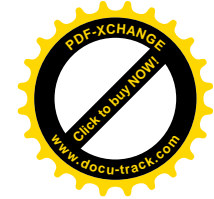
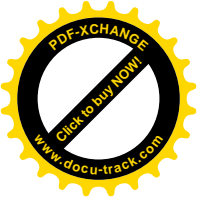


# An Ukrainian National Forest Inventory in an European context

Ulf Söderberg  
Department of Forest Resource  
Management , SLU  
Umeå, Sweden



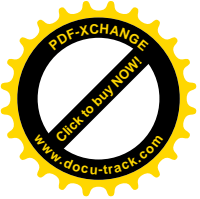


# Short history of NFI's

§ Started in the 1920's

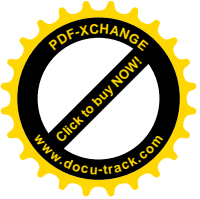
§ What is the growing stock ?

§ What is the increment?



# 1:st inventory 1923-1929

- County-wise strip inventory
- Conducted by appointed national committee
- Field crews 10 persons



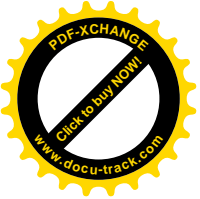
## 2:nd inventory (1938-1952)

- Combination of strip and plot inventory
- In 1943 the responsibility for the NFI was transferred to the National Forest Research Institute
- 1953 the tract system was introduced
- 1/10 of the tracts for the entire country each year



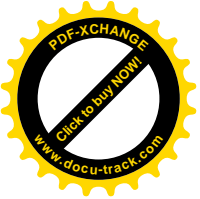
## 6:th NFI (1983-1992) should address

- Timber supply demand
- Environmental changes
- Utilisation of forests; damages caused by moose, energy issues
- Increasing demands on the forest resource from other than forestry



## 6:th NFI (1983-1992)

- Permanent tracts (plots)
- Intensified inventory of felling and actions of regeneration
- Detailed site inventory (vegetation and soil sampling)
- Increased inventory on mire and uncultivated pasture



# Changing aims over time

1920 -What are the forest resources

Improving forest state

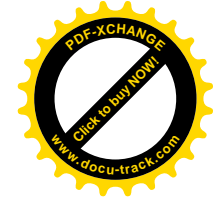
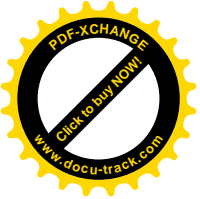
Subsidies

1940- status of regeneration

Cutting level

1980 environmental and ecological considerations

1990 Biodiversity, changed forestry act and forestry practises, carbon



# Some European NFI's

|   | NFI Start   | Form of tract | Distance between | Tract side | Distance between | Plot size |     |
|---|-------------|---------------|------------------|------------|------------------|-----------|-----|
| • | Austria     | 1961          | Square           | 3,9        | 200              | 200       | K=4 |
| • | Estonia     | 1999          | square           | n.i.       | 800-1200         | 100-400   | 314 |
| • | Norway      | 1919          | square           | 3          |                  |           | 250 |
| • | Finland     | 1921          | L-shape          | 7-16       | 1300-2100        | 400-600   | 300 |
| • | Sweden      | 1923          | square           | 3-15       | 300-1200         | 300-600   | 314 |
| • | Switzerland | 1983          | single plot-     |            | -                | 1400      | 500 |
| • | Germany     | 1986          | square           | 4          | 150              | 150       | K=4 |
| • | Lithuania   | 1998          | square           | 4          | 250              | 250       | 500 |



# Future trends

- Field sampling still the basis
- More co-operation -interdisciplinary  
-international
- New methods
- Harmonisation
- International agreements and conventions



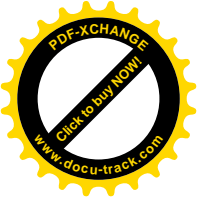
# International and Eu initiatives

- Helsinki process
- ICP-Forests (Level I stopped)
- Forest Focus
- LUCAS
- Kyoto- protocol
- EFICS
- FRA



# New methods

- Combination of different sources of information
- Remote sensing
- Digital photography
- Airborne laser scanning
- Landscape modelling



# Perspectives

- Utilisation of data and knowledge from different sources
- More integrated systems
- Continuous development of methods



# COST E43 on Harmonisation of National Forest Inventories in Europe: Techniques for Common Reporting

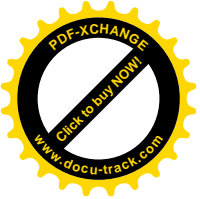
27 Countries

3 working groups (forest inventory, carbon balances, biodiversity)

Several questionnaires

Meetings/workshops

Short scientific missions



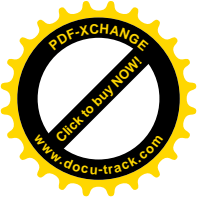
# Harmonisation report

Reference definitions for trees and shrubs

Reference definitions for forest and other wooded land

Reference definitions for volumes

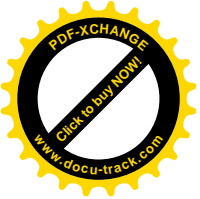
Reference definitions for tree biomass



# Forest definition

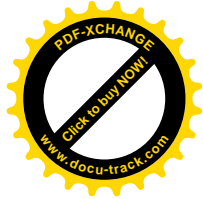
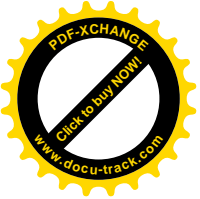
FAO forest definition . . . × . . × . . . ×× . . . × . . . × . × . . . . .

National forest definition ××× . ×× . ××× . . ××× . ××× . × . ×××××



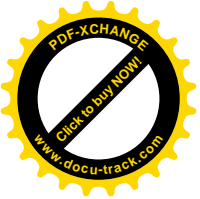
# Forest definition

|      | CC | H   | MS   | MW |     |
|------|----|-----|------|----|-----|
| • AT | 30 |     | 0.05 | 10 | ..  |
| • BE | 10 | 5   | 0.1  | 9  | ..  |
| • CH | 20 | 3   |      | 25 | ..  |
| • CY | 10 | 5   | 0.5  | 20 | ..  |
| • CZ | 20 |     | 0.04 | 10 | ..  |
| • DE | 50 |     | 0.1  | 10 | ..  |
| • DK | 10 | 5   | 0.5  | 20 | ..  |
| • EE | 30 | 1.3 | 0.1  |    | × . |
| • ES | 5  | 3   | 2.5  | 25 | ..  |
| • FI |    |     | 0.25 |    | × . |
| • FR | 10 | 5   | 0.5  | 25 | .   |
| • GR | 10 | 5   | 0.5  | 20 | ..  |
| • HU | 50 |     | 0.5  | .  | ×   |



# Defining reference of growing stock

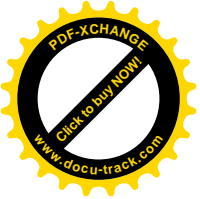
1. minimum DBH;
2. species;
3. stump included or excluded (with stump height  $W$  as threshold value);
4. tree tops included or excluded (with minimum diameter  $Z$  as threshold value);
5. branches included or excluded (with minimum diameter  $Z$  as threshold value);
6. bark included or excluded;
7. dead trees included or excluded;
8. lying trees included or excluded:



# Minimum diameter

Dbh

|     |                                |
|-----|--------------------------------|
| 0   | DK, EE, FI, HU, IS, NO, SE, SK |
| 2.1 | LT, LV                         |
| 4.5 | IT                             |
| 5   | AT, GR, NL                     |
| 6.4 | BE                             |
| 7   | CZ, DE, IE, LU                 |
| 7.5 | ES, FR, PT                     |
| 8   | RO                             |
| 10  | SI                             |
| 12  | CH, CY                         |



# Volume definition

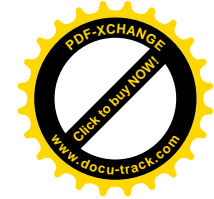
Reference definition for growing stock = stem + bark + tree top

| Definition                            | N | V [m3 (10 <sup>6</sup> ) | %    |
|---------------------------------------|---|--------------------------|------|
| Reference definition                  | 8 | 10167                    | 50.0 |
| Reference definition + stump          | 2 | 4037                     | 19.9 |
| Reference definition - tree top       | 4 | 798                      | 3.9  |
| Reference definition - top + branches | 1 | 1450                     | 7.1  |
| Other                                 | 6 | 2679                     | 13.2 |
| Not available                         | 5 | 1208                     | 5.9  |



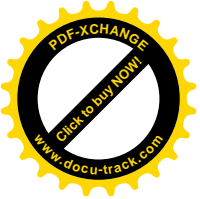
# Basic requirements for success

- § Objectives
- § Organisation
- § Stakeholders
- § Competence
- § Funding



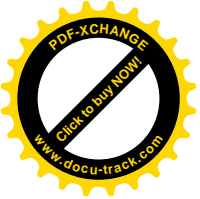
# NFI objectives...

"...**continuously supply analysed data** for  
**strategic planning** of forestry utilisation on a  
**regional level** as well as for **the whole country**.  
It shall also supply data for forestry research.  
.. The analysed data shall give information  
about **present state** and **changes**."



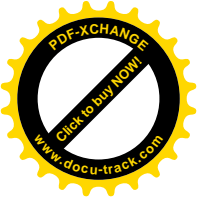
# Objectives

- Provide data for analyses of sustainable forestry and land-use (policy issues)
- Reporting to national and international agreements and conventions
- Provide data for research



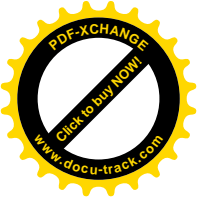
# Organisation

- Be responsible for both data collection and analyses
- Continuity
- Competence
- Links to stakeholders and users
- Independent



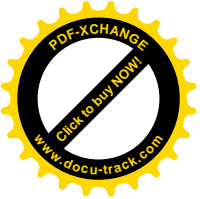
# Design

- Based on sound statistical methods  
( various sampling methods)
- Objective measurements
- Give confidence to users and interest groups



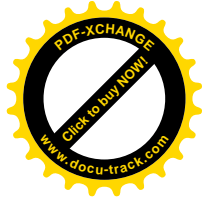
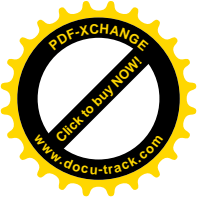
# Implementation of NFI

- From planning of data acquisition to data analyses and dissemination of results
- The process differ slightly if the assessment is run on a continuous basis or not
  - Certain time intervals
    - Data aquisition may extend over several years
    - Analyses & dissemination
  - Contiuous basis
    - Cycle of data acquisition and analyses –analyses will be based on average data from the last 3-5 years



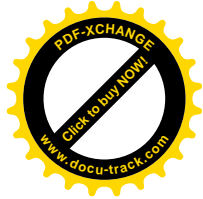
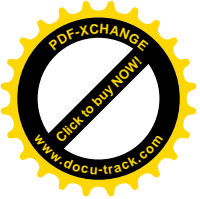
# The cycle of implementing NFI

- i) Conversion of theoretical design into practice
- ii) Development or up-dating of manuals for the inventory
- iii) Development or up-dating of data capture procedures
- iv) Acquisition of materials needed for the sample surveys



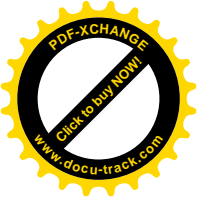
# The cycle of implementing NFI (cont.)

- v) Hiring and training of staff for the data collection
- vi) Data collection
- vii) Conduction of independent check assessments
- viii) Data control and compilation of databases
- ix) Analyses
- x) Dissemination of results



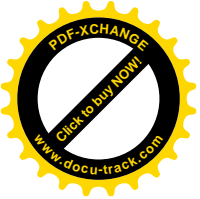
## viii) Data control and compilation of databases

- Data compilation completeness tests
- Logical relationships between different variables may be checked
- Final databases can be established



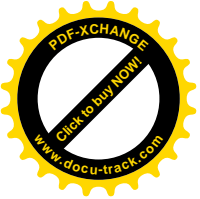
## ix) Analyses

- Important to have the analyses in focus during the entire planning and conduction phase of the NFI
- Standard results on for example totals and averages of land use categories generally are straightforward to derive
- Integrated analyses including scenario analyses are very demanding



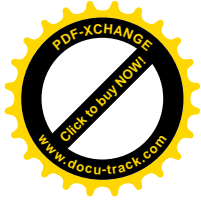
## x) Dissemination of results

- Relevant results to relevant stakeholders!
- Try to find ways to disseminate results so that the information is used for policy decisions
- A common mistake is to allocate a too small share of the resources to analyses and dissemination of results.



# Concluding remarks

- In many cases theoretical issues related to NFI design are considered as the most important issues....
- However, in practice the reliability of the NFI results will depend on a number of issues related to the implementation, which in turn depends on the organization!



Thank you !



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