A Cluster based approach for identifying farm forest resources to maximize potential markets

Key external stakeholders:
COFORD, Council for Forest Research and Development
Forest Service, Department of Agriculture, Food and Marine
Teagasc Forestry Producer Groups
Forestry Companies and Stakeholders

Practical implications for stakeholders:
• The potential of Geographic Information Systems (GIS) as a tool to derive forest clusters has succeeded in identifying large geographic concentrations of private forestry in Ireland.
• GIS technology can assist in the rapid cost-effective assessment of timber resources
• Forest clusters provide many advantages for small scale forestry including provision of economies of scale, in supply, reduced costs and increased competitiveness of the private forest sector.
• Such concentrations of forests and growers may enable the establishment of Forestry producer groups within defined geographic locations, and enabling a more targeted knowledge transfer and extension service.

Main results:
A GIS based cluster analysis of private forestry in Ireland succeeded in locating 16 forest clusters greater than 10,000 hectares. The sixteen cluster areas contain 88,000 hectares (Table 1). A survey to examine the potential timber supply and constraints of private forestry was undertaken in one forest cluster near Ballaghaderreen in Co. Roscommon. The use of GIS methods and field survey data enabled a rapid assessment of forest resources to be performed. The methodology employed offers a cost-effective solution to the assessment of private forest resources which could be used to assess national wood supply targets.

Opportunity / Benefit:
This research has demonstrated a cost-effective solution to the assessment of private forest resources. Significant opportunities for developing a local forestry infrastructure, using innovative solutions to identify forestry resources, presents economies of scale and scope, indicating that there are grounds for co-production and integration of harvesting activities. Secondly, the boundaries or extent of a cluster, also present opportunities exists to pool resources from geographic concentrations of farm forest plantations and knowledge gained thus optimising the value of first thinning.

Collaborating Institutions:
None
Teagasc project team:  Dr. Niall Farrelly (PI)  
                        Mr Brian Clifford  
                        Mr Stuart Green  

External collaborators: None

1. Project background:  
The project aimed to quantify the potential of clustering as a technique suited for identifying geographic  
concentrations of private forest plantations approaching first thinning, specifically to address the following  
issues:  
1. Quantification of the resource  
2. Identifying markets for produce  
3. Creating economies of scale  
4. Reducing the costs associated with harvesting  
5. Location of potential end users close to the resource  
6. Creation of harvest and forecasting schedules for cluster areas

2. Questions addressed by the project:  
- Allows identification of large concentrations of private forestry in defined geographic locations with  
significant harvest potential  
- It provides a cost effective methodology for assessing private forest resources  
- It allows a rapid assessment of thinning potential in local defined areas.  
- It provides a methodology for the establishment of forest grower 'producer groups' who may wish to  
collaborate in the sale and harvesting of forest products and in the grouping of forest operations  
together to achieve economies of scale.

3. The experimental studies:  
All private forests in receipt of grant aid in Ireland were identified from a spatial database provided by the  
Forest Service, Department of Agriculture, Food and Fisheries. We performed a GIS cluster analysis which  
identified 16 national forest clusters. A cluster study area was chosen in the counties of Mayo, Sligo and  
Roscommon. Within the study area, we developed a forest inventory database covering 4,597 ha using remote  
sensing technologies (including LIDAR) together with a detailed field survey. A sample survey of 92 forest  
owners was conducted covering 932 ha to compile forest growth data. We simulated various management  
regime practices on forests using growth data and windthrow risk. This allowed a forecast of production from c.  
5,000 ha covering the period 2009 – 2028.

4. Main results:  
The GIS based cluster analysis succeeded in locating 16 forest clusters occupying 88,000 hectares. The use of  
a cost-effective solution to assessing private forest resources was in one forest cluster near Ballaghaderreen in  
Co. Roscommon enabled c. 5,000 ha of forest to be identified which offered a realistic thinning potential. A  
follow up ground survey indicated that although average individual plantation sizes were small (5.14 ha - 47%  
were less than 8 ha), the majority of stands assessed had good public road access, a key factor influencing the  
availability of forest thinnings. In fact thinning has been carried out in 30% of the forest area examined but is  
confined solely to productive forests. These forests are predominately pure stands of Sitka spruce, where  
exceptional yields (>24m³ ha⁻¹ yr⁻¹) of on difficult to farm wet mineral soils offer short term harvest potential.  
The species accounts for 75% of the area and 90% of the total standing volume (754,146 m³) and stands are  
suitable for thinning on average at 14 years of age. Total standing volume for a cluster of c. 4,500 ha is  
840,698 m³ with 365,990 m³ available as small sawlog, 324,796 m³ as pulp and 149,913 m³ as large sawlog.  
These results indicate the significant potential of farm forestry to meeting local and national supply targets.
### Table 1: The location of forest clusters, forest area and forest cover in percent. Study area is highlighted in bold.

<table>
<thead>
<tr>
<th>No.</th>
<th>Location</th>
<th>Forest area (ha)</th>
<th>Cluster Area (ha)</th>
<th>Forest as % of Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Limerick, Kerry, Cork</td>
<td>28,400</td>
<td>296,314</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>Galway, Limerick, Tipperary</td>
<td>13,455</td>
<td>163,220</td>
<td>8%</td>
</tr>
<tr>
<td>3</td>
<td>Mayo, Sligo, Roscommon</td>
<td>9,576</td>
<td>130,409</td>
<td>7%</td>
</tr>
<tr>
<td>4</td>
<td>Leitrim, Sligo, Cavan</td>
<td>8,901</td>
<td>105,277</td>
<td>8%</td>
</tr>
<tr>
<td>5</td>
<td>Clare</td>
<td>8,922</td>
<td>80,825</td>
<td>11%</td>
</tr>
<tr>
<td>6</td>
<td>Donegal</td>
<td>4,287</td>
<td>54,044</td>
<td>8%</td>
</tr>
<tr>
<td>7</td>
<td>Westmeath, Laois</td>
<td>3,506</td>
<td>48,464</td>
<td>7%</td>
</tr>
<tr>
<td>8</td>
<td>Kilkenny, Laois</td>
<td>2,041</td>
<td>26,474</td>
<td>8%</td>
</tr>
<tr>
<td>9</td>
<td>Donegal</td>
<td>2,219</td>
<td>22,569</td>
<td>10%</td>
</tr>
<tr>
<td>10</td>
<td>Mayo</td>
<td>1,440</td>
<td>18,184</td>
<td>8%</td>
</tr>
<tr>
<td>11</td>
<td>Waterford, Tipperary</td>
<td>1,104</td>
<td>13,753</td>
<td>8%</td>
</tr>
<tr>
<td>12</td>
<td>Donegal</td>
<td>1,200</td>
<td>12,477</td>
<td>10%</td>
</tr>
<tr>
<td>13</td>
<td>Longford, Westmeath</td>
<td>768</td>
<td>10,991</td>
<td>7%</td>
</tr>
<tr>
<td>14</td>
<td>Wicklow</td>
<td>715</td>
<td>10,896</td>
<td>7%</td>
</tr>
<tr>
<td>15</td>
<td>Cork</td>
<td>881</td>
<td>10,893</td>
<td>8%</td>
</tr>
<tr>
<td>16</td>
<td>Mayo</td>
<td>728</td>
<td>10,593</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>Total Area</td>
<td>88,143</td>
<td>1,015,565</td>
<td></td>
</tr>
</tbody>
</table>

5. **Opportunity/Benefit:**

Significant opportunities exist with which to accelerate timber output from small-scale forest plantations through clustering the geographic concentrations of forests. The primary stakeholder for this research is COFORD and Government policy makers, who can use information to formulate policy regarding the supply of raw material from the private forestry sector in order to meet timber forecasts and renewable energy targets. The benefits of the project are already being realised in the setting up of forestry producer groups throughout the country. They study has provided a template for assessing forest resources. It is hoped it may facilitate local cooperation between growers and industry to achieve economies of scale in harvesting.

6. **Dissemination:**


**Main publications:**


**Popular publications:**


7. **Compiled by:** Niall Farrelly