Seasonal Variation of Production in Forest Industries and Wood Procurement in Finland

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TO DO LIST

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TO DO LIST

☐ Less seasonality in wood harvesting
☐ Bigger stems for harvesting
☐ Preclearance of undergrowth
Seasonal Variation in Forest Industries in 2010s in Finland
Production volumes of paper and paperboard by month in 2010s in Finland

Average: 894,000 t

Source: Finnish Forest Industries.
Production volumes of wood pulp by month in 2010s in Finland

Average: 585,000 t

Source: Finnish Forest Industries.
Production volumes of sawn goods by month in 2010s in Finland

Average: 854,000 m³

Share of production of paper and paperboard by month in 2010s in Finland

Average: 8.33%

Source: Finnish Forest Industries.
Share of production of paper and paperboard by month in 2010s in Finland

Average: 8.33%

Source: Finnish Forest Industries.
Share of production of wood pulp by month in 2010s in Finland

Source: Finnish Forest Industries.

Average: 8.33%
Share of production of wood pulp by month in 2010s in Finland

Average: 8.33%

Source: Finnish Forest Industries.
Share of production of sawn goods by month in 2010s in Finland

Average: 8.33%

Share of production of sawn goods by month in 2010s in Finland

Average: 8.33%

Share of production of sawn goods by month in 2010s in Finland


Average: 8.33%
Seasonal Variation in Wood Procurement in 2010s in Finland
Industrial roundwood cuttings by month in 2010s in Finland

Source: Natural Resources Institute Finland, Industrial roundwood removals and labour force.
Share of industrial roundwood cuttings by month in 2010s in Finland

Average: 8.33%

Source: Natural Resources Institute Finland, Industrial roundwood removals and labour force.
Share of industrial roundwood cuttings by month in 2010s in Finland

Average: 8.33%

Source: Natural Resources Institute Finland, Industrial roundwood removals and labour force.
Seasonality in production of paper & paperboard, pulp and sawn goods and roundwood cuttings, 2010–2016

Sources: Finnish Forest Industries, Finnish Sawmills & Natural Resources Institute Finland.
Seasonality in production of paper & paperboard, pulp and sawn goods and roundwood cuttings, 2010–2016

100 = Seasonal variation in production of paper & paperboard in each year.

Sources: Finnish Forest Industries, Finnish Sawmills & Natural Resources Institute Finland.
Seasonality in production of paper & paperboard, pulp and sawn goods and roundwood cuttings, 2010–2016

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Sources: Finnish Forest Industries, Finnish Sawmills & Natural Resources Institute Finland.

100 = Seasonal variation in production of paper & paperboard in each year.

× 2–3
Seasonality in production of paper & paperboard, pulp and sawn goods and roundwood cuttings, 2010–2016

Sources: Finnish Forest Industries, Finnish Sawmills & Natural Resources Institute Finland.

100 = Seasonal variation in production of paper & paperboard in each year.
Seasonality in production of paper & paperboard, pulp and sawn goods and roundwood cuttings, 2010–2016

Sources: Finnish Forest Industries, Finnish Sawmills & Natural Resources Institute Finland.

100 = Seasonal variation in production of paper & paperboard in each year.
Wood harvesting machinery by month in 2010s in Finland

Source: Natural Resources Institute Finland, Industrial roundwood removals and labour force.
Timber truck fleet by month in 2010s in Finland

Source: Natural Resources Institute Finland, Industrial roundwood removals and labour force.
Ratio of wood harvesting machinery used by month and annual average machinery in 2010s in Finland

100% = Average wood harvesting machinery in each year.

Source: Natural Resources Institute Finland, Industrial roundwood removals and labour force.
Ratio of timber truck fleet used by month and annual average truck fleet in 2010s in Finland

100% = Average timber truck fleet in each year.

Source: Natural Resources Institute Finland, Industrial roundwood removals and labour force.
Highlights of Survey on Reduction of Seasonality in Wood Harvesting in Finland
Targets of our survey

• In the survey by Stora Enso Wood Supply Finland it was mapped out:
  − Which are the main causes of seasonal variation?
  − What are the most significant ways to decrease seasonality?
  − How the different ways are currently used to reduce seasonal fluctuations?

• Furthermore, the potential for the future utilization of the various means of reducing seasonal variation was determined.
Material & methods (1/2)

• The study was carried out as a Webropol survey in December 2016.

• The selected parties participated in the survey:
  - Forest machine entrepreneurs of Stora Enso WSF
  - Wood harvesting officers of Stora Enso WSF
  - Tornator corporation personnel (later Forest owners)
  - Forest machine and equipment manufacturers
  - Representatives of R&D organizations.

• The survey provided a total of 32 possible reasons for seasonal variation and 39 potential ways of reducing seasonal fluctuations in wood harvesting.
Material & methods (2/2)

• A response link for the query was sent to a total of 193 persons selected, of whom 149 replied to the questionnaire.

• Hence, the response rate was very good (77.2%).

• The survey was a part of the EU funding EFFORTE project at the Bio-based Industries Consortium at Stora Enso WSF.
Weather was the most significant reason for seasonal variation

- Respondents felt that the weather (the season of bad roads during spring and autumn, as well as short and mild winters) cause the most seasonal variation in Finland.

- The respondents listed also other factors for the main reasons of seasonality:
  - Limited standing stocks,
  - Bad condition of road infrastructure,
  - Variations in the wood consumption of mills, and
  - Prejudices of forest owners towards summertime wood harvesting operations in Norway spruce stands and peatland forests.
**TOP10 – The most significant reasons for seasonal variation in Finland**

<table>
<thead>
<tr>
<th>Reason</th>
<th>Machine entrepreneurs</th>
<th>Wood harvesting officers</th>
<th>Forest owners (Tornator)</th>
<th>Machine manufacturers</th>
<th>R&amp;D</th>
<th>All respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Season of bad roads during spring</td>
<td>3.4</td>
<td>3.6</td>
<td>3.7</td>
<td>3.8</td>
<td>3.5</td>
<td>3.6</td>
</tr>
<tr>
<td>Short winters</td>
<td>3.1</td>
<td>3.2</td>
<td>3.3</td>
<td>3.3</td>
<td>3.1</td>
<td>3.2</td>
</tr>
<tr>
<td>Season of bad roads during autumn</td>
<td>3.0</td>
<td>3.1</td>
<td>3.2</td>
<td>3.2</td>
<td>3.0</td>
<td>3.1</td>
</tr>
<tr>
<td>Mild winters</td>
<td>3.0</td>
<td>3.1</td>
<td>3.2</td>
<td>3.2</td>
<td>3.0</td>
<td>3.1</td>
</tr>
<tr>
<td>Limited standing stocks</td>
<td>3.0</td>
<td>3.1</td>
<td>3.2</td>
<td>3.2</td>
<td>3.0</td>
<td>3.1</td>
</tr>
<tr>
<td>Bad condition of road infrastructure</td>
<td>3.0</td>
<td>3.1</td>
<td>3.2</td>
<td>3.2</td>
<td>3.0</td>
<td>3.1</td>
</tr>
<tr>
<td>Variations in wood consumption of mills</td>
<td>2.8</td>
<td>2.9</td>
<td>3.0</td>
<td>3.0</td>
<td>2.8</td>
<td>2.9</td>
</tr>
<tr>
<td>Prejudices of forest owners towards summertime harvesting in Norway spruce stands</td>
<td>2.7</td>
<td>2.8</td>
<td>2.9</td>
<td>2.9</td>
<td>2.7</td>
<td>2.8</td>
</tr>
<tr>
<td>Prejudices of forest owners towards summertime harvesting in peatland forests</td>
<td>2.2</td>
<td>2.3</td>
<td>2.4</td>
<td>2.4</td>
<td>2.2</td>
<td>2.3</td>
</tr>
<tr>
<td>Rainy summers</td>
<td>2.2</td>
<td>2.3</td>
<td>2.4</td>
<td>2.4</td>
<td>2.2</td>
<td>2.3</td>
</tr>
</tbody>
</table>

1=Not at all significant ... 5=Extremely significant
TOP10 – The most significant reasons for seasonal variation in Finland

- Rainy summers
- Prejudices of forest owners towards summertime harvesting in peatland forests
- Variations in wood consumption of mills
- Bad condition of road infrastructure
- Limited standing stocks
- Season of bad roads during spring
- Season of bad roads during autumn
- Mild winters
- Short winters
- Mild winters

1=Not at all significant  ...  5=Extremely significant

Machine entrepreneurs
Wood harvesting officers
Forest owners (Tornator)
Machine manufacturers
R&D
All respondents
High-quality skills of the operator were the most important tool to reduce seasonal fluctuation

- The respondents said that the high-quality skills of harvesting machine operators are the most significant tools for fighting seasonality.
- Subsequently, the second and third most important means were sufficient standing stock levels and accurate and updated information about the standing stocks.
- Forest machine entrepreneurs estimated that sufficient standing stocks are the most significant means to reduce seasonal fluctuations.
- All other respondents evaluated that the high-quality skills of the operators are the most important means of reducing seasonal variation.
TOP10 – The most significant ways to decrease seasonal variation in wood harvesting in Finland

1. Keeping in harvesting removals planned monthly
2. More accurate planning of harvesting sites
3. Handy planning and steering systems of wood harvesting
4. Reduction of ground surface pressures of harvesting machinery
5. Improving road infrastructure
6. Accurate and updated information about standing stocks
7. High-quality skills of machine operators
8. Sufficient standing stock levels
9. More accurate classification of sites for harvesting operation
10. Harvesting machinery equipped with wide load-bearing tracks

1=Not at all significant  ...  5=Extremely significant

- Machine entrepreneurs
- Wood harvesting officers
- Forest owners (Tornator)
- Machine manufacturers
- R&D
- All respondents
TOP10 – The most significant ways to decrease seasonal variation in wood harvesting in Finland

1. High-quality skills of machine operators
2. Sufficient standing stock levels
3. Accurate and updated information about standing stocks
4. Improving road infrastructure
5. Reduction of ground surface pressures of harvesting machinery
6. Harvesting machinery equipped with wide load-bearing tracks
7. More accurate classification of sites for harvesting operation
8. Handy planning and steering systems of wood harvesting
9. More accurate planning of harvesting sites
10. Keeping in harvesting removals planned monthly

1=Not at all significant … 5=Extremely significant

Legend:
- Machine entrepreneurs
- Wood harvesting officers
- Forest owners (Tornator)
- Machine manufacturers
- R&D
- All respondents
Some tools for reduction of seasonality are currently used well; some not

• The respondents considered that **the most effectively used tools** for combating seasonal fluctuations currently (Dec. 2016) are:
  - High-quality skills of machine operators,
  - Harvesting removals accordingly wood orders by mills and keeping in harvesting removals planned monthly,
  - Accurate and updated information about standing stocks,
  - Harvesting machines equipped with wide load-bearing tracks.

• The participants underlined that **the most disadvantaged ways used** for reduction of seasonality are:
  - Trucks of machine locations and timber trucks equipped with CTI system,
  - Common planning and steering system of wood harvesting (WoodForce™),
  - Harvesting small-sized wood,
  - Development of tutoring systems for operators.
TOP10 of reduction tools of seasonality which are currently the most utilized in Finland

1. High-quality skills of machine operators
2. Harvesting removals according to wood orders by mills
3. Keeping in harvesting removals planned monthly
4. Accurate and updated information about standing stocks
5. Harvesting machinery equipped with wide load-bearing tracks
6. More accurate planning of harvesting sites
7. Forest machine enterprise has versatile harvesting machinery
8. Flat storage levels of cut timber monthly
9. Improving equipment of harvesting machinery
10. Planning of harvesting sites carried out by forest machine enterprise

1=Not at all in use … 5=Excellently in use
TOP10 of reduction tools of seasonality which are currently the least utilized in Finland

- Trucks of machine relocation equipped with CTI
- Timber trucks equipped with CTI
- Common planning and steering system of wood harvesting (WoodForce)
- Harvesting small-sized wood
- Developing tutoring systems for machine operators
- Forest machine enterprise produces also mechanized silviculture services
- Participation of forest machine enterprise in client's annual planning
- Smaller-sized harvesting machines
- Better forecasting mobility of forest roads
- Improving road infrastructure

1=Not at all in use  ...  5=Excellently in use

Machine entrepreneurs
Wood harvesting officers
Forest owners (Tornator)
Machine manufacturers
R&D
All respondents
WoodForce™, renovation of road infrastructure and sufficient standing stocks have the largest potential (1/3)

• Forest machine entrepreneurs and wood harvesting officers predicted that the biggest opportunities for reducing seasonal fluctuations in the next few years will be:
  – A common planning and steering system of wood harvesting (i.e. WoodForce™),
  – Sufficient standing stocks and
  – Improving road infrastructure in Finland.

• Forest owners (Tornator) estimated that the greatest potential for exploitation is:
  – Lowering the ground surface pressures of harvesting machinery equipped with wide load-bearing tracks,
  – High-quality skills of the operators and
  – The advanced usage of weather and soil information in harvesting operations.
WoodForce™, renovation of road infrastructure and sufficient standing stocks have the largest potential (2/3)

• The largest utilization potential of the machine manufacturers was:
  − The WoodForce™,
  − The development of tutoring systems for forest machine operators,
  − The reduction of ground surface pressures of harvesting machinery,
  − The participation of a forest machine enterprise in the client’s annual planning and
  − Peatland wood harvesting during summertime.
WoodForce™, renovation of road infrastructure and sufficient standing stocks have the largest potential (3/3)

- The representatives of R&D organizations listed that the biggest potential for exploitation is:
  - The better forecasting of the mobility of forest roads,
  - Developing tutoring systems for the operators,
  - The renovation of road infrastructure,
  - The more accurate classification of harvesting sites and
  - The better utilization of soil data in wood harvesting operations.

Source: Jussi Peukurinen, Arbonaut Ltd.
TOP10 of tools which had the largest potential for reduction of seasonality in the next few years in Finland

- Common planning and steering system of wood harvesting (WoodForce)
- Improving road infrastructure
- Sufficient standing stock levels
- Developing tutoring systems for machine operators
- Better forecasting mobility of forest roads
- More accurate classification of sites for harvesting operation
- Participation of forest machine enterprise in client's annual planning
- Utilization of soil data in wood harvesting operations
- Reduction of ground surface pressures of harvesting machinery
- Handy planning and steering systems of wood harvesting

0=No potential ... 4=Extremely large potential

Machine entrepreneurs
Wood harvesting officers
Forest owners (Tornator)
Machine manufacturers
R&D
All respondents
The reduction work of seasonal fluctuation continues! – Our common task is to further decrease the seasonal variation in wood harvesting!

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