowing | | | | | | | | | | | | | | | | |
| | | Roads & Access | | | | | | | | | | | | | | | | |
| | | Protection | | | | | | | | | | | | | | | | |
| | | WIG Capital works | | | | | | | | | | | | | | | | |
| | | Sundries/ contingencies | | | | | | | | | | | | | | | | |
| | | Supervision | | | | | | | | | | | | | | | | |
| | | Professional Fees | | | | | | | | | | | | | | | | |
| | 139 | **Sub total costs** | 73,572 | 8,399 | 10,439 | 5,253 | 4,768 | | | | | | | | | | | |
| £/ha | | **Loss in farmed income** | | | | | | | | | | | | | | | | - |
| | | VAT (if not registered) | | | | | | | | | | | | | | | | |
| | | **TOTAL COSTS** | 73,572 | 8,399 | 10,439 | 5,253 | 4,768 | | | | | | | | | | | |
| | | **INCOME** | | | | | | | | | | | | | | | | |
| | | Planting & maintenance | 68,635 | 7,630 | 7,630 | 7,630 | 7,630 | 7,630 | | | | | | | | | | |
| | | Stock Fencing | | | | | | | | | | | | | | | | |
| | | Wildlife fencing | | | | | | | | | | | | | | | | |
| | | WIG | | | | | | | | | | | | | | | | |
| | | Forest environment payment | | | | | | | | | | | | | | | | |
| | | Restructuring & Restocking | | | | | | | | | | | | | | | | |
| | | Farmland Premium | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | |
| | | Agri-environment payments | | | | | | | | | | | | | | | | |
| | | Sale of timber | | | | | | | | | | | | | | | | |
| | | Misc | 200 | | | | | | | | | | | | | | | |
| | | **TOTAL INCOME** | 74,435 | 13,230 | 13,230 | 13,230 | 13,230 | 13,230 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 190,985 |
| | | NET INCOME(EXPENDITURI | 863 | 4,831 | 2,791 | 7,977 | 8,462 | 13,230 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 190,985 |
| | | CUMULATIVE INCOME (EXPENDITURE) | 863 | 5,694 | 8,484 | 16,461 | 24,923 | 38,153 | 43,753 | 49,353 | 54,953 | 60,553 | 66,153 | 71,753 | 77,353 | 82,953 | 88,553 | |
| | | Net Cashflow | 863 | 4,831 | 2,791 | 7,977 | 8,462 | 13,230 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 88,553 |
| | | Net Cashflow cumulative | 139 | 4,970 | 7,760 | 15,737 | 24,199 | 37,429 | 43,029 | 48,629 | 54,229 | 59,829 | 65,429 | 71,029 | 76,629 | 82,229 | 87,829 | |
| | | Discounted cashflow | 814 | 4,299 | 2,344 | 6,317 | 6,321 | 9,327 | 3,724 | 3,511 | 3,315 | 3,125 | 2,951 | 2,783 | 2,626 | 2,475 | 2,335 | 56,269 |
| | | Discounted cashflow cumulative | **814** | **5,113** | **7,457** | **13,775** | **20,096** | **29,423** | **33,147** | **36,658** | **39,973** | **43,098** | **46,049** | **48,832** | **51,459** | **53,934** | **56,269** | |
| | | Discount rate | 0.9430 | 0.8900 | 0.8400 | 0.7920 | 0.7470 | 0.7050 | 0.6650 | 0.6270 | 0.5920 | 0.5580 | 0.5270 | 0.4970 | 0.4690 | 0.4420 | 0.4170 | |
| | | | | IRR | | | | | | | | | | | | | | |
| Years - t | 15 | NPV per ha | £2,603.85 | #DIV/0! | | | | | | | | | | | | | | |
| Interest rate | 0.06 | Annuity factor | £0.10296 | | | | | | | | | | | | | | | |
| | | EAE (margin) per ha | 268.1 | | | | | | | | | | | | | | | |

THE SCOTTISH AGRICULTURAL COLLEGE
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INDICATIVECASH FLOW FORECAST

## (3) 35ha improved conifer fence

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 35 | | | | | | | | | | | | | | | |
| | | **ESTABLISHMENT COSTS** | 2010/11 | 2011//12 | 2012/13 | 2013/14 | 2104/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 | |
| | | Stock Fencing | | | | | | | | | | | | | | | | |
| | | Wildlife Fencing | | | | | | | | | | | | | | | | |
| | | Scrub Clearance | | | | | | | | | | | | | | | | |
| | | Ground preparation | | | | | | | | | | | | | | | | |
| | | Drainage | | | | | | | | | | | | | | | | |
| | | Plants and Planting | | | | | | | | | | | | | | | | |
| | | Tree shelters/guards | | | | | | | | | | | | | | | | |
| | | Weeding | | | | | | | | | | | | | | | | |
| | | Replace losses | | | | | | | | | | | | | | | | |
| | | Inter-row mowing | | | | | | | | | | | | | | | | |
| | | Roads & Access | | | | | | | | | | | | | | | | |
| | | Protection | | | | | | | | | | | | | | | | |
| | | WIG Capital works | | | | | | | | | | | | | | | | |
| | | Sundries/ contingencies | | | | | | | | | | | | | | | | |
| | | Supervision | | | | | | | | | | | | | | | | |
| | | Professional Fees | | | | | | | | | | | | | | | | |
| | **139** | Sub total costs | 54,306 | 10,824 | 10,775 | 2,737 | 949 | | | | | | | | | | | |
| £/ha | | **Loss in farmed income** | | | | | | | | | | | | | | | | - |
| | | VAT (if not registered) | | | | | | | | | | | | | | | | |
| | | **TOTAL COSTS** | 54,306 | 10,824 | 10,775 | 2,737 | 949 | | | | | | | | | | | 79,591 |
| | | **INCOME** | | | | | | | | | | | | | | | | |
| | | Planting & maintenance | 42,210 | 5,635 | 5,635 | 5,635 | 5,635 | 5,635 | | | | | | | | | | |
| | | Stock Fencing | | | | | | | | | | | | | | | | |
| | | Wildlife fencing | | | | | | | | | | | | | | | | |
| | | WIG | | | | | | | | | | | | | | | | |
| | | Forest environment payment | | | | | | | | | | | | | | | | |
| | | Restructuring & Restocking | | | | | | | | | | | | | | | | |
| | | Farmland Premium | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | 5,600 | | | | | | |
| | | Agri-environment payments | | | | | | | | | | | | | | | | |
| | | Sale of timber | | | | | | | | | | | | | | | | |
| | | Misc | 200 | | | | | | | | | | | | | | | |
| | | **TOTAL INCOME** | 48,010 | 11,235 | 11,235 | 11,235 | 11,235 | 11,235 | 5,600 | 5,600 | 5,600 | 5,600 | | | | | | 126,585 |
| | | NET INCOME(EXPENDITURE | (6,296) | 411 | 460 | 8,498 | 10,286 | 11,235 | 5,600 | 5,600 | 5,600 | 5,600 | | | | | | 46,994 |
| | | CUMULATIVE INCOME (EXPENDITURE) | (6,296) | (5,885) | (5,425) | 3,073 | 13,359 | 24,594 | 30,194 | 35,794 | 41,394 | 46,994 | 46,994 | 46,994 | 46,994 | 46,994 | 46,994 | |
| | | Net Cashflow | - 6,296 | 411 | 460 | 8,498 | 10,286 | 11,235 | 5,600 | 5,600 | 5,600 | 5,600 | - | - | - | - | - | 46,994 |
| | | Net Cashflow cumulative | - 6,296 | - 5,885 | - 5,425 | 3,073 | 13,359 | 24,594 | 30,194 | 35,794 | 41,394 | 46,994 | 46,994 | 46,994 | 46,994 | 46,994 | 46,994 | |
| | | Discounted cashflow | - 5,937 | 366 | 386 | 6,731 | 7,684 | 7,921 | 3,724 | 3,511 | 3,315 | 3,125 | - | - | - | - | - | 30,825 |
| | | Discounted cashflow cumulative | **- 5,937** | **- 5,571** | **- 5,185** | **1,546** | **9,229** | **17,150** | **20,874** | **24,385** | **27,700** | **30,825** | **30,825** | **30,825** | **30,825** | **30,825** | **30,825** | |
| | | Discount rate | 0.9430 | 0.8900 | 0.8400 | 0.7920 | 0.7470 | 0.7050 | 0.6650 | 0.6270 | 0.5920 | 0.5580 | 0.5270 | 0.4970 | 0.4690 | 0.4420 | 0.4170 | |
| | | | | IRR | | | | | | | | | | | | | | |
| Years - t | 15 | NPV per ha | £1,409.40 | 58% | | | | | | | | | | | | | | |
| Interest rate | 0.06 | Annuity factor | £0.10296 | | | | | | | | | | | | | | | |
| | | EAE (margin) per ha | 145.1 | | | | | | | | | | | | | | | |
| | | Av margin | | | | | | | | | | | | | | | | |

THE SCOTTISH AGRICULTURAL COLLEGE
WOODLANDS UNIT
INDICATIVECASH FLOW FORECAST

## (4) 150ha unimproved native fence

| | | | 150 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **ESTABLISHMENT COSTS** | 2010/11 | 2011//12 | 2012/13 | 2013/14 | 2104/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 | |
| | | Stock Fencing | | | | | | | | | | | | | | | | |
| | | Wildlife Fencing | | | | | | | | | | | | | | | | |
| | | Scrub Clearance | | | | | | | | | | | | | | | | |
| | | Ground preparation | | | | | | | | | | | | | | | | |
| | | Drainage | | | | | | | | | | | | | | | | |
| | | Plants and Planting | | | | | | | | | | | | | | | | |
| | | Tree shelters/guards | | | | | | | | | | | | | | | | |
| | | Weeding | | | | | | | | | | | | | | | | |
| | | Replace losses | | | | | | | | | | | | | | | | |
| | | Inter-row mowing | | | | | | | | | | | | | | | | |
| | | Roads & Access | | | | | | | | | | | | | | | | |
| | | Protection | | | | | | | | | | | | | | | | |
| | | WIG Capital works | | | | | | | | | | | | | | | | |
| | | Sundries/ contingencies | | | | | | | | | | | | | | | | |
| | | Supervision | | | | | | | | | | | | | | | | |
| | | Professional Fees | | | | | | | | | | | | | | | | |
| | 11 | **Sub total costs** | 315,306 | 35,997 | 44,740 | 22,515 | 20,435 | | | | | | | | | | | |
| £/ha | | **Loss in farmed income** | | | | | | | | | | | | | | | | - |
| | | VAT (if not registered) | | | | | | | | | | | | | | | | |
| | | **TOTAL COSTS** | 315,306 | 35,997 | 44,740 | 22,515 | 20,435 | | | | | | | | | | | 438,992 |
| | | **INCOME** | | | | | | | | | | | | | | | | |
| | | Planting & maintenance | 294,150 | 32,700 | 32,700 | 32,700 | 32,700 | 32,700 | | | | | | | | | | |
| | | Stock Fencing | | | | | | | | | | | | | | | | |
| | | Wildlife fencing | | | | | | | | | | | | | | | | |
| | | WIG | | | | | | | | | | | | | | | | |
| | | Forest environment payment | | | | | | | | | | | | | | | | |
| | | Restructuring & Restocking | | | | | | | | | | | | | | | | |
| | | Farmland Premium | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | |
| | | Agri-environment payments | | | | | | | | | | | | | | | | |
| | | Sale of timber | | | | | | | | | | | | | | | | |
| | | Misc | 200 | | | | | | | | | | | | | | | |
| | | **TOTAL INCOME** | 303,350 | 41,700 | 41,700 | 41,700 | 41,700 | 41,700 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 592,850 |
| | | NET INCOME(EXPENDITURE | (11,956) | 5,703 | (3,040) | 19,185 | 21,266 | 41,700 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 153,858 |
| | | CUMULATIVE INCOME (EXPENDITURE) | (11,956) | (6,253) | (9,293) | 9,893 | 31,158 | 72,858 | 81,858 | 90,858 | 99,858 | 108,858 | 117,858 | 126,858 | 135,858 | 144,858 | 153,858 | |
| | | Net Cashflow | - 11,956 | 5,703 | - 3,040 | 19,185 | 21,266 | 41,700 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 153,858 |
| | | Net Cashflow cumulative | - 11,956 | - 6,253 | - 9,293 | 9,893 | 31,158 | 72,858 | 81,858 | 90,858 | 99,858 | 108,858 | 117,858 | 126,858 | 135,858 | 144,858 | 153,858 | |
| | | Discounted cashflow | - 11,275 | 5,076 | - 2,554 | 15,195 | 15,885 | 29,399 | 5,985 | 5,643 | 5,328 | 5,022 | 4,743 | 4,473 | 4,221 | 3,978 | 3,753 | 94,872 |
| | | Discounted cashflow cumulative | **- 11,275** | **- 6,198** | **- 8,752** | **6,443** | **22,328** | **51,726** | **57,711** | **63,354** | **68,682** | **73,704** | **78,447** | **82,920** | **87,141** | **91,119** | **94,872** | |
| | | Discount rate | 0.9430 | 0.8900 | 0.8400 | 0.7920 | 0.7470 | 0.7050 | 0.6650 | 0.6270 | 0.5920 | 0.5580 | 0.5270 | 0.4970 | 0.4690 | 0.4420 | 0.4170 | |
| | | | | IRR | | | | | | | | | | | | | | |
| Years - t | 15 | NPV per ha | £632.55 | 73% | | | | | | | | | | | | | | |
| Interest rate | 0.06 | Annuity factor | £0.10296 | | | | | | | | | | | | | | | |
| | | EAE (margin) per ha | 65.1 | | | | | | | | | | | | | | | |

THE SCOTTISH AGRICULTURAL COLLEGE
WOODLANDS UNIT
INDICATIVECASH FLOW FORECAST

## (5) 150ha Unimproved Conifer

| | | | 150 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **ESTABLISHMENT COSTS** | 2010/11 | 2011//12 | 2012/13 | 2013/14 | 2104/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 | |
| | | Stock Fencing | | | | | | | | | | | | | | | | |
| | | Wildlife Fencing | | | | | | | | | | | | | | | | |
| | | Scrub Clearance | | | | | | | | | | | | | | | | |
| | | Ground preparation | | | | | | | | | | | | | | | | |
| | | Drainage | | | | | | | | | | | | | | | | |
| | | Plants and Planting | | | | | | | | | | | | | | | | |
| | | Tree shelters/guards | | | | | | | | | | | | | | | | |
| | | Weeding | | | | | | | | | | | | | | | | |
| | | Replace losses | | | | | | | | | | | | | | | | |
| | | Inter-row mowing | | | | | | | | | | | | | | | | |
| | | Roads & Access | | | | | | | | | | | | | | | | |
| | | Protection | | | | | | | | | | | | | | | | |
| | | WIG Capital works | | | | | | | | | | | | | | | | |
| | | Sundries/ contingencies | | | | | | | | | | | | | | | | |
| | | Supervision | | | | | | | | | | | | | | | | |
| | | Professional Fees | | | | | | | | | | | | | | | | |
| | 11 | **Sub total costs** | 232,740 | 46,387 | 46,179 | 11,729 | 4,068 | | | | | | | | | | | |
| £/ha | | **Loss in farmed income** | | | | | | | | | | | | | | | | - |
| | | VAT (if not registered) | | | | | | | | | | | | | | | | |
| | | **TOTAL COSTS** | 232,740 | 46,387 | 46,179 | 11,729 | 4,068 | | | | | | | | | | | 341,103 |
| | | **INCOME** | | | | | | | | | | | | | | | | |
| | | Planting & maintenance | 180,900 | 24,150 | 24,150 | 24,150 | 24,150 | 24,150 | | | | | | | | | | |
| | | Stock Fencing | | | | | | | | | | | | | | | | |
| | | Wildlife fencing | | | | | | | | | | | | | | | | |
| | | WIG | | | | | | | | | | | | | | | | |
| | | Forest environment payment | | | | | | | | | | | | | | | | |
| | | Restructuring & Restocking | | | | | | | | | | | | | | | | |
| | | Farmland Premium | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | 9,000 | | | | | | |
| | | Agri-environment payments | | | | | | | | | | | | | | | | |
| | | Sale of timber | | | | | | | | | | | | | | | | |
| | | Misc | 200 | | | | | | | | | | | | | | | |
| | | **TOTAL INCOME** | 190,100 | 33,150 | 33,150 | 33,150 | 33,150 | 33,150 | 9,000 | 9,000 | 9,000 | 9,000 | | | | | | 391,850 |
| | | NET INCOME(EXPENDITURI | (42,640) | (13,237) | (13,029) | 21,421 | 29,082 | 33,150 | 9,000 | 9,000 | 9,000 | 9,000 | | | | | | 50,747 |
| | | CUMULATIVE INCOME (EXPENDITURE) | (42,640) | (55,877) | (68,907) | (47,486) | (18,403) | 14,747 | 23,747 | 32,747 | 41,747 | 50,747 | 50,747 | 50,747 | 50,747 | 50,747 | 50,747 | |
| | | Net Cashflow | - 42,640 | - 13,237 | - 13,029 | 21,421 | 29,082 | 33,150 | 9,000 | 9,000 | 9,000 | 9,000 | - | - | - | - | - | 50,747 |
| | | Net Cashflow cumulative | - 42,640 | - 55,877 | - 68,907 | - 47,486 | - 18,403 | 14,747 | 23,747 | 32,747 | 41,747 | 50,747 | 50,747 | 50,747 | 50,747 | 50,747 | 50,747 | |
| | | Discounted cashflow | - 40,210 | - 11,781 | - 10,945 | 16,966 | 21,725 | 23,371 | 5,985 | 5,643 | 5,328 | 5,022 | - | - | - | - | - | 21,103 |
| | | Discounted cashflow cumulative | **- 40,210** | **- 51,991** | **- 62,935** | **- 45,970** | **- 24,245** | **- 875** | **5,110** | **10,753** | **16,081** | **21,103** | **21,103** | **21,103** | **21,103** | **21,103** | **21,103** | |
| | | Discount rate | 0.9430 | 0.8900 | 0.8400 | 0.7920 | 0.7470 | 0.7050 | 0.6650 | 0.6270 | 0.5920 | 0.5580 | 0.5270 | 0.4970 | 0.4690 | 0.4420 | 0.4170 | |
| | | | | IRR | | | | | | | | | | | | | | |
| Years - t | 15 | NPV per ha | £273.89 | 16% | | | | | | | | | | | | | | |
| Interest rate | 0.06 | Annuity factor | £0.10296 | | | | | | | | | | | | | | | |
| | | EAE (margin) per ha | 28.2 | | | | | | | | | | | | | | | |

## Appendix 4 – Notes on the Farm Accounts Scheme

Net Farm Income – excluding any return for farmer manual work and Management and Investment Income

The farm types are based on EC farm typology.

| | |
|---|---|
| Specialist sheep (LFA) | Farms in the LFA with more than two-thirds of the total standard gross margin coming from sheep. |
| Specialist beef (LFA) | Farms in the LFA with more than two-thirds of the total standard gross margin coming from cattle. |
| Cattle and sheep (LFA) | Farms in the LFA with more than two-thirds of the standard gross margin coming from sheep and beef cattle together. |
| Cereals | Farms where more than two-thirds of the standard gross margin comes from cereals and oilseeds. |
| General cropping | Other farms where more than two-thirds of the total standard gross margin comes from all crops. |
| Dairy | Farms where more than two-thirds of the total standard gross margin comes from dairy cows. |
| Lowground cattle & sheep | Farms mainly NOT in the LFA with more than two-thirds of the total standard gross margin coming from sheep and beef cattle. |
| Mixed | Farms where no enterprise contributes more than two-thirds of gross margins |

Note - adjusted area is the total farmed area including rough grazing converted to an equivalent area of average quality grazing.