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THE ECONOMICS OF AFFORESTATION AND MANAGEMENT IN IRELAND:
FUTURE PROSPECTS AND PLANS

2022 - Key Points

Prof Cathal O'Donoghue
University of Galway; BiOrbic SFI Research Centre

NUI Galway
OÉ Gaillimh

Ryan
Institute

biOrbic

Foreword

This project, funded by industry, forms an important part of the research programme of the BiOrbic SFI Research Centre. BiOrbic is Ireland's national bioeconomy research centre, established to promote and develop Ireland's bioeconomy through excellent research and innovation. The Centre brings together over one hundred researchers from across Ireland's leading academic and research organisations. Our expertise is multi-disciplinary and focused on supporting Ireland in a just transition to a sustainable society. We collaborate with industry, policy makers, producers, communities and citizens to support and advance this objective. Our research is both informed and informs bioeconomy and climate policy and we work to support national efforts to meet and exceed policy targets. We are working to create a bioeconomy system that is optimised for circularity, incorporating technological, ecosystem and social innovations that reduce the overall pressure on limited land resources and increase resilience of the bioeconomy.

One of the unique features of the Centre is that it provides both scientific and social scientific knowledge to help address major societal challenges. The challenge of achieving a sustainable forestry sector in Ireland is part of the BiOrbic research programme. How to deliver added value

using innovative materials, conversion technologies, using planted timber but also natural capital and the resultant ecosystem services arising are key questions BiOrbic is addressing. We also consider strategies to slow down emissions from the sector through product variation that either stores or substitutes more emissions through mechanisms such as carbon storage and greater timber use in construction to substitute concrete and steel.

The recent fall off in planting creates a significant risk of missing national Carbon Net Zero 2050 goals. Failure to deliver will have consequences in the rest of the bio-economy as emissions savings will have to be found later. BiOrbic will research policy, organisational and behavioural solutions to support the planting programme.

This report comprises an important plank in BiOrbic's enabling research to facilitate the delivery of Ireland's forestry sector goals.

Prof. Kevin O'Connor
Director, BiOrbic Bioeconomy SFI Research Centre
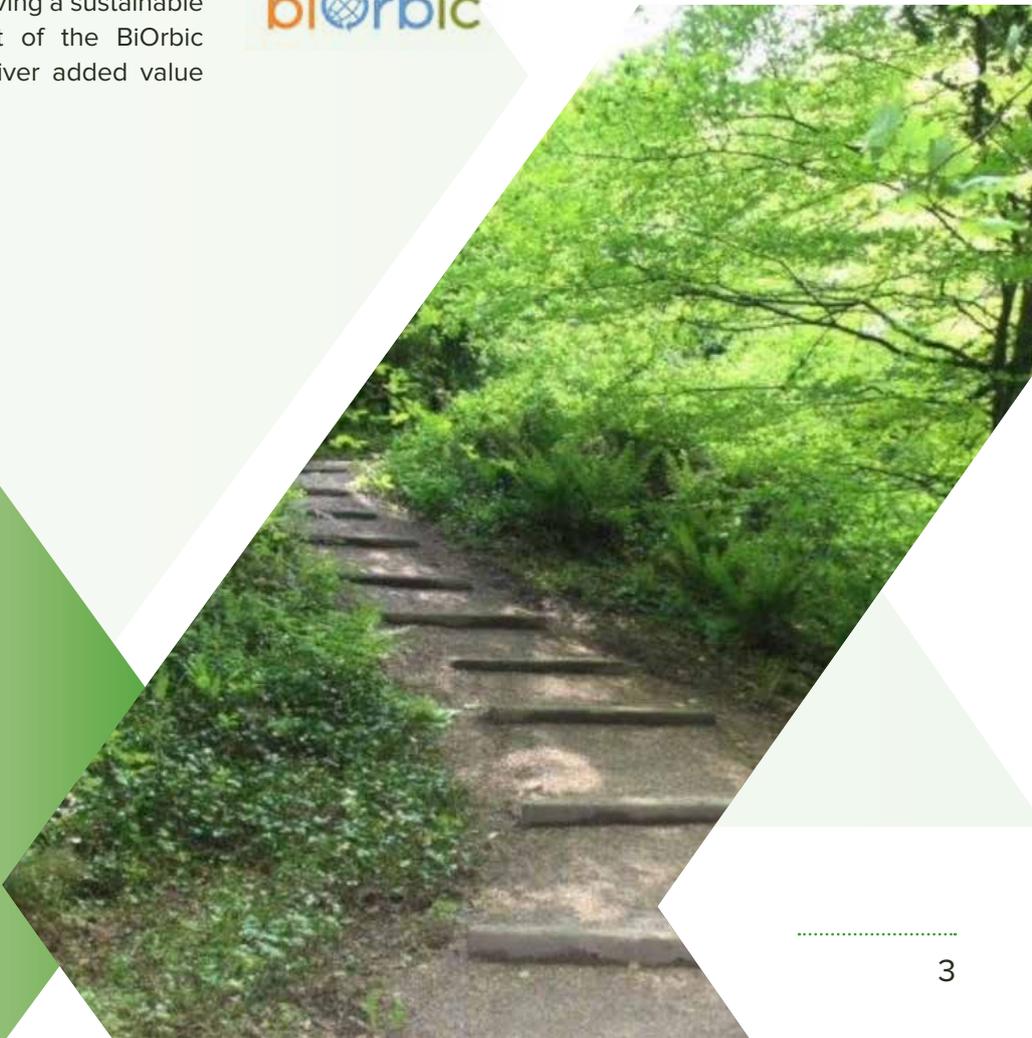
The national afforestation policy has been a great success, with 690,000 hectares planted in 100 years 1922-2022, reaching 11% of the total land area, the largest land-use change since the foundation of the State. However, the area planted has declined substantially in recent years with 2021 planting 8% of peak in 1995.

The external environment is particularly challenging in 2022. Supply chain issues and fuel and food price inflation has seen inflation return to levels unseen since the 1980's, with price growth between June 2021 and 2022 of 9.1% equivalent to the price growth over the 14 year period 2007-2020. Given this price inflation is likely to remain for a significant period of the next forestry programme, price assumptions and associated establishment grants should be reviewed regularly.

Although afforestation is very important for the timber industry, given the climate action objectives associated with global warming, the carbon sequestration potential for forestry related land use is becoming increasingly important. The national Climate Action Plan sets a roadmap for halving carbon emissions by 2030 and reaching net zero emissions no later than 2050 and identifies afforestation as the single largest land-based climate change mitigation measure available to Ireland.

Modelling scenarios that can reach carbon neutrality by 2050, the mean area of forestry required is about 18% of the land area; consistent with the Department of Agriculture, Food and the Marine's goal. Without a major afforestation strategy, it would be impossible to achieve carbon neutrality objectives using rewetting or agriculture alone unless there was a major reduction in animal numbers with consequential economic impacts. These goals are supported by the Department of Public Expenditure and Reforms carbon shadow price, which has to be used in economic appraisals of public policy which rises from €46 per tCO2e in 2022 to €100 in 2030 and to €265 in 2050.

Many farms can benefit from planting forestry financially. About 50% of all farms would have a higher income from forestry than agriculture for Sitka Spruce and about 30% have a higher return for broadleaf. The relationship however differs by farm system. Only 11% of specialist dairy farms would have a higher return from forestry. On the other hand, nearly 80% of cattle rearing farms and 70% of cattle finishing farms would have a higher return from forestry.

There is a mismatch between system and size. While cattle and sheep farms have a higher return from planting, in general they have a smaller farm size, yet dairy farms have a lower return but have a higher farm size. The challenge therefore for cattle and sheep farms is that although most have higher returns, their land base is lower, so they have less "spare land" for forestry. The replanting obligation is a particular issue for small farms as it rules out a proportionally higher area from potential planting in the future. Similarly the extra burden in recent years associated with administration and licensing, has reduced planting rates.

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It is important to link afforestation plans with agricultural plans. Two thirds of farms undertake other on-farm decisions while planting.

Some treat afforestation as a retirement income source, reducing stocking rate and reducing labour, while others, "diversifiers" increase stocking rate and generate other income from off farm activity at the same time as planting. It emphasises the importance of linking farm incentive programmes in the Common Agricultural Policy (CAP) with forestry incentive programmes. It also highlights the need for different advisory programmes for different types of farmers.

The Climate Action Plan reduced the target to 8,000 hectares, but Minister McConalogue has indicated that the target will be challenging to hit over the next decade. This target however, outlined above is far below the need to achieve 18% land cover in forestry by 2050. While in 2014, this meant 14,500 Ha per year, given the current low planting rates, the target planting rates in fact need to be 18,000 hectares per year to achieve this goal by 2050. The further this target is missed the greater will be the need to deliver reductions from other sources including agriculture.

At a carbon price of €32 per hectare, the share of farms with a positive social return (private return plus carbon benefit) from planting is 46.6% respectively. Using a carbon value of €100 per hectare, the share rises to 96.5%, while at a carbon value of €163 per hectare, nearly all farms (99.9%) have positive social returns. It emphasises the benefit to the country of planting forestry relative to other agricultural land uses.

As it takes about 40 years for a forest to reach maturing, given the existing fall off in afforestation levels over the past two decades, regardless of current strategies, there will be a reduction in carbon sequestration or carbon cliff as the forest estate moves from being a carbon sink to carbon source as harvesting exceeds planting. Carbon stored in harvested wood products however diminish the impact. However the more we can plant the less deep the cliff will be and more carbon sequestration there will be after replanting. Delaying planting decisions as a result has a major impact on 2050 totals.

For yield class 22, the discounted output per ha is lower for forestry than beef or dairy. However, when we include processing which has a higher multiplier than food processing, the gap closes, with the return similar between beef and forestry. The return to planting on dairy land is higher. Incorporating the carbon value of emissions and sequestration, the gap widens with beef at a carbon price of €32 per tCO2. However, at €100 per tCO2, forestry has a higher return than dairy. Quantifying the cost of missing a target over a rotation, we find that missing target by 6,000 hectares (distance relative to Climate Action Target) costs more than €400m at a €100 carbon price over a 40 year forest rotation, while the cost is over €1bn over a full rotation if the target is missed by 16,000 hectare as is currently the case.

The target planting rates in fact need to be 18,000 hectares per year to achieve the 18% land cover goal by 2050. The further this target is missed the greater will be the need to deliver reductions from other sources including agriculture.
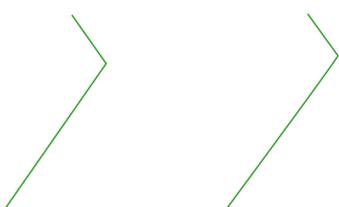
Reflecting on the Food Harvest 2020 strategy that combined ambitious targets for the food sector and was accompanied by a forestry planting target of 14,700 hectares, the targets for milk and beef were met early. The afforestation target only once reached 50% of target and worsened over the period. If the afforestation target had been met, then it would have been possible to sequester over time all the emissions from the increase in animal numbers over this period, in effect allowing for carbon neutral dairy expansion.

Current legislation imposes a replanting obligation on those who harvest trees. While it may seem like a sensible approach in maintaining the current estate after harvest, it has the implication of increasing the restrictions on land use and acts as a significant disincentive for land owners who are contemplating afforestation. Alternative behavioural strategies in relation to afforestation might also be impactful in relation to planting decisions.

Given the net increase in carbon each forest rotation, there is an opportunity to provide a carbon sequestration benefit each rotation. Pending ways to finance the scheme, the carbon value provides an opportunity both to provide a significant incentive to plant in the first place and also a way to factor in the economic cost of deforestation should a forest owner choose not to replant.

We propose a carbon sequestration scheme to take net carbon sequestration over a forest life-cycle to pay an upfront payment of (say one third of the value), followed by an annual premium for a period.

Using the carbon price of the public spending code, the total value of the net carbon sequestered in a Sitka Spruce plantation of one hectare discounted at 4% varies from €21,700 to €29,100 depending upon the yield class. These carbon prices can support a grant of up to €7,200-€9,700 depending upon the yield class and an annual premium of between €1,300 and €1,700. The results illustrate the substantial value that carbon has. Avoided animal emissions from agricultural land use change, varying from on average €14,084 to €20,184 per hectare, about two thirds of the net carbon sequestration in the trees are also assumed to accrue to the state. There is thus a win-win for the forest owner and the state.

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Policy coordination, development and implementation therefore provides particular challenges. Effective governance or coordination is essential to deliver the complex set of goals in the complex operating environment. The present governance structure of the forest industry eco-system is itself fragmented with different state agencies having responsibility. There is also an overlap between policy, regulatory and development functions. Given the unique circumstances faced by the sector and the large societal benefits that the sector can deliver, there is a merit in exploring new governance structures such as establishing a Forestry Development Agency to undertake a leadership role in developing the sector and to coordinate and deliver actions within the sector. Lessons drawn by the Mackinnon report in relation to the Scottish context should be applied in Ireland.

As the focus and structure of the forestry sector has changed over the past century, so has the Government Department in which forestry has been located. The Mackinnon report identified a "lack of political commitment and priority from the Irish Government to woodland creation". As the relative importance of the carbon sequestration goal of the sector increases, it is timely that a review is done of the best department location for forestry to achieve national carbon neutrality goals and to give the sector an added political impetus.

Another organisational issue relates to scale economies. The business model since the 1990's has been farm afforestation, with relative small parcels within farms being planted. Compared with Scotland the Mackinnon report found that economies of scale are less in Ireland. The organisational challenge of dealing with so many small holder forest owners is very significant. It is a credit to the Forest Service in managing such a large challenge and to Teagasc for the training and education support provided.

However the country seems to be reaching the limits of what this business model can achieve in terms of the amount of agricultural land that can be converted and the organisational complexity of managing so many individual units. It seems inevitable that the scale economies of the sector need to be considered. Multiple approaches are required to achieve this, which might involve incentivising larger parcels, public private partnerships that can deliver scale with say the Dairy Coops or in conjunction with state agencies. The artificial divide between public and private elements of the sector should also be reconsidered in taking a more flexible approach, improving coordination and capacity.

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Recommendation 1

Retain the longstanding target of achieving the 18% forest cover target by mid-century. Given the time lag between planting and sequestration, there is need to deliver significantly higher planting earlier, well beyond current targets.

Recommendation 2

Improve the design of forest payments to improve their compatibility with behavioural incentives including going beyond basic compensation

Recommendation 3

Link afforestation public good payments to carbon prices. Develop alternative financial instruments to continue to deliver up front payments in a carbon sequestration scheme and over multiple rotations

Recommendation 4

Develop mechanisms to deal with current inflationary environment to reduce risk by stakeholders and increase confidence

Recommendation 5

Full implementation of the Mackinnon report is necessary in a defined timeframe to deal with uncertainty due to licensing delays.

Recommendation 6

Develop a national land use strategy to provide a formal framework to make land use planning decisions.

Recommendation 7

Review the legislation on forestry and consider the introduction of a single consent covering planting, road construction, management and felling.

Recommendation 8

Afforestation incentives and forestry guidelines should be aligned to CAP rules and regulations to reflect the joint forestry and agriculture decision making that happens on farms.

Recommendation 9

Develop a Carbon Neutral Certification with the dairy farm Cooperatives.

Recommendation 10

Improve afforestation incentives by increasing flexibility in relation to the replanting obligation.

Recommendation 11

Establish a new Forestry Development Agency.

Recommendation 12

Undertake a review of the optimal department location for forestry in achieving national carbon neutrality goals.

Recommendation 13

Review the current afforestation business model to improve scale economies and deliver wider scale.

Recommendation 14

Eliminate disincentives and anomalies that arise from the interaction of afforestation and tax and social welfare policy for all stakeholders.