

Take a long term view when considering farm forestry

This article is based on forest economic research recently undertaken by Mary Ryan, Cathal O'Donoghue & Anne Kinsella of the Teagasc Rural Economy and Development Programme.

Forestry is a long-term crop with rotations of over 30 years for fast-growing conifers and up to 100 years for slower growing broadleaf species. One of the big differences between agricultural enterprises and forestry is the relatively long time period involved in growing a forest to maturity. Therefore when farmers are considering planting some land, they should consider the economic implications of the planting decision over the time-frame of the (rotation) forest crop.

There are 2 types of income from planting a forest.

1. **Forest premium payments:** for instance, on a per hectare basis, planting a fast growing conifer such as Sitka spruce (GPC 3) in 2015 will yield an annual forest premium of €510/ha (tax free) for the first 15 years of the forest rotation.
2. **Timber Sales:** after this period, the economic return from forestry will come from final harvesting with intermediate income where forests are thinned on a regular basis until the final crop is mature as presented below.

In general, there are also two types of costs that are incurred on planting.

1. **Forest establishment and maintenance costs:** these costs are covered for the first four years by grants provided by the Forest Service of the Department of Agriculture, Food and the Marine.
2. **Agricultural opportunity costs:** when a farmer decides to plant some land, they lose the agricultural income from that land. The opportunity cost of planting for individual farmers varies greatly depending on the farm system as illustrated in Table 1.

Table 1: Teagasc National Farm Survey Results 2015

Farm system	€/ha
Dairy	1,112
Cattle Rearing	329
Cattle Other	424
Sheep	323
Tillage	546

In general, dairy farmers have higher opportunity costs and are less likely to plant as the net gain will be low, while cattle and sheep farmers have lower opportunity costs, so they make a financial gain by replacing the agricultural income with higher income from forestry.

Short term view

Farmers might be tempted to compare these farm system incomes against the 2015 forest premium, however, comparing the Family Farm Income (which includes market and subsidy income) in a given year to the forest premium payment (subsidy only) is a bit like comparing apples and oranges and making a decision on the basis of the figures that apply in one year only is taking a short term view.

For a long term land use change such as forestry, landowners should take into account the full range of factors that can affect the returns from forestry over the full rotation of the forest crop. For instance, the comparison above does not take costs and revenues (from harvesting timber) over the lifetime into account. These can be projected forward using forest growth (yield) models and average historic timber prices. The return from both agriculture and forestry varies hugely depending on the soil type of the land, which determines productivity and income. Table 1 shows the relationship between agricultural soil classes. Soil Class 1 is the best agricultural soil and Soil Class 6 is the poorest, while higher forest yield classes produce more timber and higher financial returns. In general terms, the better the soil, the shorter the rotation length.

Table 2: Sitka spruce (SS) yield class estimates for NFS agricultural soil classes

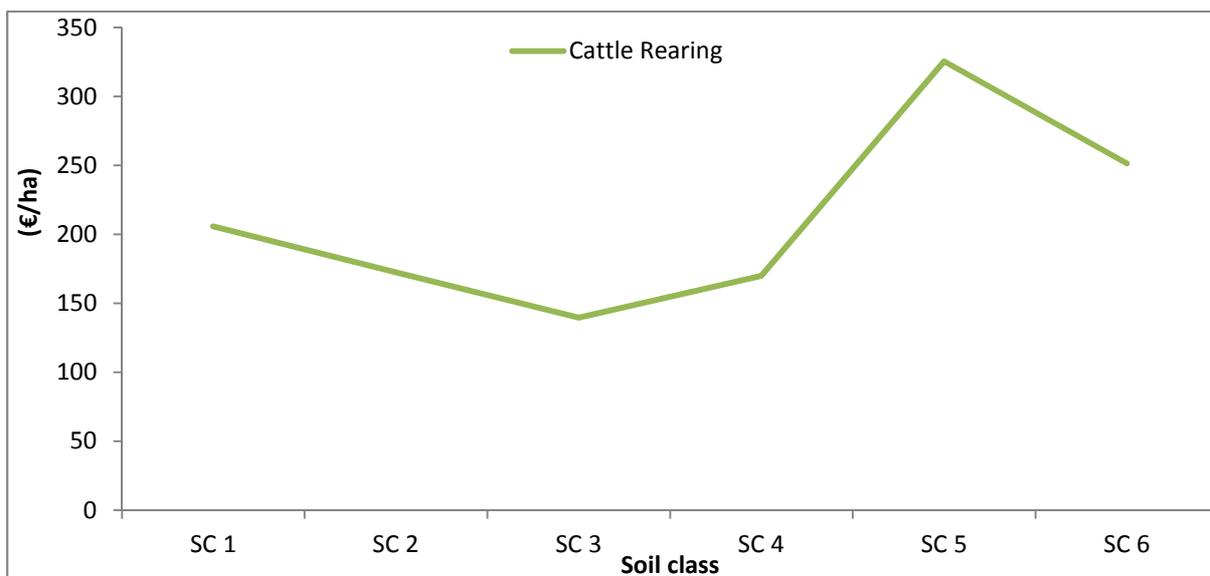
Soil class	Soil type	SS yield class
1	No limitations	24
2	Minor limitations	24
3	Higher elevations, heavier, poorer structure	20
4	Poor drainage	20
5	Agricultural potential greatly restricted	18
6	Mountainous, steep slopes, shallow soil	14

Analysis undertaken by Teagasc for the Forest Service (DAFM) calculates the afforestation income resulting from the planting of one forest rotation of a conifer crop for each of the farm systems across the range of soil classes.

Assumptions:

- Planting year: 2015
- Species: (Sitka spruce – GPC3)
- Agricultural opportunity cost is included as a cost for each year of the forest rotation
- Per hectare costs and incomes are projected for one forest rotation
- The net revenue at the end of the rotation is converted into today's money and averaged across each year of the rotation to give an average annual net gain/loss from forestry on a per hectare basis.
- The forest rotation lengths vary with soil class
- As an example, Figure 1 presents the long term net gain from planting land that was previously in the cattle rearing (suckler) system. On average suckler farmers have lower agricultural opportunity costs and are likely to have a high net gain per ha¹.

Figure 1: Annualised net gain from planting land in 2015 that was previously in the cattle rearing system, across a range of soil classes over a forest rotation.



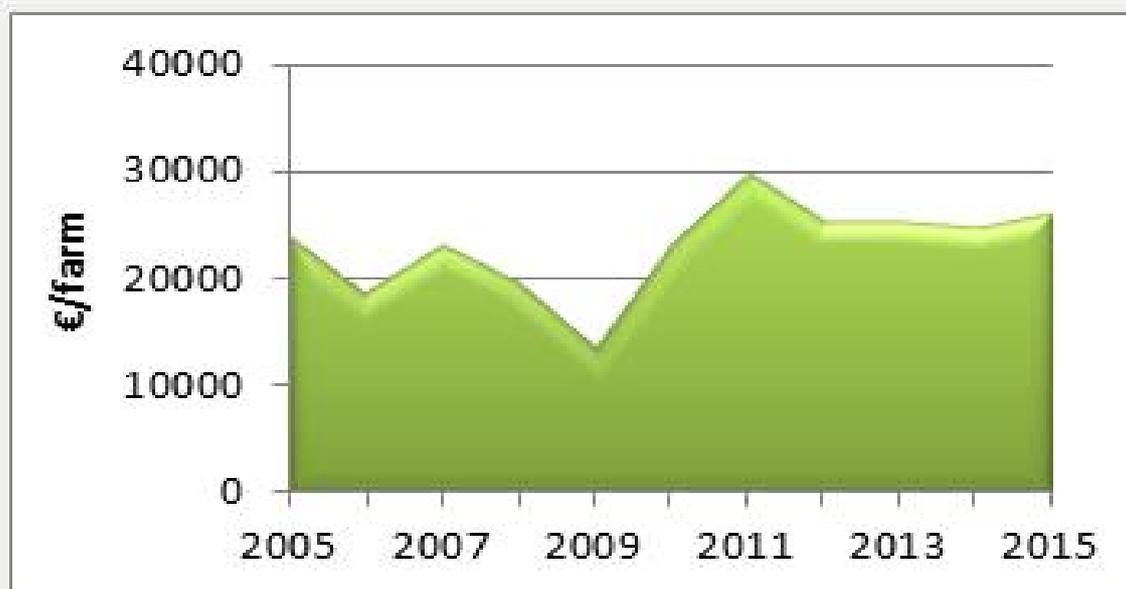
¹ It should be noted that the agricultural and forest incomes presented here are pre-tax incomes and do not take into account the different treatment of agricultural and forest incomes as income from forest premiums and sales of timber are not liable for income tax.

Across the different forest rotations on the different soil classes, the long-term net return to forestry is strongly positive regardless of soil class. However, the highest net gain from planting occurs at soil code 5/yield class 18 - land that marginal for agricultural production. This trend is largely consistent for all the farm systems.

One of the advantages of choosing forestry is that long term timber prices have kept pace with inflation over time and unlike in the farming situation, it is possible to capitalise on high timber prices by harvesting a year or two earlier or later.

On the other hand, fluctuations in farm income over time affect annual farm incomes and the opportunity cost of planting. This is evident in Figure 2 where the poor average income of 2009 due to bad weather was half the income achieved due to high prices in 2011.

Figure 2: Changes in NFS Family Farm Income over time (all farms)



Taking the long term view....

- This analysis presents a long term perspective which smooths out annual fluctuations and provides farmers with long term information.
- From an individual farm perspective, soil productivity and farm system both have a large impact on the long term return.
- Taking the opportunity cost into account, the farmers who stand to benefit the most from planting are those in the cattle and sheep systems who are considering planting land that is marginal for agriculture but which is also highly productive for forestry.
- For higher income farm systems, the opportunity cost is higher so there can be a net loss from planting. The losses are greater on good quality soils.
- However, in livestock systems with lower opportunity costs, the smoothed annual net gain over the course of a forest rotation is strongly positive. The highest gains are evident on marginal land at yield classes 18 and 20, where cattle and sheep farmers stand to gain between €100 and €330 per hectare on average **for each year** of the forest rotation.

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