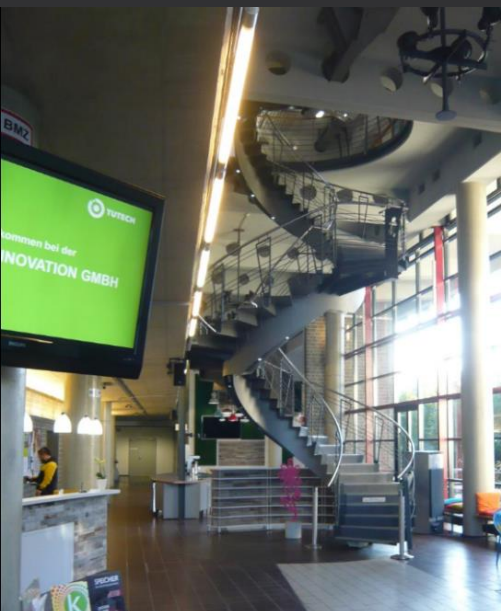# Concept of comparison between forest inventory data and wood consumption statistic

ITOC - dashboard

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1 What is the basic idea of the ITOC-dashboard?

2 What can I do – do I have to do?

3 What is behind the calculation? (Method)

4 What do I get?

Bridging the gap from

Terms are unclear: Indicator 3.1 Increment and fellings

Forest **I**nventory data

T

O

"If fellings are lower than the net increment, the growing stock is increasing." (p 52)

Consumer biomass availability

1. Find a transparent system
acceptable for inventory experts as well as
for market analysts.

2. Keep it easy –
even for Non-Forestry-People.

3. Avoid serious mistakes –
it's impossible to stay completely correct
for both sides if you want to achieve 1 + 2.

ORIGINAL PAPER

From inventory to consumer biomass availability—the ITOC model

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Alain Thivolle-Cazat[7] · Przemko Döring[1] · Edmundas Petrauskas[8] · Hermann Englert[9] ·
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From Inventory TO Consumer biomass availability - the ITOC-model dashboard

2016

Calculation

work here

3. User Guidance
4. Questionnaire
5. Results
8. Country specific comments

Data sources

default data

State of Europe's Forests 2011
Global Forest Resources Assessment 2010
The European Forest Sector Outlook Study II
Other data sources

INFRO®

4. Questionnaire

1	Switzerland	ITOC-model (based on international statistical data)	Source of information	Country specific ITOC model (please adapt the statistical data)

2	ECE	CZ	CZECH REPUBLIC		22	ESE	GR	GREECE
3	ECE	HU	HUNGARY		23	ESE	HR	CROATIA
4	ECE	MD	REP MOLDAVIA		24	ESE	ME	MONTENEGRO
5	ECE	PL	POLAND		25	ESE	MK	MACEDONIA
6	ECE	RO	ROMANIA		26	ESE	RS	SERBIA
7	ECE	SK	SLOVAKIA		27	ESE	SI	SLOVENIA
8	ECE	UA	UKRAINE		28	ESE	TR	TURKEY
9	ECW	AT	AUSTRIA		29	ESW	ES	SPAIN
10	ECW	BE	BELGIUM		30	ESW	IT	ITALY
11	ECW	CH	SWITZERLAND		31	ESW	MT	MALTA
12	ECW	DE	GERMANY		32	ESW	PT	PORTUGAL
13	ECW	FR	FRANCE		33	EUN	DK	DENMARK
14	ECW	GB	UNITED KINGDOM		34	EUN	EE	ESTONIA
15	ECW	IE	IRELAND		35	EUN	FI	FINLAND
16	ECW	LU	LUXEMBOURG		36	EUN	IS	ICELAND
17	ECW	NL	NETHERLANDS		37	EUN	LT	LITHUANIA
18	ESE	AL	ALBANIA		38	EUN	LV	LATVIA
19	ESE	BA	BOSNIA-HERZEG		39	EUN	NO	NORWAY
20	ESE	BG	BULGARIA		40	EUN	SE	SWEDEN

24 questions to get to the target.

Country specific ITOC model (please adapt the statistical data)		Source of information
1.240	2010	Please specify
1.200	2010	Please specify
please select	2010	Please specify
5		Please specify
only vertical stem axis		Please specify
yes		Please specify
no		Please specify
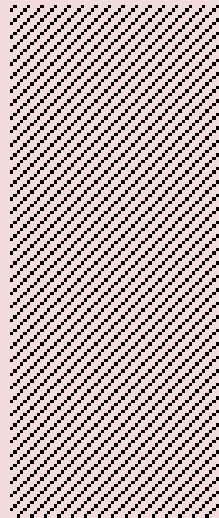
1) Input of the potential harvestable volume (PHV)

2) harmonisation of this potential (volume of all stem wood with >= 7cm diameter, above stump)

3) Expansion of this value to obtain a theoretical potential using model specific parameters

4) Consideration of harvesting restrictions and various kinds of losses to obtain the actually consumer biomass availability.

From Inventory to Consumer Biomass Availability - the ITOC-Model

based on MANTAU, U.: UNECE/FAO Timber Section Workshop on Estimating Potential Sustainable Wood Supply; GENEVA 30 March 2009
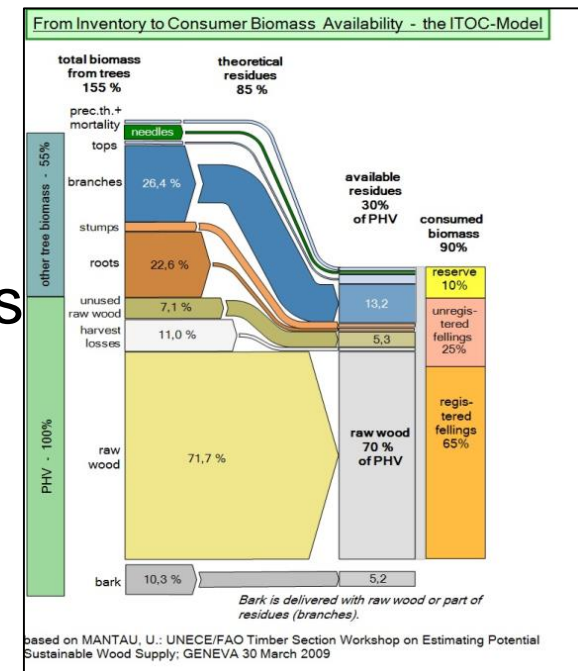
3. What is behind the calculation? (Method)

Added other tree biomass

Starting point: NAI (PHV) growth model increment.

From Inventory to Consumer Biomass Availability - the ITOC-Model

Real potential

based on MANTAU, U.: UNECE/FAO Timber Section Workshop on Estimating Potential Sustainable Wood Supply; GENEVA 30 March 2009
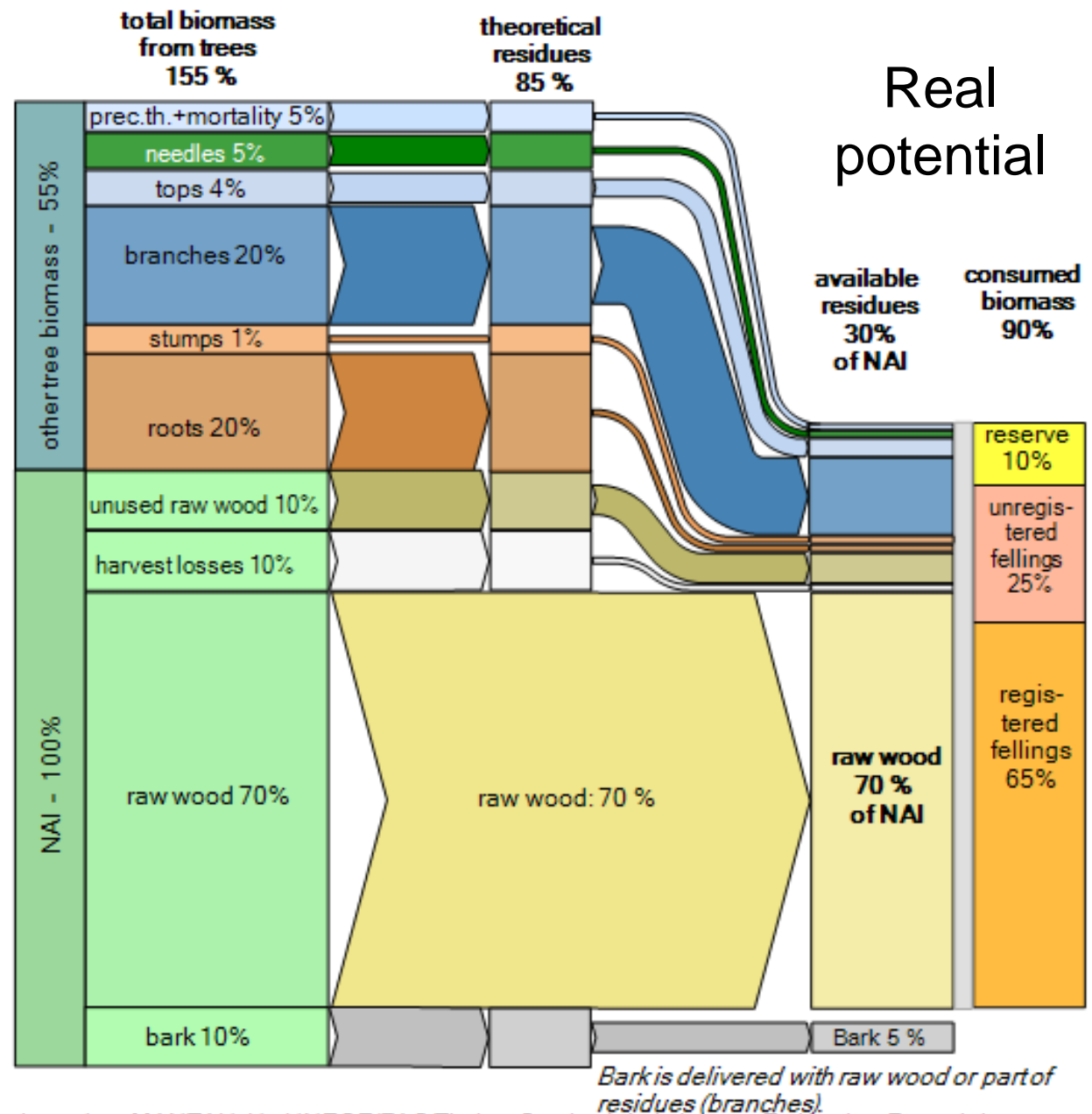
Theoretical potential	Harmonized NAI = 100 %	
Tree components (%)	hardwood	softwood
stem wood under bark (5-7 cm)	**100.0**	**100.0**
branches and stem top	33.5	24.0
leaves and needles	5.0	5.0
stumps (above-ground part)	4.2	2.5
bark (stem)	12.6	10.9
above-ground biomass	155.2	142.3
below-ground biomass (roots)	21.8	23.0
Total biomass	**177.0**	**165.3**

Paletto, A. et al.: study based on the following sources:
Cairns et al. (1997); Cienciala et al., (2005, 2006, 2008); Fattorini et al., (2004); Garcia et al., (2004);
Green et al., (2007); Koprivica et al. (2010); Pajtík et al. (2008); Skovsgaard and Nord-Larsen (2012);
Svoboda et al., (2006); Tabacchi et al., (2011).

Harvesting restrictions / losses

How much (in %) of the theoretical biomass potential can be harvested under technical and ecological restrictions?

2. Determination of technical and ecological restrictions for different compartments of the whole tree (in %)	HARDwood	SOFTwood
(11) Please estimate the rate of potential utilisation (in %) of the following assortments in your country considering technical and ecological restrictions (harvesting restrictions)		
branches	50,0	50,0
stem tops	50,0	50,0
stumps (above ground)	5,0	5,0
leaves / needles	0,0	25,0
THP below-ground (roots)	5,0	5,0

Potentials of available biomass assortments

Results for:	ITOC-model (based on international statistical data)			Country speci on coun
Harmonisation of potential harvestable volume (PHV)	**HARDwood**	**SOFTwood**	**Total**	**HARDwood**
potential harvestable volume (in million m³ o.b.)	2,027	4,205	6,232	2,027
reduction/expansion factor to reach reference definition of 7 cm d.b.h treshold / 7 cm stem top treshold / above stump	1,007	1,007	1,007	0,966
harmonised potential harvestable volume over bark	**2,042**	**4,235**	**6,278**	**1,958**
Calculation of annual theoretical harvestable potential (THP)				
harmonised potential harvestable volume (in million m³ o.b.)	2,042	4,235	6,278	1,958
branches, tops, stumps, leaves / needles	0,770	1,122	1,892	0,738
- branches	0,664	0,974	1,638	0,636
- tops	0,020	0,042	0,063	0,020
- stumps	0,086	0,106	0,192	0,082
- leaves / needles	0,102	0,212	0,314	0,098
Above-ground biomass in solid wood equivalents	2,812	5,358	8,170	2,696
Below-ground biomass (roots) in solid wood equivalents	0,445	0,974	1,419	0,427
Other tree biomass in solid wood equivalents	1,317	2,308	3,625	1,263
TOTAL tree biomass (THP) in solid wood equivalents	**3,359**	**6,544**	**9,903**	**3,220**

Merchentable biomass assortments

Calculation of merchantable stem wood				
harmonised potential harvestable volume (in million m³ o.b.)	2,042	4,235	6,278	1,95
- bark	0,184	0,466	0,650	0,17
- losses	0,186	0,508	0,694	0,17
- unused wood in the rough	0,145	0,301	0,446	0,13
Stem wood potential at mill site	1,527	2,961	4,488	1,46
bark at mill site	0,097	0,229	0,325	0,09
Calculation of merchantable other woody biomass				
unused wood in the rough (recovered)	0,109	0,226	0,334	0,10
losses (recovered)	0,019	0,051	0,069	0,01
branches (recovered)	0,332	0,487	0,819	0,31
tops (recovered)	0,010	0,021	0,031	0,01
stumps (harvested)	0,064	0,079	0,144	0,06
leaves / needles	0,000	0,053	0,053	0,00
roots (below-ground biomass)	0,022	0,049	0,071	0,02
precommercial thinnings	0,020	0,042	0,063	0,02
recovered mortality wood	0,000	0,000	0,000	0,00
Utilizable other biomass	**0,576**	**1,008**	1,584	**0,55**

Potentials of available biomass assortments

Calculation of biomass reserve				
Stem wood potential at mill site	1,527	2,961	4,488	1,46
registered fellings	1,828	3,709	5,537	1,82
unregistered fellings	0,610	1,266	1,876	0,61
total fellings	2,439	4,974	7,413	2,43
Reserve to registered fellings	-0,301	-0,748	-1,049	-0,36
Reserve to total fellings	-0,911	-2,014	-2,925	-0,97
Utilizable other biomass	0,576	1,008	1,584	0,55
harvested	0,230	0,402	0,632	0,22
Other biomass reserve	0,346	0,606	0,952	0,33

Switzerland	EFISCEN (EFSOS)		ITOC model calculation	E
	reference 2010	energy 2030		referenc 201
hardwood	1,956	2,092	1,527	1,95
softwood	7,512	6,495	2,961	7,51
raw wood, total	9,467	8,587	4,488	9,46
forest residues	1,902	3,904	1,584	1,90
bark	0,968	0,878	0,463	0,96
Total biomass	**12,337**	**13,369**	**6,536**	**12,33**

Germany
BWI[3]

Get your own
colored
country
flow chart.

From Inventory to Consumer Biomass Availability - the ITOC-Model
- Germany -

| total biomass from trees 193.1 M. m³ | theoretical residues 106.1 M m³ | available residues 37.1 M. m³ of NAI | consumed biomass 82.2 M m³ |

other tree biomass – 71.6 M. m³

prec.th.+mortality	1.2 M. m³
needles	6.1 M. m³
tops	1.2 M. m³
branches	31.9 M. m³
stumps	3.7 M. m³
roots	27.5 M. m³

prec. thinnings: 1,2 M. m³   stumps: 2,8 M. m³
mortality: 0,0 M. m³   roots: 1,4 M. m³
needles: 1,0 M. m³   unused stemwood: 6,5 M. m³
tops: 0,6 M. m³   harvest losses: 1,3 M. m³
branches: 16,0 M. m³   bark mill side: 6,3 M. m³

NAI – 121.6 M. m³

unused raw wood	8.6 M. m³
harvest losses	13.4 M. m³
raw wood	87.0 M m³
bark	12.5 M. m³

residue reserve 18.5 M. m³
harvested residues 12.3 M. m³

raw wood 87.0 M. m³ of NAI

reserve 17.1 M. m³
unregistered fellings 17.6 M. m³
registered fellings 52.3 M. m³

Bark 6.3 M. m³

reserve 35.6 M. m³
unregistered fellings 17.6 M. m³
registered fellings 64.6 M. m³

based on MANTAU, U.: UNECE/FAO Timber Section Workshop on Estimating Potential
Sustainable Wood Supply; GENEVA 30 March 2009

Concept of comparison between forest inventory data and wood consumption statistic

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