COST ACTION E43

Harmonisation of National Inventories in Europe: Techniques for Common Reporting

Minutes from the Task force meeting of Working Group 1 at the Federal Research and Training Centre for Forests, Natural Hazards and Landscape (BFW), Vienna

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by Thomas Gschwantner

Participants:
Erkki Tomppo (FI, Chair), Klemens Schadauer (AT, Vice-Chair), Claude Vidal (FR, Leader WG1), Adrian Lanz (CH, Deputy Leader WG1), Lucio Di Cosmo (IT), Karl Gabler (AT), Patrizia Gasparini (IT), Christian Ginzler (CH), Andrius Kuliesis (LT), Mark Lawrence (UK), Heino Polley (DE), Nicolas Robert (FR), Ulf Söderberg (SE), Thomas Gschwantner (AT).

1. Introductory discussion

After the opening of the Task force meeting by Klemens Schadauer, vice-chair of COST Action E43, the status quo of the action was summarized and the expectations by the end of the action were outlined. The main points of this discussion were:

* reference definitions for common reporting
* pilot studies on harmonisation possibilities
* core variables for harmonisation
* table of harmonised results
* country reports

The mentioned points were considered more in detail later on during the meeting. The Task force meeting was seen in connection with the next meeting in Helsinki (7th to 9th June 2007). Therefore, the present situation and the pending tasks were reviewed: COST Action E43 is now at a stage were bridges for common reporting shall be developed. During the meeting in Helsinki the current situation in the individual COST E43 member countries shall be clarified. Case studies on harmonisation possibilities will support the clarification. It can be expected, that harmonised results will be obtained at different quality levels. The quality of harmonisation will depend on the data availability in the individual countries. At the current stage of COST Action E43 the methods of bridge building are of particular interest. The calculation of harmonised estimates and the compilation of a table with harmonised results are of secondary importance. The reference definitions for forest area and growing stock, as already formulated, shall be the basis for bridge building functions. Also the status of the country reports was considered during the first session.
The introductory discussion was finished by listing the expectations from WG 1 by the end of the action:

1. The reference definitions are the basis for the harmonisation process. In the long run, countries should adopt reference definitions, for the moment bridges are needed.
2. A time schedule for adopting reference definitions or for the development of tools to provide harmonised estimates shall be provided. This time schedule must stick to the time table of international reporting processes (MCPFE, FRA,…).
3. Harmonised estimates for the participating COST E43 countries will be at different quality levels. Some countries will carry out their own studies. Other countries will use the findings from studies in neighbouring countries or from countries with similar conditions.
4. Core variables for harmonised reporting are “Forest area” and “Growing stock”. Other possible core variables could be “Other wooded land” and “Standing dead wood”.
5. Harmonised estimates shall include the error of estimates, as well as uncertainty analyses distinguishing between model errors and assessment errors.
6. The sensitive points where harmonisation work has to go into depth have to be identified. It has to be clarified how far harmonisation work has to go into depth concerning these points.

2. Reference definitions

Following these conclusions, the newest version of the Draft paper on reference definitions was discussed. Agreements were achieved on several definitions. Particularly tree definitions were taken into consideration, since they are the basis for the formulation of the reference definitions “forest” and “growing stock”. The distinction of trees and shrubs provides several difficulties. The criteria used in existing definitions are either hard to assess (existence of a main stem, definiteness of the crown) or can only be applied with uncertainty (height threshold of 5 m at maturity). Especially the maximum height of shrubs or the minimum height of trees was discussed. The tree definition established in Thessaloniki was found to be appropriate. It omits the 5 m threshold in the tree definition but includes the height range of 0.5 m to 5 m in the shrub definition. The tree definition and shrub definition shall serve as guideline for the construction of a species list. They shall not be applied to individual woody plants, but are thought to refer to a species on a specific site, or even to a species independent of site conditions. After the tree and shrub definition, the discussion focused on measurement issues like height and length, the location of breast height and the location of the ground level. It became obvious that a definition for tree length in addition to tree height is needed. The existing definitions for height, breast height and ground level (status Thessaloniki) were found appropriate, except that the actual ground surface shall be the reference for height measurement in the case of soil accumulation (e.g. alluvial forests). The definition for stem was reformulated: “Stems, for NFI DBH measurement purposes, are any woody (off)shoot(s) being of measurable size at breast height.”
A new version of WG1’s paper on reference definitions will be sent out as soon as possible to the COST E43 countries. Comments from the countries shall be received in May. The reference definitions will be discussed during Helsinki meeting.

3. Examples on bridge building

The NFIs represented in the Task force meeting gave an overview on the current situation concerning forest area and growing stock estimation in their countries. In addition, ideas and possibilities in bridge building were presented. Several NFIs currently carry out studies in this concern. The findings from these studies were presented and discussed. The content of the countries' presentations are summarized in the following table.

NFI	Core variable	
	Forest area	Growing stock
Italy	* case studies were carried out: comparison of national and FAO definition, assessed on orthophotos -> Findings: * FAO definition resulted in higher forest area * difference between national and FAO definition is not large * 2.8 % of the sample points were forest either according to national or FAO definition * crown coverage causes the main differences * 20 % of sample points were within 25 m from forest boundary -> data availability: * data on actual canopy cover classes	* dbh-threshold = 4.5 cm * smaller diameters are counted on additional circles * counting is carried out by species in three size classes (diameter and/or height). -> Arising difficulties for harmonisation: * Models for growing stock estimation may not work for small diameter trees.
Sweden	* national and FAO definition are used * national definition is based on productivity (1m³/ha/year) * the introduction of FAO definition increased the forest area by 25 % * OWL was also introduced which added additional 3 mill. ha	* diameter distribution over the whole scale starting from dbh = 0 cm, only tree species are measured. -> relevant for harmonisation: * data can be used for modelling the volume in low diameter trees * relevant to countries with similar forests
Great Britain	* aims at agreement with COST E43 definitions for next NFI * national definitions will be developed soon * harmonisation between Scotland, England and Wales * forest map: 0.5 ha, 20 % canopy cover * 1 % land cover survey will assess trees that fall outside the forest	* models derived from yield tables are used (guestimates) * during the next NFI mensuration data will be collected * better models will be developed

Finland	* similar to Sweden * national forest definition is based on productivity (>=1m³/ha/year) * also national definition for poorly productive forest (>=0.1 and <1m³/ha/year) * FAO forest definition and OWL definition were introduced * forest area increased from 20 to 22.4 mill. ha * canopy cover of 10 % is difficult to assess (canopy cover is assessed in the field, relascope technique for crowns) -> relevant to harmonisation: * good methods are needed to assess canopy cover	* similar to Sweden * minimum dbh = 0 cm since 1970's * diameter distribution over the whole range * data could be relevant for modelling the low diameter volume
Germany	* case study with two approaches (Google earth, GIS) * comparison of the forest plot selection for national definition[1] and FAO definition * two test areas: Schleswig-Holstein, Brandenburg -> Results: * 99.5 % of NFI forest is also FAO forest * only marginal differences between NFI and FAO forest [1] National forest definition: Minimum area = 0.1 ha, minimum width = 10 m, canopy cover >= 50 %, minimum tree height = not defined	* dbh-threshold = 7 cm * data are also available for the diameters below 7 cm, but these data have not been evaluated until now

Lithuania	-> harmonisation of forest definition[1]: * the difference in canopy cover needs no bridge building, because a canopy cover of 10-30 % is rare * forest cadastre and inventory system allows distinction of forest by size [1] National forest definition: minimum area = 0.1 ha, minimum width = 10 m, minimum canopy cover = 30 %	* functions for stem volume, branches and roots * main points for volume estimation: root collar, terminal bud, breast height * stem heights are taken from the root collar * to clarify volume estimation a tree should be divided into stem = top+bole+stump[1] branches=large + small branches roots=stump[2]+large+small roots -> relevant for harmonisation: * harmonisation of measurements and the points were trees are measured * calculation of ratios V_{top}/V_{stem}, V_{bole}/V_{stem}, V_{stump}/V_{stem}, etc. * these ratios by species groups * ratios should be similar in countries? [1] above root collar [2] below root collar
Austria	* pilot study for applying national forest definition[1] and FAO definition * 2/5 of NFI plot are covered * location from GPS measurements * aerial photos for whole Austria * two approaches: 1. "window" with area of 500 m² -> delineation of the forest border -> assessment of FAO criteria 2. identification of borderline -> assessment of FAO criteria -> relevant for harmonisation: * may be relevant for CH * distinction between forest and OWL is already done [1] National forest definition: Minimum area = 0.05 ha, minimum width = 10 m, minimum canopy cover = 30 %	* dbh-threshold = 5 cm

Switzerland	* 2nd NFI: Arial photo interpretation for forest/non-forest decision * 3rd NFI: Arial photo interpretation for forest parameters: canopy closure, width, height for national forest definition * interpretation area = circle of ¼ ha * LiDAR data covering whole CH * two ideas: 1 estimate forest variables from aerial photos (e.g. height) 2 automatic forest/non-forest decision on every plot * quality of estimates differs regionally (underestimation in winter of canopy cover in areas with broadleaves) * pulse intensity = 1 pulse/1.5 m, is lower in steep areas * not sure if LiDAR data are available in the future (long term monitoring)	

The presentations by the participating countries of the Task force meeting were the basis for conclusions and for drafting the agenda for Helsinki meeting. Forest area and growing stock estimation were discussed and considered separately.

3.1 Forest area

The presentations for Helsinki meeting were outlined. The first presentation will be on agreed reference definitions which are the basis for the harmonisation process. This presentation will be followed by presentations on:

- forest mapping (by Mark Lawrence, GB)
- minimum width and minimum area considerations (by Heino Polley, DE)
- point vs. area decision (by Christian Ginzler, CH)
- location of forest borderline (by Klemens Schadauer, AT)
- crown coverage and minimum area (by Patrizia Gasparini, IT)
- forest mapping vs. statistical estimation (by Nicolas Robert, FR)

These presentations shall clarify the situation and illustrate harmonisation possibilities. The presentations will be followed by discussions from which the following can be expected:

- explanation from countries where they see differences between their national definitions and the reference definition
- exploration of possibilities to solve the situation in the individual countries
- identification of the next steps to achieve harmonised results

The countries shall be asked to provide results according to the reference definition. The application of reference definitions requires specifications that describe how various criteria have to be assessed, e.g. how the borderline is determined, from which to which point the minimum width has to be measured, how the canopy cover

shall be quantified, etc. Since the reference definitions shall allow the estimation of changes precisely, firm and clear specifications are necessary. The countries shall be asked to give their criteria for forest area and borderline determination, e.g. border of land use, stem of border trees, or end of canopy cover). Furthermore, they shall be asked if they use a map for forest decision, or if they use an interpretation area. For the latter, also the size of the interpretation area shall be asked.

3.2 Growing stock

In order to establish bridge building functions for growing stock, two main problems have to be solved for harmonised estimates:

a) dbh-thresholds
b) included tree components

ad a) The countries do not use the same dbh-thresholds (ranging from 0 – 12 cm). Since a dbh-threshold of 0 cm is agreed for the reference definition of growing stock, methods are required to estimate the volume of low diameter trees. In the countries the situation is different concerning the low diameter trees. Some measure them (dbh-threshold = 0 cm), others count these trees, others have no information. It was pointed out, that ideas from the NFIs should be collected to close the gap between the country-individual dbh-threshold and the dbh-threshold of 0 cm. Data from Scandinavian countries (use a dbh-threshold of 0 cm) could be used, but it was also emphasized that this data are likely to apply only to northern countries. To western, southern and central European countries the data may not apply. However, at least rough estimates should be possible. Presentations on growing stock estimation in Helsinki will be used to collect ideas from the countries. A STSM in Edinburgh will also focus on modelling the volume of the trees below the country dbh-thresholds. Previous to the STSM a questionnaire will be sent to the countries. The answers to this questionnaire will be the data basis for the development of bridge building functions.
The presentations will focus on:

- Volume distribution from Finland, Sweden and Lithuania (by Ulf Söderberg, Andrius Kuliesis, and Erkki Tomppo)
- Volume estimation of trees below country dbh-thresholds using volume functions (by Patrizia Gasparini)
- Results from the STSM on modelling the growing stock below dbh-thresholds from volume distributions

ad b) The national definitions for growing stock also differ concerning the included tree components. For harmonised growing stock estimates also the inclusion of tree components needs harmonisation and thus requires bridges. During the Helsinki meeting also a presentation on

- tree components (by Thomas Gschwantner)

shall be given. In this presentation the tree components shall be repeated and explained. Examples for bridge building concerning tree components could be given by Sweden and Austria. The involvement of other countries was discussed. The inclusion of tree components will also be part of the questionnaire and the work of the STSM in Edinburgh.

4. Country reports

Erkki Tomppo and Klemens Schadauer presented the status of the country report. The idea is to give the historical background of European NFIs, the main use of NFI results and to obtain descriptions of definitions from the COST E43 countries. A new version is expected to be ready by 20th of April. Comments are possible until end of April. Afterwards the final version will be sent to the countries. The deadline for providing the data is 7th of September. The country representatives to Working Group 1 will have to nominate a person who is responsible for the country report and the addressee for questions and clarifications.

5. Concluding discussion

The last session of the meeting was dedicated to reflect on the points of discussion, the agreements and outcomes of this Task force meeting. During this discussion the agenda for Helsinki meeting was drafted. The ideas on the talks that will be given in Helsinki were refined, including the presentation on the results from a STSM that will work on bridge building functions for growing stock estimation in May.