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FOOD AND AGRICULTURE ORGANIZATION

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Agenda item 2 of the provisional agenda

Guidance on Work Area 3: Forest Sector Outlook Studies

AGENDA ITEM 2.4 – Follow-up on the workshop "Estimating Potential Sustainable Wood Supply": Good Practice Guidance on PSWS

Note by the secretariat

Summary

Through this background note, Working Party members are being informed on work under the UNECE/FAO timber and forestry programme on assessment of Potential Sustainable Wood Supply in Europe. This work is linked to the Working Party's "Work Area 3: outlook studies". This note provides good practice guidance on estimating potential sustainable wood supply and has been developed as a follow-up to the PSWS workshop, held in Geneva on 30 March 2009. The guidance is at the disposal of countries on a voluntary basis in order to ease preparation of future PSWS studies. The Working Party is kindly asked to review the document and provide suggestions on how to improve it.

I. Background

1. The question of how much wood is available on a sustainable basis for energy and industrial raw material has become urgent in the light of the ambitious targets for biomass energy being adopted at national and European level. In March 2009, the UNECE/FAO Timber Section held a workshop on Estimating Potential Sustainable Wood Supply (PSWS) which brought together recent work and to propose an overall assessment of potential sustainable wood supply. The workshop identified considerable differences among national approaches towards the assessment of PSWS and thus acknowledged difficulties in constructing a regional picture. The variation in reporting is a significant drawback as many of the policy instruments are designed at the European level. As a follow-up to the workshop, good practice principles for PSWS studies were developed in order to harmonize future national PSWS studies.

2. Furthermore, a linked workshop on "Strategies to increase wood mobilisation on a sustainable basis" was co-organized by UNECE/FAO in June 2009 in Grenoble, France. This is discussed in paper 2.1

II. Good practice principles for PSWS studies

3. This note provides guidance for the estimation of wood supply potential in Europe to be used on a national level. The guidance is at the disposal of countries on a voluntary basis in order to facilitate preparation of future PSWS studies. It is suggested that national PSWS studies are orientated on the following seven principles.

- Cover and define all elements of wood supply;
- Present study results in harmonized way;
- Separately identify potential constraint screens of woody biomass;
- Identify the sources of uncertainty concerning PSWS estimates;
- Apply different wood supply and demand scenarios;
- Coordinate data research;
- Make estimates which are consistent with all dimensions of sustainable development.

A. Cover and define all elements of wood supply

4. PSWS studies should cover all elements of wood supply: forest (stem, above and below ground biomass, harvest residues), trees outside the forest, expansion of forest area, co-products from industry and recovered wood (see Table 1).

- When it is difficult to cover one of these make it clear that the estimates are only partial;
- Estimates should be provided, if sound data for a source is difficult to calculate;
- Imports are another source of wood supply and need to be included into PSWS studies.

Table 1: Overview on elements of wood supply

Domestic	Forest	Stem wood	(cbm)
		Bark	(cbm)
		Other woody biomass	(cbm)
		Harvesting residues	(cbm)
	Expansion of forest area / short-rotation plantations		(cbm)
	Wood supply outside the forest	Other wooded land	(cbm)
		Trees / woody biomass outside the forest	(cbm)
		Wood fiber from agriculture	(cbm)
		Industry co-products / residues	(cbm)
		Post-consumer recovered wood	(cbm)
Imports	Imports		(cbm)
Sum			(cbm)

B. Present study results in a harmonized way

5. It is necessary to use existing international terms and definitions, concepts and units to allow regional comparisons. It is suggested to use the following key reporting variables and their definitions and units:

- Indicate reference period: year or range of years for which estimates are expected;
- When reporting figures in cubic meters (cbm) please use solid wood equivalent under bark[1];
- Provide results in the standard unit cbm or oven-dry tonne, i.e. avoid using different units for different types of supply, so that national and international aggregations are possible;
- Provide a conversion from national data to an agreed international classification of categories of wood supply, for example that used in the PSWS study by UNECE/FAO[2];
- Specify conversion factors from oven-dry metric tons (ODMT) to cbm;
- Indicate oven-dry tonnes for each biomass component (stem wood, bark, branches, foliage, stumps and roots) where applicable;
- Be specific about how estimates were made and transmit national expansion and conversion factors. When estimates are required, be specific about how they were made and about type of wood to be supplied (stem, chips, clean, contaminated etc.);
- If there is no national default value, use 0.35 ODMT per cbm (IPCC[3] default value) as expansion factor for other above-ground biomass (branches, twigs);
- If there is no national default value, use 0.30 ODMT per cbm (IPCC default value) as expansion factor for below-ground biomass (roots, stumps).

C. Separately identify potential constraint screens of woody biomass

6. The total woody biomass potential can be defined as the overall supply potential from forest and non-forest sources in a country (all woody biomass components and their net annual increment, respectively the annual amount of co-products and waste). This maximum supply potential states only a theoretical figure. It is important to consider different constraint screens of wood supply and to clearly state what assumptions underlie each in order to estimate the amount of woody biomass which is actually available.

7. Taking account of several research studies[4], the following approach helps to identify whether the calculated supply potential is truly sustainable, from all points of view (economic, social, environmental)[5]:

- *Theoretical potential (TP)*: Define the theoretical woody biomass potential from forest, wood sources outside the forest, forest expansion, agriculture via the respective Net Annual Increment (NAI), as well as the woody biomass potential from co-products and waste.
- *Bio-technical constraint screen*: Subtract biomass from TP which can not be utilised from a bio-technical viewpoint. These relate to biological (i.e. site conditions, near-natural silviculture and biodiversity needs, soil and water protection) and technical (i.e. topography, site conditions, forest machinery) constraints, as well as to national forest law restrictions. The resulting figure is the bio-technically available biomass (CS1).

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[1] If reported figures refer to growing stock, please provide data o.b. (over bark)
[2] http://www.unece.org/timber/docs/tc-sessions/tc-66/pd-docs/Paper_PotentialWoodSupply_v18Oct.pdf
[3] Intergovernmental Panel on Climate Change
[4] BAFU (2009): Wood Utilization Potential in the Swiss Forest; Schadauer, K. (2009): HOBI - ein umfassender Ansatz zum künftigen Holz- und Biomassenaufkommen. BFW-Praxisinformation 18, 3 – 4; Asikainen (2009): Constraints of Energy Wood Potentials / State of the Art report; Draft EU Wood interim report (unpublished)
[5] The categorization into three constraint screens is not definite as some of the constraints can refer to more than one category.

- *Social constraint screen:* Subtract the amount of biomass from CS1 which can not be utilised due to social limitations. These limitations relate to recreation forests, protective function needs, forest owners' willingness to harvest, CO2 sink services and the skill level of the forest sector workforce. The resulting figure is the socially available biomass (CS2). If exact data do not exist, please provide estimates.
- *Economic constraint screen:* Subtract the amount of biomass from CS2 which is not utilised due to economic constraints. These relate to harvest operations where income would be lower than costs and to a lack of forest infrastructure. The resulting figure is the economically available biomass (CS3).

Calculation example on a national basis:

- The (NAI) in a country is 10 million. m3 of wood. The bio-technically available biomass is 8 million. m3, as 2 million. m3 of the NAI can not be fully used due to biological and technical limitations. The biological constraints amount to 1 million. m3, consisting of unfavourable site conditions (0.2 million. m3), near-natural silviculture needs (0.1 million. m3), biodiversity needs (0.5 million m3), soil and water protection needs (0.1 million m3) and national forest law restrictions (0.1 million m3). There is 1 million m3 of technical limitations as well.
- The socially available biomass is 7 million m3, as 1 million m3 of the bio-technically available biomass cannot be utilised. These social constraints consist of recreation forests needs (0.1 million m3), protective function needs (0.1 million. m3), forest owners' unwillingness to harvest (0.7 million m3), CO2 sink services (0.05 million m3) and lack of skills of forest sector workforce (0.05 million m3).
- The economically available – and thus actually available - supply potential is 6 Mio. m3 of wood. The economic wood supply restrictions amount to 1 million m3 resulting from negative contribution margins of timber harvest (0.7 million m3) and from high transport costs (0.3 million m3).
- Note: The following example calculation approach may be considered to estimate the amount of wood which can be supplied under given economic conditions (i.e. wood prices and supply costs): If the lowest supply of a specific wood type refers to 10 USD per m3 and the highest to 60 USD per m3, then the actual supply level at a wood price of 40 USD is 60%
- In the same year, additional 30 million m3 of co-products and waste is being re-collected, traded or processed within the country. This potential needs to be converted and added to the really available supply potential. The suggested conversion factor for co-products and waste is as follows: 1 toe equals 1.6 m3 of round wood.

The resulting figure is the potential sustainable wood supply PSWS:

PSWS = TP – CS1 – CS2 – CS3 + industry co-products / residues + post-consumer wood + imports

D. Identify the sources of uncertainty concerning PSWS estimates

8. Policies need to be based on sound estimates of potential future wood supply. Therefore it is important to know the sources and extent of uncertainty in PSWS studies. It is suggested to:

- Indicate the sources and amount of uncertainty concerning estimates of the amount that maybe sustainable;

- Include unused stem wood (harvest residue of stem wood) in the statistics;
- Consider unregistered fellings, i.e. in private forests, in order to ensure sustainable forest management and to develop a sound wood resource balance.

E. Apply different wood supply and demand scenarios

9. In order to ensure sustainable forest management under shifting ecological and socio-economic conditions it is necessary to apply different wood supply and demand scenarios. It is suggested to:

- Report two basic future scenarios: “Business as usual” and “Highest sustainable supply”;
- Report the expected future development of national wood supply;
- Specify age class distributions and diameter class distributions by tree species to ease assessment of environmental sustainability;
- Specify growing stock and both gross and net annual increment.

F. Coordinate data research

10. Those responsible for studies of wood supply are often from national forest inventory background. It is suggested to reach out to expertise in other bodies and disciplines to make the best use of all available information:

- Coordinate data research with experts in other bodies and disciplines and in the industry;
- Obtain data on wood supply from industry residues and -co-products and post-consumer wood from forest-based or pulp and paper companies;
- Use different types of enquiries and information sources to cross-check data.

G. Make estimates which are consistent with all dimensions of sustainable development

11. PSWS estimates need to be in line with the principles described above in order to compile a comprehensive and correct estimate of PSWS on a national and regional level, and to allow sound policy making. Moreover PSWS studies should be consistent with all dimensions of sustainable development, i.e. income, employment, ecological functions and climate change.

III. Spreadsheet framework for each country to use in estimating

12. A spreadsheet template may be used for national PSWS studies. The excel file is at the disposal of correspondents and can be obtained on the UNECE/FAO website under: http://timber.unece.org/fileadmin/DAM/meetings/20100324/2-4-psws-spreadsheet.xls

Country:	Albania			Unit
WOODY BIOMASS FROM THE FOREST	Stemwood from FAWS* (above national threshold)	Theoretical biomass potential from stemwood		1,000 m3
		Constraint screens (sum)	0	
		Bio-technical constraint screen		
		Social constraint screen		
		Economic constraint screen		
		Available biomass from stemwood	0	
	Above-ground biomass other than stemwood	Theoretical above-ground biomass other than stemwood		
		Constraint screens (sum)	0	
		Bio-technical constraint screen		
		Social constraint screen		
		Economic constraint screen		
		Available above-ground biomass other than stemwood	0	
	Below-ground biomass	Theoretical below-ground biomass potential		
		Constraint screens (sum)	0	
		Bio-technical constraint screen		
		Social constraint screen		
		Economic constraint screen		
		Available below-ground biomass	0	
		Total available biomass from the forest	**0**	
WOODY BIOMASS OUTSIDE THE FOREST	Other wooded land	Theoretical biomass potential from OWL		1,000 m3
		Constraint screens (sum)	0	
		Bio-technical constraint screen		
		Social constraint screen		
		Economic constraint screen		
		Available biomass from other wooded land	0	
	Trees outside forest	Theoretical biomass potential from trees outside the forest		
		Constraint screens (sum)	0	
		Bio-technical constraint screen		
		Social constraint screen		
		Economic constraint screen		
		Available biomass from trees outside forests	0	
		Total available biomass from outside the forest	**0**	
FOREST EXPANSION	Short Rotation Plantations / Afforestation	Theoretical biomass potential from SRP / afforestation		1,000 m3
		Constraint screens (sum)	0	
		Bio-technical constraint screen		
		Social constraint screen		
		Economic constraint screen		
		Available biomass from SRP / afforestation	0	
		Total available biomass from forest expansion	**0**	
AGRICULTURE	Fruit trees, olives and vineyards	Theoretical biomass potential from agriculture		1,000 m3
		Constraint screens (sum)	0	
		Bio-technical constraint screen		
		Social constraint screen		
		Economic constraint screen		
		Available biomass from agriculture	0	
		Total available biomass from agriculture	**0**	
		Total available biomass from all sources excl. Co-products and waste	**0**	**1,000 m3**
CO-PRODUCTS AND WASTE	Chips, residues, post-consumer wood	Theoretical biomass potential** from co-products and waste		1,000 t
		Constraint screens (sum)	0	
		Bio-technical constraint screen		
		Social constraint screen		
		Economic constraint screen		
		Available biomass from co-products and waste	0	

IV. References

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