Evaluating the Economics of Impact of Converting land from Agriculture to Forestry in Ireland Using the Forest Investment and Valuation Estimator (FIVE).

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Ireland is in a unique position in Europe having only 11% forest cover whereas the EU average is approximately 30%, yet Ireland's climate affords it a competitive advantage in growing fibre for timber and for renewable energy. In order to redress this, the Irish Programme for Government has set an annual afforestation target of 14,700ha. In recent years however, the annual afforestation programme has been less than 6,000 hectares. Afforestation in Ireland has been undertaken primarily by farmers since 1996, which has resulted in over 47% of the current forest estate being privately owned. The rate of farmer afforestation needs to increase substantially to meet government targets. Although it is recognised that the decision of farmers to plant forests is motivated by a broad range of factors, it is important to gain a greater understanding of the economic implications of converting agricultural land to forestry.

Economic models or forest investment calculators are used by forest extension and investment professionals in many countries (UK, Australia, New Zealand, US) to assess the rate of return on different species and management options. Most models focus specifically on forestry rates of return, however in countries such as Australia and New Zealand where there is a large percentage of the forest cover in farm ownership, some of the economic models include an opportunity cost for the income foregone on the planted land. However, the growth rate of Irish forests and the opportunity cost of farm income foregone are different in Ireland, thus necessitating different modelling approaches to those employed in other countries. In order to provide a sound framework within which the farm forestry decision can be analysed, the FIVE (Forestry Investment and Valuation Estimator) economic model was developed on a Microsoft Excel platform by the authors and provides the basis for a cost-benefit framework to model the inter-temporal costs and benefits of forestry planting decisions relative to alternative agricultural uses.

We utilise this model to assess the net present value of a range of alternative forestry planting decisions for different environmental and soil conditions. By linking forest productivity and farm gross margin to soil type, we can generate income streams for both forestry and agricultural enterprises on specific soil types, thus enabling the comparison of the rates of return from both the agricultural and forestry income streams for specific farm systems on specific soil types. The opportunity cost is derived from average farm incomes (gross margins) which are generated by farm system from a panel data set of Teagasc National Farm Survey data from 1996 to 2011. The FIVE assumes that all costs change over time as a result of inflation. For this reason, a 'real' discount rate is used when discounting cash flows. The results clearly show the variation in the net present value (NPV) of replacing each of the six different farm systems with forestry. The results also clearly show the impact of soil quality on the financial returns when converting from an agricultural to a forestry land use.