COEVOLUTION OF FINNISH FORESTRY AND SOCIETY FROM PREINDUSTRIAL TO INDUSTRIAL FORESTRY

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**BOOKS DURING WFSE**


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2. THEORY, METHODS AND DATA

3. SUSTAINED YIELD OF TIMBER
   - Transition *de jure* 1917-1950
   - Transition *de facto* 1900-1910

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Forest area in the tropics 1960-2050

Total forest cover as % of total land area in 168 countries in 2000 (updated 2000 data of FAO SOFO 2005).
Forest Industry Exports per Capita and the Share of Total Exports in 2003

Forest industry exports EUR per capita

<table>
<thead>
<tr>
<th>Country</th>
<th>Forest Industry Exports / Total Exports, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finland</td>
<td>24.8%</td>
</tr>
<tr>
<td>Sweden</td>
<td>13.2%</td>
</tr>
<tr>
<td>Austria</td>
<td>8.2%</td>
</tr>
<tr>
<td>Canada</td>
<td>10.2%</td>
</tr>
<tr>
<td>Norway</td>
<td>2.0%</td>
</tr>
<tr>
<td>Germany</td>
<td>2.8%</td>
</tr>
<tr>
<td>France</td>
<td>2.4%</td>
</tr>
<tr>
<td>USA</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

SOURCE: Finnish Forest Industries Federation, Statistics Finland
SUSTAINABLE FORESTRY TRANSITIONS IN COSTA RICA, FINLAND, JAPAN AND KOREA: CASE STUDIES AND COMPARATIVE ANALYSES

Research Project Plan for 2004-2006

by

Matti Palo, Yeo-Chang Youn, SNU and Guillermo A. Navarro
CATIE, Costa Rica
PURPOSE OF THE RESEARCH PROJECT

• **The first purpose** of this research project is to analyse the evolution of closing down deforestation and transitions to Sustained Yield Forestry and towards Sustainable Forest Management in the four successful case study countries. The aims are both to describe and explain these evolutions separately, but with the same methodology, in each country.

• **The second purpose** is to make a comparative analysis of the case study countries in order to find out the possible generalizations against our theoretical framework of common underlying causes of overcoming deforestation and transition by the successful cases and of continuing deforestation by the unsuccessful cases.

• **The third purpose** is to make policy proposals based on our study findings in support of closing down deforestation and of supporting transitions of countries towards sustainable forestry in our contemporary world.

• **The fourth purpose** is to effectively disseminate our findings and contribute to human capacity building, particularly for governments in developing countries, intergovernmental organizations, ODA-bodies, academics, NGOs and media.
CONCLUSIONS 1

• EFFECTIVE DE JURE LEGISLATION TO SUPPORT SUSTAINED TIMBER YIELD IN FINLAND WAS MOBILIZED IN 1917, INTENSIFIED IN 1928 AND COMPLETED IN 1950.

• DE FACTO SUSTAINED TIMBER YIELD/INCREASING GROWING STOCK WAS ACHIEVED IN FINLAND BEFORE THE DE JURE TRANSITION, ALREADY FOR A CENTURY AGO !!

• THIS TRANSITION WAS A CONSEQUENCE OF INCREASES IN VALUE OF FORESTS BASED ON INCREASING EXPORT DEMAND, A GREAT LAND REFORM 1776-1900, FOREST SERVICE SINCE 1851 AND FORESTRY COLLEGE SINCE 1858.

• OUR HYPOTHESES ON THE KEY ROLES OF POLICIES, MARKETS, COMMUNITY AND KNOWLEDGE INSTITUTIONS, PROPERTY RIGHTS AND THE VALUE OF FORESTS FOR SUSTAINABILITY BECAME STRENGTHENED.

• AS PRESUMED INTERNATIONAL POLICIES HAD FUNDAMENTAL IMPLICATIONS AT THE NATIONAL LEVEL IN STRENGTHENING THESE PROCESSES PRIMARILY AT THE BILATERAL LEVEL.
CONCLUSIONS 2

- The findings of the case study of Finland can be generalized against its theory. The same theory is relevant also for tropical deforestation. Therefore, we may draw pilot inferences also on the tropics.

- Accordingly, a balanced application of policy, market, knowledge and community institutions as well as strong and clear property rights with increasing value of the remaining forests are fundamental factors in decelerating tropical deforestation.

- Most tropical forests are run by socialist foretry under corruption and open access, where deforestation is continuing without any 'invisible hand'-effect of increasing value of remaining forests.

- After 62 years of FAO activities and two decades of global forest politics no deceleration in tropical deforestation has been observed. Sustained timber yield in tropics will remain a distant dream.
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6. CONCLUSIONS AND DISCUSSION
Box 1. The typology of preindustrial forestry, industrial forestry and postindustrial forestry (Mather 2001, Pirot et al. 2000)

1. PREINDUSTRIAL FORESTRY: subsistence; open access prevailing
   - traditional knowledge
   - common property – closed access in restricted scale
   - colonization: state ownership–open access-deforestation
1a. Traditional pre-industrial forestry: hunting, fishing, shifting cultivating, gathering of firewood, food, medical plants, etc.
1b. Agrarian forestry: clearing of forests for agriculture, agro-forestry, grazing of cattle, fodder, shelter belts, other support to agriculture

2. INDUSTRIAL FORESTRY: sustained or progressive yield of timber; private property prevailing, industrial use of wood prevailing
   - scientific forestry knowledge, forester education: paradigm formation

3. POSTINDUSTRIAL FORESTRY: sustainable forest management/forest ecosystem management
   - scientific ecological, sociological, forestry knowledge, forest ecosystem education, paradigm transition; prevailing private ownership, common and public properties in minority.
Figure 3. Roles of property rights, knowledge and local communities along with state and markets in support of sustainable forestry.
Resource Management Regimes

- Open access
- Common property
- Public property
- Private property
Guidelines for design of property rights

• Full specification of rights & obligations
• Separability of rights
• Transferability
• Exclusivity
• Investment security
• Enforceability
• Equitable distribution
• Flexibility
COEVOLUTION

"TWO EVOLVING POPULATIONS COEVOLE IF AND ONLY IF THEY BOTH HAVE A SIGNIFICANT CAUSAL IMPACT ON EACH OTHER’S ABILITY TO PERSIST"  (Murman 2003)
Figure 4. Model of coevolution of forestry sector and society towards sustainability with impacts from the external world (modified from Palo 1993). Key: solid line = causal impact, dashed line = information flow.
LONGITUDINAL CASE STUDY (Yin 2003):

"How certain conditions change over time, and the desired time intervals to be selected would reflect the presumed stages at which the changes would reveal themselves."
Figure 2.5 Case Study Method
SOURCE: COSMOS Corporation.
DEFORESTATION AND DEGRADATION

DIRECT LOCAL AGENTS

AGRICULTURE

COLONIZATION

SHIFTING CULTIVATION

GRAZING

FUELWOOD

LOGGING

INFRASTRUCTURE

HUMAN WELFARE

HUMAN POPULATION DOMESTIC DEMANDS

INTERNATIONAL TRADE

INTERNATIONAL POLITICS

TECHNOLOGY ACCESSIBILITY

Political instability of government

Value of forests

Corruption

Market failures

Government failures

Public incentives

Traditional commons

Open access

Climate and other natural factors

Accessible forest area

Energy production and physical infrastructure

Agricultural production

Forest-based development

Cumulative causation forces

National political factors

International factors
Slash-and-burn was the major method of cultivating arable crops until this century (Painting by Eero Järnefelt, reprint with permission of The Finnish National Gallery)
Figure 5a. Shifting cultivation in Finland in 1860 (Heikinheimo 1914).
Evolution of forestry legislation 1240-1917 in Finland with population and income per capita

- **1347** King Magnus Eriksson: village common forest; illegal use of forest
- **1442** King Kristoffer: beginning of state forests; control of hunting; protection of fruit trees/oaks, beeches and apple trees
- **1542** King Gustav Vasa declared wildernesses as state forests
- **1577** Protecting oak from shifting cultivation
- **1634** First forestry (hunting) administration
- **1647** FIRST COMPREHENSIVE FORESTRY ACT
- **1683** Forestry acts supervised by Department of Mining
- **1734** MOST COMPREHENSIVE FORESTRY ACT
- **1739** Liberalization of sawmills
- **1757** GRAND LAND REFORM (IMPLEMENTATION 1775-1935)
- **1789** Liberalization of farmer forest owners
- **1793** Forestry act
- **1805** Forestry act
- **1851** STATE FORESTRY ADMINISTRATION; REGULATION OF SAWMILLS
- **1857** Liberalization of steam-powered sawmills
- **1858** Forestry College
- **1857** Forestry acts supervised by Department of Mining
- **1851** STATE FORESTRY ADMINISTRATION; REGULATION OF SAWMILLS
- **1886** FORESTRY ACT: NO DEFORESTATION/ POLICE ADMINISTRATION
- **1917** FORESTRY ACT: NO DEFORESTATION/ STATE FORESTER ADMINISTRATION

Oral traditions prevailed before laws in writing and forestry conflicts were solved at provincial tings.
Box 5. THE PRIVATE FORESTRY ACT OF 1917

1. ”Forest shall not be logged in such a way that natural regeneration would be risked.”

2. ”Young coniferous forest should not be logged in conflict with rational thinning.”

3. Implementation by provincial forester, provincial and municipal forestry boards, subordinated to State Forest Service.

4. Obligatory reporting to a municipal forestry board about forthcoming commercial logging.

5. Sanctions by provincial forestry boards: logging ban; the value of illegally logged timber lost, if the ban is violated.
Changes in socio-economic and technological environment, corruption

Vested interests

Reference group

External groups

Law

Implementation

Group activity

Acceptance of the law

Motivation of local actors

Changed behavior of local actors

Changes in the forest

Figure 5. A model of transition from de jure to de facto situation under a new law (modified from Stjernquist 1973).
Evolution of forestry legislation in independent Finland with population and income per capita.
Growing stock of timber, total population and GNP/capita in Finland

Growing stock of timber

Data source: Myllyntaus et al. 1998.

Total Population

GNP/capita

Data sources: Statistics Finland, Bank of Finland.
Increment and drain of growing stock of trees in Finland, 1900-2000

Data source: Sevola 2000.
FROM DEFORESTATION TO TRANSITION VIA MARKETS
Figure 5b. Shifting cultivation in Finland in 1913 (Heikinheimo 1914)
Kuv. 13. Yleiskuva kaskisoudulta; asumusten ympärillä vähäiset pellot, näitten takana alkavat kasket ja hajaaniset kaskimetät. — Etualalla vasta polttetu kivinen kaski, johon kaikki männit on jätetty pystyyn. Ylhäällä oikealla kaarhalme
— Heinävesi, Petruma.
The same site as in Photo 7a but in the 1990s (Erkki Oksanen).
Kuv. 20. Siemenniskykyisen männyn, rauduskoivun, lepän, haavan ja kuusen ympäröimiä eri aikoina raivattuja kaskiahoja. Pääasiassa siemenvuoden mukaan on näille syntynyt lepän (oikealla), männyn ja rauduskoivun (kuvasta vasemmalla) taimistoja. — Heinävesi, Vihtari valtiolle kuuluva tila n:o 15.
Figure 3. Roles of property rights, knowledge and local communities along with state and markets in support of sustainable forestry.
TERMINATING DEFORESTATION 1 (1870-1920)

1. PROPERTY INSTITUTIONS
   - GREAT LAND REFORM (isojako) 1776-
   - LIBERATION OF FARMER FOREST OWNERS 1789

2. STATE REGULATORY INSTITUTIONS
   - STATE FOREST SERVICE (metsähallinto) 1851-
   - GENERAL FORESTRY LAW 1886 (weak de facto impact)

3. MARKET INSTITUTIONS (most important)
   - INCREASING REAL STUMPAGE PRICES AND VALUE OF FORESTS
   - INCREASING INCOMES TO FARMER FOREST OWNERS
   - INCREASING AGRICULTURAL PRODUCTIVITY
   - DECREASING PRICES AND INCREASING IMPORTS OF GRAINS
   - INCREASING LOGGING AND GENERAL LEVEL OF INCOME
   - INCREASING INDUSTRIALIZATION AND URBANIZATION
   - SLOWING DOWN OF POPULATION GROWTH
TERMINATING DEFORESTATION 2 (1870-1920)

4. COMMUNITY INSTITUTIONS

- Finnish Society of Forestry (Finska Forstsällskapet) 1879-
- Two state sponsored consultants to support private forestry 1898-
- Society of Silviculture (Metsänhoitoyhdistys) Tapio 1907-
- Local Forestry Management Associations 1907-

5. KNOWLEDGE INSTITUTIONS

- Two textbooks on forestry by Finns 1830 and 1851
- 20 Finnish students graduated in forestry in Tharant 1850-1860
- College of Forestry 1858-1907
- University School of Forestry 1908-
- Forest ranger schools 1875/1905-
Real stumpage prices of saw logs in Finland, 1920–1960

Fi markka/cubic foot in 1964 prices

Data source: Sivonen 1970.
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Utilization of roundwood in Finland, 1860-2000

Data source: Sevola 2000.
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Figure 4. Model of coevolution of forestry sector and society towards sustainability with impacts from the external world (modified from Palo 1993). Key: solid line = causal impact, dashed line = information flow.
Figure 32.2: The proportion of forest products of total exports from Finland, 1860–1996 (paper industry includes printing during 1978–1996) (Seppälä et al. 1980; Statistics Finland 1983–1997).

Figure 7. The share of forest products of the value of total exports from Finland 1860-1996 (Seppälä et al. 1980, Statistics Finland 1983-1997).
Total value of exports of Finland, 1970-2003

mrd. € vuoden 2003 rahana - € billion in 2003 money

Suomen kokonaistavaravienti
Total exports of goods

Puu ja metsäteollisuustuotteet
Roundwood and forest industry products

Rahanarvot on muunnettu tukuhintaindeksillä – Monetary values are deflated using wholesale price index
Lähteet: Tullihallitus; Metsäntutkimuslaitos – Sources: Board of Customs; Finnish Forest Research Institute
INTERNATIONAL FOREST POLITICS IN 1700-1959

- INTERNATIONAL WARS AND COLONIZATION FOR TIMBER HUNT BY BRITAIN, FRANCE, GERMANY, USA, ITALY, JAPAN, RUSSIA, NETHERLANDS, BELGIUM IN PARTICULAR
- TRANSFERS OF GERMAN FORESTRY PARADIGM TO RUSSIA, DENMARK, INDIA, JAPAN, NORWAY, SWEDEN, FINLAND, USA, CANADA, etc.

- EXCHANGES OF STUDENTS AND TEACHERS, OTHER CONSULTANCES, RESEARCH FINDINGS AND TEXTBOOKS
  - 1892 IUFRO WAS ESTABLISHED AMONG THE GERMAN SPEAKING NATIONS
    - 1927 WORLD FORESTRY CONGRESS I IN ROMA
- IN 1932: TIMBER TRADE MEETING OF EXPERTS IN GENEVE BY THE LEAGUE OF NATIONS
  - IN 1932: COMITE INTERNATIONAL DE BOIS CIB WAS ESTABLISHED IN VIENNA

- 1935 IN COPENHAGEN AND 1936 IN HELSINKI: CONVENTION OF THE EUROPEAN TIMBER EXPORTERS
  - 1936 WORLD FORESTRY CONGRESS II IN BUDAPEST
    - 1939 IN BERLIN: CENTRE INTERNATIONAL DE SYLVICULTURE CIS
      - 1939 WORLD FORESTRY INSTITUTE IN THARANT/HAMBURG
- 1945 IN ROMA: FAO ESTABLISHED A DIVISION OF FORESTRY AS A WORLD FOREST STATISTICS CLEARING HOUSE

-- 1948 IN HELSINKI: WORLD FORESTRY CONGRESS III: "PROGRESSIVE FORESTRY"
  - 1954 IN DEHRA DUN, INDIA: WORLD FORESTRY CONGRESS IV
Labor input in forestry

Figure 15. Labor input in Finnish forestry since 1860. (Elovirta 1987)
Felling a tree by a two-man manual saw (for big trees) in the early 20th century. Most logging took place during winter.
Bucking a tree by one-man manual saw of wooden frames, which was used for small trees. Work efficiency study is going on.
Felling a tree with steel-framed manual saw.
Debarking a log with a manual tool (petkele).
Extraction of logs by a horse and sledge. Snow and frost lowered the costs of extraction.
Metsätalo/Forest Building in 1939 in the downtown Helsinki.
Metsätyöntekijä Kalervo Kallion ”Jätkänpatsas”-veistoksen paljastamistilaisuuden kunniavartiossa. MB.
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CONCLUSIONS 2

- THE FINDINGS OF THE CASE STUDY OF FINLAND CAN BE GENERALIZED AGAINST ITS THEORY. THE SAME THEORY IS RELEVANT ALSO FOR TROPICAL DEFORESTATION. THEREFORE, WE MAY DRAW PILOT INFERENCES ALSO ON THE TROPICS.

- ACCORDINGLY, A BALANCED APPLICATION OF POLICY, MARKET, KNOWLEDGE AND COMMUNITY INSTITUTIONS AS WELL AS STRONG AND CLEAR PROPERTY RIGHTS WITH INCREASING VALUE OF THE REMAINING FORESTS ARE FUNDAMENTAL FACTORS IN DECELERATING TROPICAL DEFORESTATION.

- MOST TROPICAL FORESTS ARE RUN BY SOCIALISTIC FORESTRY UNDER CORRUPTION AND OPEN ACCESS, WHERE DEFORESTATION IS CONTINUING WITHOUT ANY ’INVISIBLE HAND’-EFFECT OF INCREASING VALUE OF REMAINING FORESTS.

- AFTER 62 YEARS OF FAO-ACIVITIES AND TWO DECADES OF GLOBAL FOREST POLITICS NO DECELERATION IN TROPICAL DEFORESTATION HAS BEEN OBSERVED. SUSTAINED TIMBER YIELD IN TROPICS WILL REMAIN A DISTANT DREAM.
Forest area in the tropics 1960-2050

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KIITOKSET
MIELENKIINNOSTA!
THANKS FOR YOUR ATTENTION!

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Foto 4.
YOUR QUESTIONS & COMMENTS?