Possibilities for Intensive Forestry in Joensuu

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What’s Needed for Intensive and Competitive Forestry?

1. Markets for timber = Forest industry
2. Knowledge
3. Good (logistic) infrastructure
4. Data on forest resources
5. Efficient supply chains & sustainable thinning forestry
6. Resilient forestry
Joensuu - “The Forestry Capital of Europe”

- Unique concentration of forest-based research
- All the levels in forestry education
- World leading technology for forestry, forest management & logistics and other high value products

North Karelia: 163,000 inhabitants • size 21,585 km² • 13 municipalities
World-leading technology for harvesting, material handling and wood logistics

Arbonaut, John Deere Forestry, Mantsinen Group, Kesla, Waratah OM, Pentin Paja, Konepaja Antti Ranta, Konekorjaamo Riikonen, Veekmas, Outokummun Metalli, Vallius Forestry, PKP-Flex, etc.
Forest resources and world-class expertise in North Karelia

89% of total land area covered by forests

Annual growth of forests 9.3 MIL M³

Annual usage of forests 5.9 MIL M³

500 companies, turnover of 2 BILLION €

6000 employees

600 experts
Requirement 1: Market for wood

**Dissolvent pulp for textiles**
Enocell pulpmill by Stora Enso
1st line switched to dissolvent pulp in 2012
Production totally for dissolvent pulp in 2019-
Opportunities for value-add products

**Bioenergy & refined biofuels**
1st integrated fast pyrolysis plant in the World by Fortum
Started in 2013, capacity 25 kt/y
Coming: Biochar from peat by VAPO

**Wood construction ecosystem**
14-storey “Light House Joensuu”
Several other first-of-a-kind public wooden buildings
Towards industrial construction
Recuirement 2: Knowledge
Unique collaboration and expertise

- European Forest Institute – EFI HQ
- Natural Resources Institute – Luke
- Finnish Environment Institute – SYKE
- University of Eastern Finland – UEF
- Karelia University of Applied Sciences
- Riveria Vocational Forestry College
- Finnish Forest Centre
- Forestry Management Association
- Business Joensuu Oy & other regional business development organisations

= Green HUB
3: Logistic infrastructure

- Forest resources available all the year + major impact on timber costs at the mill
  - Key factors when planning for investments!
- Improved access to silvicultural works
- Efficient forest fire management!
- Multiple use: mushrooms, berries, hunting, fishing...
- In Finland:
  - Average road density 12-13 m/ha
  - Most of the roads available around the year
  - Haulage distance <250 m, logistic costs reasonable
4: Data on forest resources

Since 1970’s accurate stand-level forest inventory data and forest management plans (farm-level, regional) have been the basic tools for forestry professionals in Finland

• **Basis for planning and optimizing all the forestry operations:**
  • Harvesting
  • Road construction (pre-planning)
  • Forest & energy industry investments
  • Transparent real estate markets
  • Multi-disciplinary planning for combining different forest uses: game, multiple use, protection of water systems etc.

• **Culture of using the data – urge to get better data !**
LIDAR-based inventory data – dramatic drop in costs
- In large scale operative use since 2007 in Finland
- more accurate & unbiased data: location-based tree data, versatile data on forest environment
  - Soil type
  - Moisture
  - Understory
  - Accurate ground model...

Graph: Arbonaut Ltd.
Terrain operability for loggings
- becoming more and more important due to Climate Change (mild winters)

Soil bearing capacity - seasonal operability map

Source: Arbonaut Ltd.
5: Efficient supply-chains & thinning forestry
Mechanization of forest operations – Cut-to-Length machinery

- Over 99% of timber harvested using harvesters
- Fast mechanization in 1980’s and 1990’s
- Machines owned by private contractors (not forest industry)

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Metsätehko Oy:n osakkaiden (suurimpien metsäteollisuusyritysten ja Metsähallituksen) hakkuut.
Fellings by the forest industries and Metsähallitus, which is a state-enterprise administrating all state-owned forests.

Lähde – Source: Metsätehko Oy

Kuva 5.4 Hakkuiden koneellistamisaste 1985–2011
Figure 5.4 Degree of mechanisation in fellings of commercial roundwood, 1985–2011
5 Result: Cost-development in Finnish timber supply - quite well in control

Luvut sisältävät Metsäteho Oy:n osakkaiden (suurimpien metsäollisuusyritysten ja Metsähallituksen) korjaaman ja kuljettamansa markkinalakkaiden puun.

The figures include domestic logs and pulpwood harvested and transported by the forest industries and Metsähallitus.

Raharanot on muunneltu tukuhintandeeksilla (1949=100). – Monetary values are deflated using wholesale price index (1949=100).

Lähde – Source: Metsäteho Oy
6: Resilient Forestry - Climate-Smart Forestry

- **Sustainable & cost-efficient wood procurement**
  - Thinning forestry & Cut-to-Length (CTL)
  - Soft soil harvesting & logistics
  - Timber logistics: Road infrastructure – terminals - HCT (High Capacity Transport)

- **Resilient forests - management vs. increasing climate-induced disturbances**
  - Forest fires & wind damages
  - Biotic: insects & fungi
  - Erosion

- **Precision forestry**
  - LIDAR-based inventory: forest management and land use planning
  - Sensors & Big Data
    - Open data & service applications based on data fusion
  - Digitalization in forestry, AR/VR, virtual forest
  - Forest & Photonics

- **Biomass energy**
  - Harvesting – storage – processing - logistics
  - Fuel quality management
  - Refined biofuels
6: Resilient Forestry - Climate-Smart Forestry

- **Challenge: Extended rotation time & continuous cover forestry**
  - Reforestation, forestry land as carbon sink

- **Challenge: Biodiversity, ecosystem services & non-wood products**
  - Sustainability, forests and water systems, endangered species & silviculture
  - Semi-culture, organic production, chain-of-custody
  - Restoration of drained peatlands
Forest & Photonics
7th - 8th October 2019
Koli National Park, Finland

Photonics 4 Forestry
Koli, Finland | 7 - 8 October 2019

Forest&Photonics 2019
» Artificial Intelligence (AI)
» Forest Fires
Thank You for Your Attention!

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