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ILLEGAL LOGGING – THE EXTENT OF THE PROBLEM ANDREW K SKIDMORE



FACULTY OF GEO-INFORMATION SCIENCE AND EARTH OBSERVATION





GLOBAL FOREST AREA

- 4 billion ha (global)
- 485,000 ha (NL) = 0.01% (FRA 2010)



- Growing stock 2010 = 527 billion m3
- 70 million m3 (NL) = 0.01%









FAOSTAT 2013

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Europe EEA 2006 http://www.eea.europa.eu/data-andmaps/figures/share-of-land-cover-types

Netherlands

CBS 2008 http://www.cbs.nl/en-GB/menu/themas/dossiers/nederlandregionaal/publicaties/artikelen/archief/2011/2011-3433-wm.htm

DEFINING LAND COVER TYPES

Teak (*Tectona grandis*) interplanted with sweet potato (*Ipomea batatas*) - **Solomon Islands**

 Native cypress pine (Callitris glauca) - Australia

> Forest: crown cover >10%, area >0.5 ha, ht>5m











LAND COVER TYPES

LAND COVER TYPE, VEGETATION TYPE, PLANT FUNCTIONAL GROUPS

- Land cover traditionally derived from air photo interpretation
 - Vegetation characterized as discrete patches
 - This does not capture mixes and gradients
- Land classes become
 - pre-classified areas
 - transferability issues







HOW ARE FOREST AREAS ESTIMATED?

TRADITIONAL FOREST INVENTORY

- UN FAO Forest Resource Assessment 2010
 - COLD Iry STANDARD PUALITY CONTROL VERIFIED Y &
 - Ground survey
 - Forest inventory plots
 - Satellite remote sensing









HOW ARE FOREST AREAS ESTIMATED?

LAND COVER FROM REMOTE SENSING

- Earth Observation by satellite
- NASA AVHRR
- NASA MODIS
- NASA Landsat
- French SPOT VGT
- ESA MERIS
- ESA SENTINEL series







HOW ARE FOREST COVER MAPS MADE?







HOW ARE FOREST COVER MAPS MADE?





HOW ARE FOREST AREAS ESTIMATED?

REMOTE SENSING

- Use a pixel value, plus change in the value, to define a cover class ³
- IGBP AVHRR 1999
 - 1 km pixel
- GLC2000 SPOT VGT 1999
 - 1 km pixel
- CORINE Landsat/SPOT 1999
 - 250 m (photo Interpretation)
- GLOBCOVER MERIS 2004
 - 300 m
- BU MODIS Collection 5 (Friedl 2010)
 - pixel size 500 m daily



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Jung et al 2006

HOW RELIABLE ARE THESE AREA ESTIMATES?

UN FAO FRA 2012

- Austria
 - Forest definitions different at national and FAO level

Australia

- Districts→Regions→State
 →Commonwealth
- 2003→2008: 9%reduction in forest area
- Azerbaijan
 - Country report compiled by FAO staff in Rome (p.4)

DEFINITIONS

FAO = 0.5 ha, trees, > 5m ht, >10% canopy cover A = 0.05 ha, trees > 5m ht, >30% canopy cover

CHANGING TECHNIQUES

"The ability by states and territories to estimate forest extent continues to improve with the increasing availability of high resolution remotely sensed data and improvements in forest typing methods." FRA 2010 – Country Report Australia (p.6)

FRA 2010 – Country Report, Azerbaijan

Report preparation and contact persons

No report has been received from Azerbaijan.

This report is the result of a desk study prepared by the FRA secretariat in Rome, which is based on the existing available information using the established form at for FRA 2010 country reports



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FOREST USES - DIFFERENT TYPES OF LOGGING

- Standard clearcut
- Patch clearcut (reserves)
- Strip clearcut
- Shelterwood







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GLOBAL FOREST CHANGE

- 13 million ha/yr forest lost 2000-2010
- 16 million ha/yr forest lost 1990-1999

FAO FRA 2010

250-500

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50-250



250-500

> 500

- Asia shifted from net loss to net gain in forest cover
- Oceania net loss 1 mill ha/y
 - Australia identifies improved inventory (p6)
 - FRA blames drought (p19)



10% of original primary forest remains (Nellemann 2012)

REGIONAL FOREST CHANGE - EUROPE

- FAO 2010 FRA European forest area expanded by:
- 1990-1999 = 0.9 million ha/yr
- 2000-2010 = 0.7 million
 ha/yr



http://www.cgd.ucar.edu/tss/clm/pfts



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- EEA 2006 European forest area expanded by:
 - 2000-2006 = 0.1 million
 ha/yr
 - CORINE database



EEA 2006 http://www.eea.europa.eu/data-and-maps/figures/net-land-cover-changes-200020132006

FOREST CHANGE – NATIONAL LEVEL



Ontwikkelingen in areale	en bodemgebruik				
	ha in 1950	ha in 1990	Verandering in %		
Agrarisch gebied	2.523.510	2.373.890	-5.9		
Bos	245.850	329.390	34.0		
Loofbos	75.310	118.580	57.5		
Naaldbos	155.430	135.710	-12.7		
Gemengd bos	15.110	75.100	397.0		
Natuur	262.670	146.040	-44.4		
Moeras	43.600	47.530	9.0		
Kwelders	24.980	10.080	-59.7		
Duin en strand	48.030	43.870	-8.7		
Heide	110.840	35.820	-67.7		
Stuifzand	7.340	3.540	-51.8		
Hoogveen	27.880	5.200	-81.3		
Bebouwd	262.770	541.010	105.9		
Wegen e.a.	97.850	133.210	36.1		
Bebouwd gebied	164.920	407.800	147.3		
Water	782.500	664.770	-15,0		
Totaal	4.077.300	4.055.090	-0.5		
Bron: CBS			CBS/MNC/jan07		

http://www.kennislink.nl/publicaties/nederlands-landschap-ondergaat-metamorfose



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Netherlands

 $\underline{http://www.compendiumvoordelee for geving.nl/indicatoren/nl1002-Oppervlakteverandering-bodemgebruik.html?i=4-25$







GLOBCOVER Forest class 300 m pixel with Morphologic Spatial Pattern Analysis (MSPA)





http://upload.wikimedia.org/wikipedia/commons/f/fe/Enschede-topografie.jpg http://www.earthzine.org/2012/07/25/pan-european-forest-maps-derived-from-optical-satellite-imagery/ http://forest.jrc.ec.europa.eu/download/data/google-earth-overlays/

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TIMBER PRODUCTION

- Global production (2011)
 - 1578 million m³ roundwood
 - Sawnwood
 - Veneer and plywood
 - Pulp and paper
- Export
 - 115 million m³ roundwood
 - Average \$140/m³
 - Tropical hardwood \$185- Source: FAOSTAT-Forestry 340/m³
- Forest exports \$246 billion

Product		Production			Exports				
		2011	Change (%) compared to:		2011	Change (%) compared to:			
	Unit		2010	2000	1980		2010	2000	1980
Roundwood	million m ⁸	3 469	2%	1%	11%	123	10%	4%	31%
Wood fuel	million m ³	1 891	1%	4%	12%	8	19%	112%	
Industrial roundwood	million m ³	1 578	3%	-3%	9%	115	10%	1%	23%
Sawnwood	million m ⁸	406	4%	6%	-3%	120	5%	5%	71%
Wood-based panels	million m ⁸	288	3%	55%	184%	71	1%	24%	334%
Veneer and plywood	million m ³	97	1%	46%	120%	28	7%	25%	242%
Particleboard and fibreboard	million m ³	191	5%	60%	233%	43	-2%	24%	423%
Wood pulp	million tonnes	173	1%	1%	38%	53	7%	39%	152%
Other fibre pulp	million tonnes	18	-3%	17%	145%	1	13%	76%	161%
Recovered paper	million tonnes	211	1%	47%	317%	59	8%	140%	976%
Paper and paperboard	million tonnes	403	1%	24%	138%	112	0%	14%	221%
Forest products value	US\$ billion					246	10%	70%	334%

ITTO, FAOSTAT 2012



GLOBAL TRADE - INDUSTRIAL ROUNDWOOD EXPORT





FAOSTAT 2013



GLOBAL TRADE IN TIMBER



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ILLEGAL LOGGING IN THE NEWS – APRIL 2013





GLOBAL EXTENT OF ILLEGAL LOGGING

- WWF (2008) illegal logging:
 - 20-40% of global trade
 - 350 to 650 million m³ / year
- Nellemann (2012) Interpol
 - 15-30% global trade
 - \$30-100bn
- Amazon basin, Congo basin and south-east Asia
 - 50 to 90% logging illegal
- Indonesia illegal logging (Luttrell 2012)
 - 75% illegal = \$8.7 billion, in lost tax = 1% GDP, and 10% of tax revenue



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EU ILLEGAL TIMBER IMPORTS

- 16-19% of the timber imports (WWF 2004)
 - 27-31 million m³ (10% global trade)
 - 40% of manufactured products illegal BUT excluded by FLEGT*
- 7% softwood and 25% hardwood trade (American Forest and Paper Association 2004)



MUL M^a (RA/E)



(WWF 2008)



*EU Voluntary Licensing Regulation FLEGT – Forest Law Enforcement, Governance and Trade UNIVERSITY OF TWENTE.



FIRE WOOD AND ILLEGAL LOGGING



FAO FRA (2010) does not include informal collection of firewood



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% of total

production

40% global

80% tropical

EFFECTS OF ILLEGAL LOGGING

- Illegal logging is covert
- Organized crime
- Land cover conversion
- Suppresses timber prices
- Magnitude encourages corruption
- Carbon emission 17% of all CO₂ annually emitted is from deforestation (Nellemann 2012)



http://allisonleahy.com/post/13879619925/brazilian-forest-code-reform-will-devastate-the-amazon



EFFECTS OF ILLEGAL LOGGING

- Leakage China logging ban encourages Indonesian logging
- Undermines REDD+ for payments to communities – illegal payments are larger than REDD+ payments
- Increased flooding
- Decreased biodiversity

Total investment by World Bank 2008-2013 is \$650 million through the Forest Carbon Partnership Facility (FCPF). (0.2% of illegal trade)

http://www.worldbank.org/en/news/press-release/2013/01/10/new-fundingfor-climate-forests-protection



TRACKING ILLEGAL LOGGING

- The <u>EU Timber Regulation</u> (EUTR) requires importers or sellers of timber and wood products to keep records of the sources of their supplies
- VPA (Voluntary Partnership Agreements)
- INTERPOL LEAF (Law Enforcement Assistance for Forests) – UNEP, NORAD



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Malaysia hopes to ink VPA with EU this year



Malaysia hopes to conclude negotiations and sign the Voluntary Partnership Agreement (VPA) with the European Union (EU) by year-end, to ensure the legality of the country's timber, the Ministry of Plantation, Industries and Commodities said.

Besides potentially increasing the export value of wood products to the EU, the VPA is a trade agreement between the EU and timber producing countries, aimed at halting illegal logging and its associated trade.

"One of Malaysia's initiatives to ensure an uninterrupted flow of wood exports to the EU until the VPA is concluded, includes the Malaysian Timber Legality Assurance System (MYTLAS)," the ministry's advisor, Datuk Dr Freezailah Che Yeom said.

He was speaking at a press conference on the third Sub-Regional Training Workshop on Timber Legality Assurance which began here today.

The MYTLAS is a credible domestic system to verify the legality of Malaysian wood products and is acknowledged by the European Forest Institute (EFI).







http://ec.europa.eu/environment/eutr2013/index_en.htm

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*EU 2005 Forest Law Enforcement, Governance and Trade regulation

HOW TO SOLVE THE PROBLEM OF ILLEGAL LOGGING

- Buy wood and paper products that are certified in accordance with the principles and criteria of the Forest Stewardship Council (FSC) and which bear the FSC label
- Together with colleagues from 4 UT Faculties/Research Institutes we are developing methods to track legal timber and identify illegal wood products



In order to help forest managers, stakeholders and certification bodies interpret





 Thank you for your attention



