

Sustainability Criteria & Certification systems for Biomass Production

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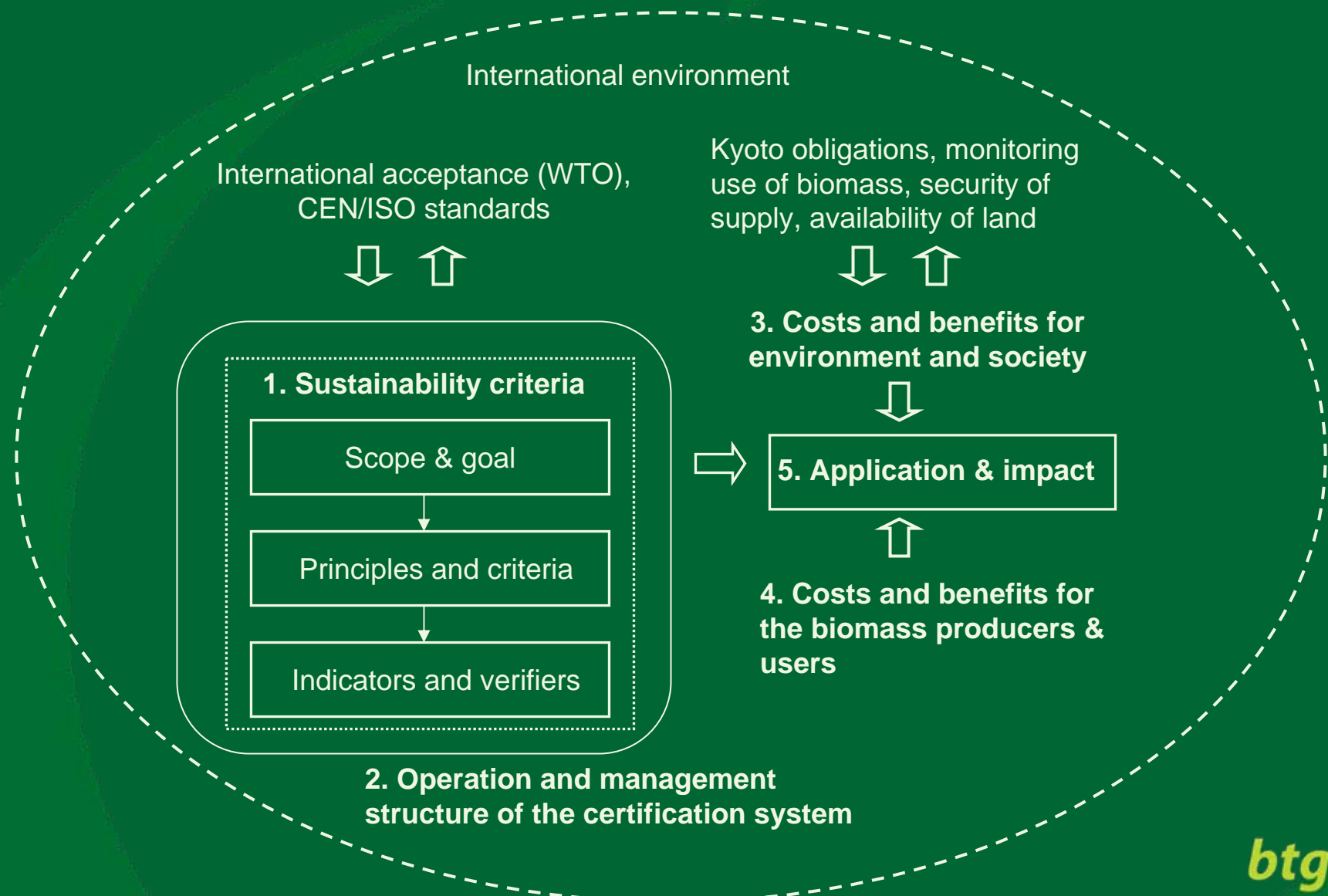
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This presentation

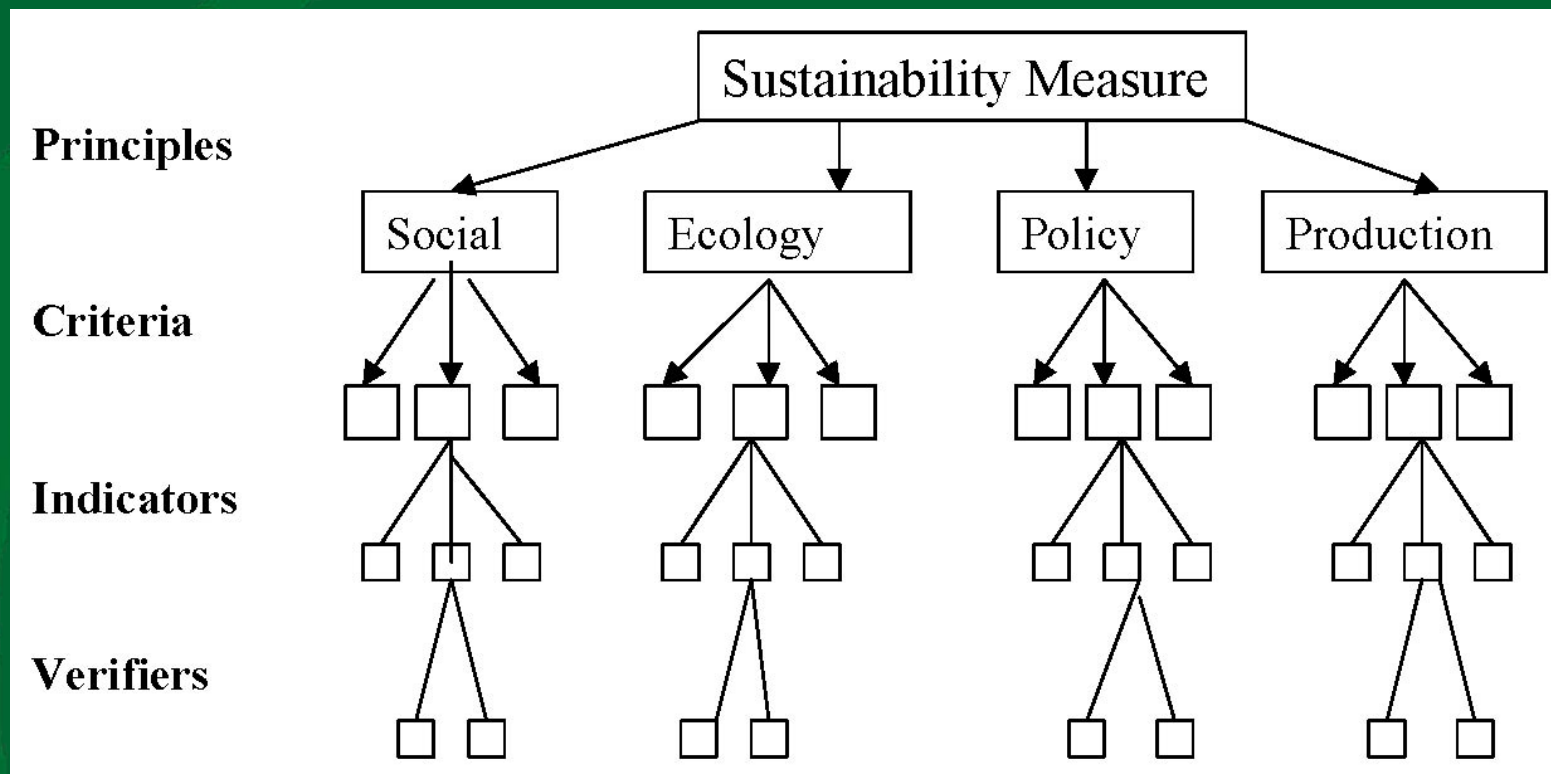
- > Research framework
- > Policy overview
- > Lessons from existing certification systems
 - Forestry
 - Energy crops
 - Power sector
 - Emission trade
- > Barrier analysis
- > Possible way forward



Research framework



Sustainability criteria



Source: Mendoza and Prahbu, 2000

Policy overview

> EU level

- Road Map for Renewable Energy in Europe – Jan 2007
- Targets in road map confirmed in Spring European Council
- Public consultation *'how should a biofuel sustainability system be designed'* – April- May 2007
- European Parliament – Review fuel quality directive
- European Parliament, resolution of 25 Sept 2007 on Road map for Renewable energy, calls on Commission to develop mandatory comprehensive certification scheme
- European Commission, 23 Jan 2008 *Proposal for a directive on the promotion of the use of energy from renewable sources, which includes sustainability criteria for biofuels and other bioliquids.*



Draft directive on renewable energy

- > *Draft* directive on the promotion of the use of energy from renewable sources, 23 Jan 2008
 - 20% overall target for renewable energy
 - 10% target for biofuels in vehicles
 - Sustainability scheme **biofuels in vehicles**
 - Sustainability scheme for **biomass in general** to be developed by end of 2010 at the latest



Sustainability criteria biofuels

1. GHG emission savings at least 35%
2. No raw materials from high biodiversity areas
 - Forests undisturbed by significant human activity
 - Areas designated for nature protection purposes
 - Highly biodiverse grassland
3. No raw materials from high carbon stock areas
 - Wetlands, continuously forested areas
4. EU raw materials: minimum environmental requirements for agriculture in the EU (EC1782/2003)



Implementation scheme

- > Sustainability scheme **biofuels in vehicles and other bioliquids for energy**
 - Directive to be transposed in national legislation by 31 March 2010 at the latest
 - Biofuel production installations already in operation in January 2008 need to meet criteria from 1 April 2013.
- > Sustainability scheme for **biomass in general**
 - European commission will report on it by 31 Dec 2010 at the latest.
 - The report and workshop focused on this issue



National level

> Netherlands

- Commission 'Sustainable Production of Biomass' led by Prof Cramer'.
- Reporting obligation as a start (postponed)

> Germany

- Amendment to Biofuel Quota law
- International pilots initiated (MEO,FNR)

> United Kingdom

- Sustainability criteria related to Renewable Transport Fuel Obligation (RTFO)
- Reporting obligation as a start.



Stakeholder representations

> NGOs

- WWF, CEO, Wetland int., Greenpeace, etc.

> Universities, institutes, international organisations

- EPFL Roundtable on Sustainable Biofuels
- OECD Roundtable on sustainable energy
- UN Energy
- FAO – International Bioenergy Platform
- IEA Bioenergy, tasks 29, 38, 40
- Etc.



Lessons from existing certification systems

- > Forest certification systems
 - FSC, PEFC and related systems
- > Biomass energy crops certification systems
 - RSPO (palm oil), RTRS (soy), BSI (sugarcane)
- > Certification systems used in power sector
 - Biomass certification systems (Essent GGL, Laborelec)
- > Systems related to emission trading
 - Clean Development Mechanism



Forest certification



Introduction

- > Main umbrella certification systems
 - Forest Stewardship Council (FSC)
 - Programme for Endorsement of Forest Certification Schemes (PEFC)

Certified forest area by scheme and region in Dec 2006 (million hectares)

	North America	South & Central America	Europe	Asia	Oceania	Africa	Russia	Total
FSC	27.3	9.6	29.6	1.6	1.3	2.5	12.3	84.2
PEFC	128.3	2.3	57.4		5.7			193.7
Other^a	11.0			4.8		1.2		17.0
Total	166.6	11.9	87.0	6.4	7.0	3.7	12.3	294.9

^a Other in North America refers to American Tree Farm System, in Asia to the Malaysian Timber Certification Council, in Africa to areas in Gabon recognised under the Dutch Keurhout system
source: www.forestrycertification.info

Forest certification

FSC & PEFC

> FSC

- Founded in 1993, supported by main NGOs
- Centralized approach: all national FSC systems need to comply with FSC's International Forestry Principles and Criteria
- If no national system available, certification with the FSC International Standard is possible.

> PEFC

- Founded in 1999, as reaction of forestry sector on upcoming FSC standards.
- Uses inter-governmental principles (e.g. Pan European Principles for European forests, Montreal Principles for other temperate and boreal forests, ATO/ITTO principles for tropical forests).
- No international certification system, only endorsement of national systems.



Sustainability criteria

> **General**

- Compliance with national laws
- Management plan

> **Social**

- Tenure and use rights and responsibilities
- Community relations and worker's rights
- Indigenous peoples' rights

> **Environmental**

- Environmental impact assessment
- Biodiversity protection
- Maintenance of HCV forests
- Wildlife habits
- Soil protection
- Water production
- Agrochemical use
- Use of GMOs

> **Economic**

- Efficient use of the forest's multiple products
- Benefits for local economy
- No harvests above sustainable levels







Forest certification

Sustainability criteria

- > Illustration: Variation of UPM's performance and overall indicative performance by topic in selected areas in Canada, Finland and the UK. Source (UPM 2005)

	Canada		Finland			UK
	FSC Maritimes	SFI	FFCS	FSC Draft Finland	FSC Sweden	UKWAS
Environmental	2,3	3,0	3,0	2,0	2,7	2,8
Social	2,8	3,0	3,0	3,1	3,4	3,1
Economic	2,6	3,0	3,5	2,9	3,2	3,5
Total	2,5	3,0	3,2	2,7	3,0	3,1

 Exceed compliance	 Comply	 Minor non-conformity	 Major non-conformity
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Operation & management structure

- > Forest certification scheme:
 - system of standards, rules and procedures for assessing conformity with specified forestry requirements

- > Four elements:
 1. Forest certification standards
 2. Forest certification
 3. Accreditation of forest certification bodies
 4. Mechanism to control environmental claims



1. Standard setting process

> FSC

- Three chamber approach: economic, social and environmental with equal voting rights
- Interim standards by FSC accredited certification bodies

> PEFC

- Standard setting by national standard setting bodies.
- Initiated by forest sector representatives, all relevant parties must be invited to participate
- Use of ISO 59 required: Code of Good Practice for Standardization



2. Certification process

- > **PEFC require certification bodies to conform:**
 - ISO Guide 62: 1996 (EN 45012: 1998) General requirements for bodies operating assessment and certification/registration of quality systems.
 - ISO Guide 65: 1996 (EN 45011: 1998) General requirements for bodies operating product certification systems.
 - ISO Guide 66: 1999 General requirements for bodies operating assessment and certification/registration of environmental management systems.

- > **FSC requires certification bodies to conform:**
 - Procedures set in FSC Accreditation Manual – which closely parallels the ISO guidelines for certification, adapted for use in forestry sector.

- > **Auditors must Conform ISO 19011 & additional requirements set by PEFC & FSC**



3. Accreditation certification bodies

> PEFC

- Accreditation bodies should conform ISO Guide 61: 1996 (EN 45010: 1998) General requirements for assessment and accreditation of certification/registration bodies
- Can be shown through membership IAF and/or EA

> FSC

- Accreditation through Accreditation Services International GmbH (ASI), FSC is sole shareholder
- ASI uses Quality System Manual drawn following ISO 10013:1995 and ISO/IEC 17011:2004



4. Environmental claims

> Tracking of products from certified forests

- 100% physical separation
- Mass balance system
 - Calculation percentage of certified wood
 - Non certified wood should be 'controlled wood', no illegal logging, HCV areas, or GMOs (only FSC).

> Use of labels



Forest certification:

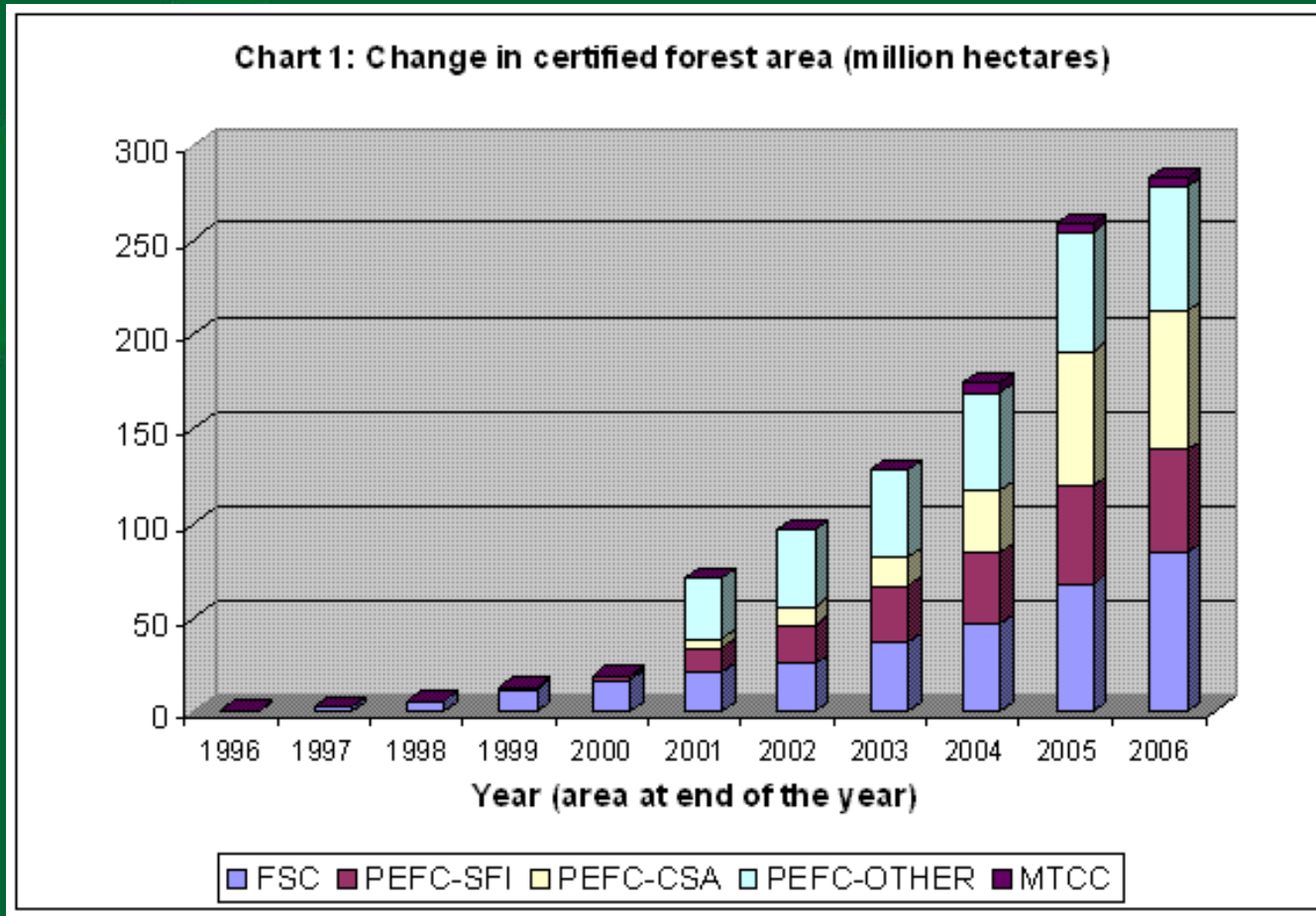
Benefits and costs

	Main benefits	Main costs
Environmental	<ul style="list-style-type: none">> Mapping & protection ecol.sign.areas> Increase deadwood> Species biodiversity> Restoration threatened forest types	
Social	<ul style="list-style-type: none">> Increased attention workers safety> Better awareness other stakeholders	
Economic (society)		<ul style="list-style-type: none">> Loss income forestry sector> Potential loss of jobs
Economic (user)	<ul style="list-style-type: none">> Access to eco-sensitive markets> Price premium> Efficiency improvement by better management	<ul style="list-style-type: none">> Costs of measures that lead to reduced harvests> (In)direct auditing costs



Forest certification: application and impact

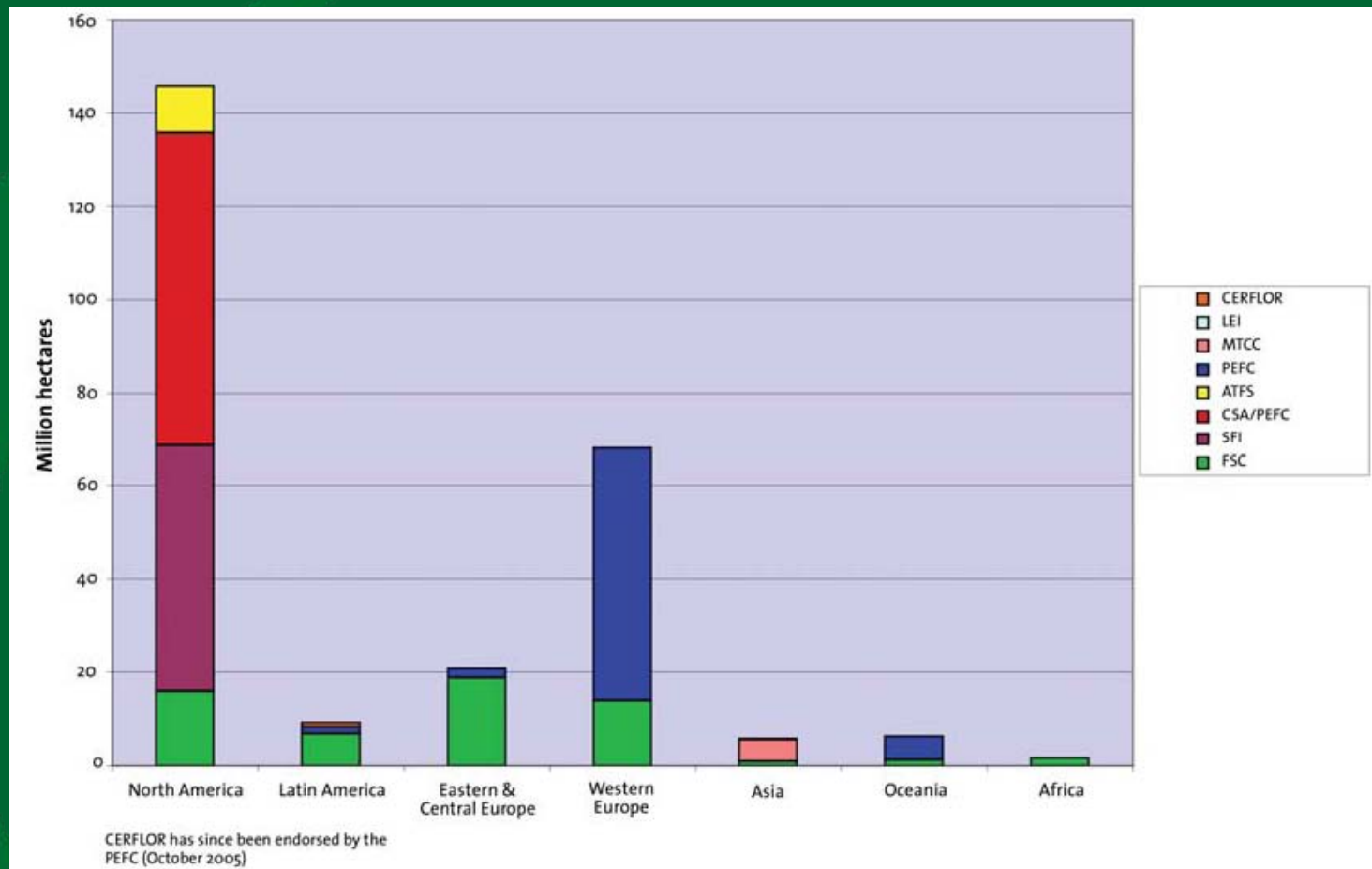
Certified area over time (mln ha)



Source: www.forestrycertification.info (2008)

Forest certification: application and impact

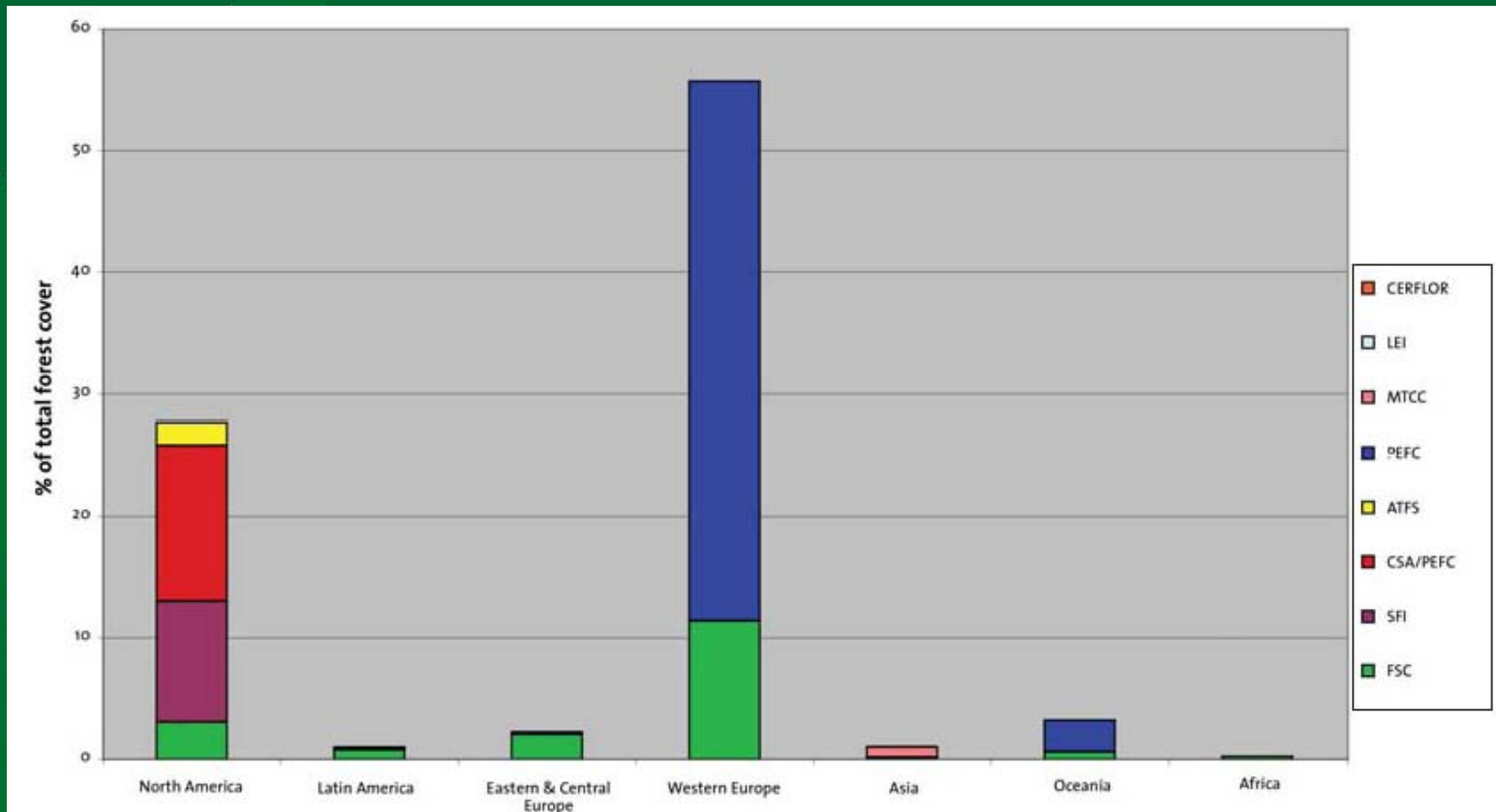
Certified area by region (mln ha)



Source: Cashore, Gale et al. (2006) Confronting sustainability: Forest Certification in developing and transitioning countries. Data from 2005

Forest certification systems: application and impact

Certified area (% of total forest)



Source: Cashore, Gale et al. (2006) Confronting sustainability: Forest Certification in developing and transitioning countries. Data from 2005

Criticism on FSC & PEFC

- > Criticism on FSC (by PEFC proponents)
 - Top down approach FSC does not take into account national and local circumstances sufficiently
 - Some criteria lead to unnecessary costs, for instance obligatory set aside areas, leading to suboptimal conservation and high costs
 - Weaker implementation of ISO standards, development 'generic standards' by certification bodies.

- > Criticism on PEFC (by FSC proponents)
 - Mainly system standards instead of performance standards
 - Unequal membership between industry and other stakeholders
 - PEFC has endorsed a number of weak systems, especially SFI (industry dominated, initially no third party certification)
 - Info on certification reports not always easy accessible.

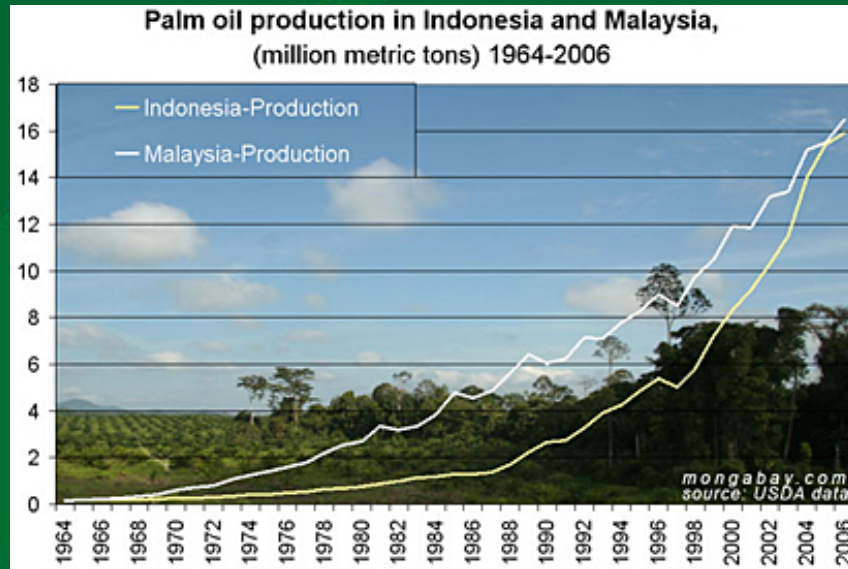


Conclusion

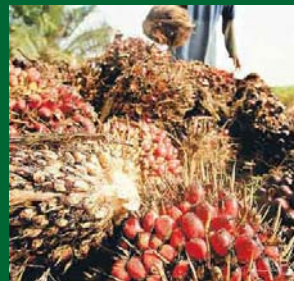
- > **Two main certification models**
 - Centralised approach (FSC)
 - Endorsement of national systems (PEFC)
- > **Criteria & indicators**
 - Developed sets
 - Ongoing discussion performance vs system standards
- > **Operational and management structure**
 - Fully developed based on ISO standards
- > **Benefits & costs**
 - Benefits: mainly for environment
 - Costs: mainly for forest owner
- > **Impact**
 - High in eco-sensitive markets (N-Am, Europe)
 - Low in areas for which forestry certification was initially designed.



Biomass energy crop certification



- > Palm oil (RSPO)
- > Soy (RTRS)
- > Sugar (BSI)



Principles and criteria

> 8 Principles

1. Commitment to transparency
2. Compliance with applicable laws and regulations
3. Commitment to long-term economic and financial viability
4. Use of appropriate best practices by growers and millers
5. Environmental responsibility and conservation of natural resources and biodiversity
6. Responsible consideration of employees and of individuals and communities affected by growers and mills
7. Responsible development of new plantations
8. Commitment to continuous improvement in key areas of activities

> 48 criteria



Standard setting process

> Standard setting

- International principles and criteria
- Indicator development on national level following certain rules (min 45 compulsory indicators)
- If no national interpretation available, certification bodies can develop set of indicators to be approved by RSPO

> RSPO executive board

- | | |
|--|---|
| - Oil palm growers | 4 |
| - Palm oil processors and traders | 2 |
| - Consumer good manufacturers | 2 |
| - Retailers | 2 |
| - Banks and investors | 2 |
| - Environmental/nature conservation NGOs | 2 |
| - Social/development NGOs | 2 |



Biomass energy crop certification: RSPO operation and management

Certification & accreditation

> Certification

- Third party certification bodies must conform ISO 19011:2002 plus requirements set by RSPO

> Accreditation

- Accreditation body must operate conform ISO 17011:2004
- Three certification bodies in process to be approved



Biomass energy crop certification: RSPO operation and management

Environmental claims

- > Three supply chain mechanisms allowed
 - Fully segregated
 - Mass balance
 - Book and claim



Benefits and costs

> Benefits

- Addresses one of most controversial biomass types in coherent way
- Example for other biomass certification systems

> Costs

- Setting up certification system requires considerable effort (RSPO developed system in 4 years, which is quite fast)
- Cost of certification not yet known.



Application and impact

> Application

- About to be implemented

> Limits to impact

- GHG benefits not covered in present RSPO principles.
- RSPO acknowledges that development of compatible additional criteria might be needed (Source: RSPO position on Bio-energy).
- Indirect land use change, competition with food cannot be avoided by RSPO (or any certification system!)



Certification in power sector



> Biomass certification

- Green Gold Label
- Laborelec sustainability certification

> Renewable electricity certification

- Eugene
- Ecolabel, Bra Miljövel, Econergia, Milieukeur, Green Power, Grüner Strom Label, OK power, Nature made basis/star

Certification in power sector

Green Gold Label

- > Initiated by Dutch power company Essent
- > GGL mainly focused on CoC certification
- > **Forestry biomass**
 - Should be conform FSC, PEFC, CSA, SFI or FFCS
 - Approved pre-scope
 - Testimony of approval according to GGL forest management criteria
- > **Biomass from agricultural origin**
 - Conform Organic certification, Eurepgap or
 - Testimony of approval' according to GGL agricultural source criteria



Certification in power sector

Green Gold Label

- > Standard setting by independent GGL foundation (not found on internet)
- > Certification process
 - CoC process well described
 - certification body should conform ISO Guide 65 (or equivalent)
 - Control Union presently only certifier performing GGL
- > Accreditation
 - Approval by GGL foundation needed
 - No approval procedure found
- > Application & impact
 - Part of biomass used by Essent is GGL certified
 - System mainly by (suppliers to) Essent



Laborelec certification

- > Green electricity certificates
 - Flanders: based on energy balance supply chain
 - Wallonia: based on CO₂ balance supply chain
- > Characteristics Laborelec sustainability certification
 - Mainly CoC system
 - FSC and RSPO certified biomass regarded as sustainable, but unclear if it is prerequisite for certification
- > Details on criteria, standard development, accreditation etc. not found on internet
- > Application and impact:
 - Applied by Electrabel for about 1,000,000 tonnes imported biomass
 - Costs <50 ct/tonne



Certification in power sector

Renewable electricity labels

- > Labels used to distinguish the best types of green electricity, and to communicate it to the end user
- > Some biomass types excluded:

Eligibility biomass/waste type and co-firing

Label	Eu-gene	Ecolabel UZ46	Bra Miljövel	Eco-nergia	Milieu-keur	Green Power	Green-e	Env. Choice	Grüner Strom	OK power	Nature made
Country	EU	AT	SE	FI	NL	AU	USA	CA	DE	DE	CH
Unseparated biod MSW	N	N	N	N	N	Y	N	Y	N	N	N
Separated biod MSW	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y
Demolition wood	N	N	N	N			Y	N	Y	Y	Y
Landfill gas		N	Y	Y	Y	Y		Y	N	N	N
Sewage sludge comb.	N				N			N	N	N	N
Sewage gas dig.	Y			Y	N			Y	Y	N	Y
Co-firing	Y	N	N	Y	Y	Y	Y			Y	N

Source: Derived from Oehme 2006

Certification in power sector

Renewable electricity labels

> Including criteria / guidelines on:

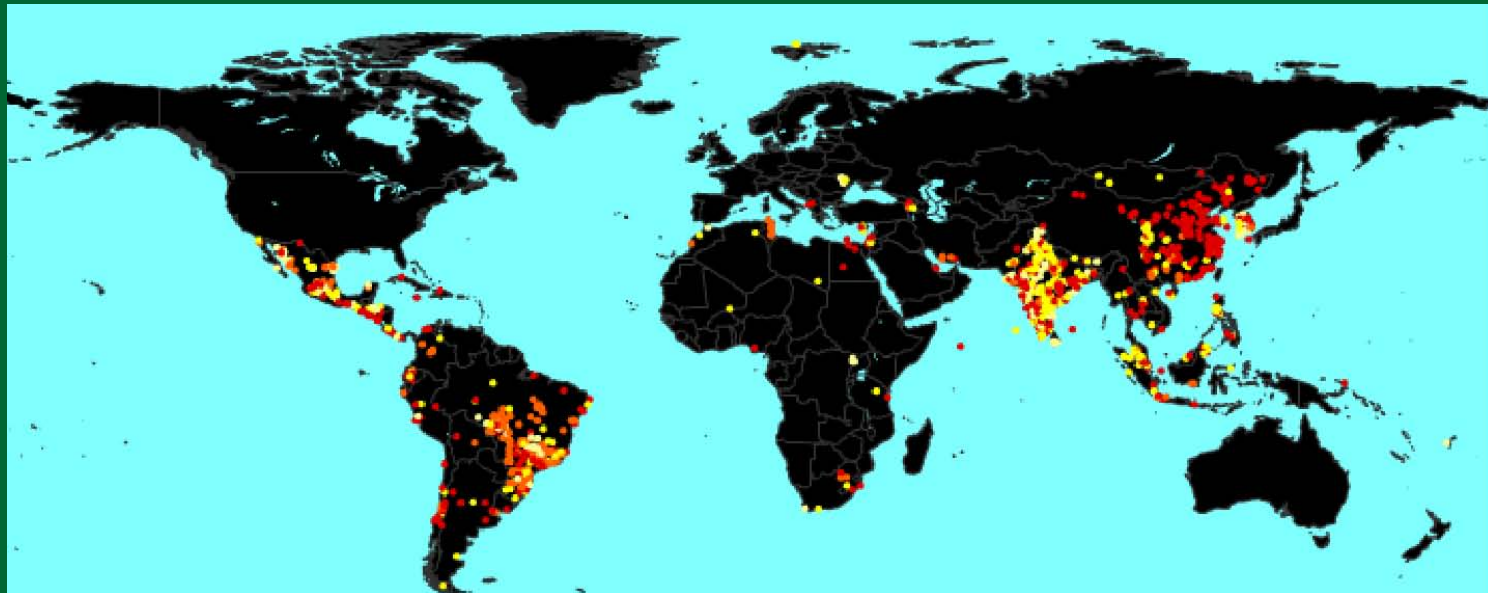
Label	Eu-gene	Ecolabel UZ46	Bra Miljövel	Eco-nergia	Milieu-keur	Green Power	Green-e	Env. Choice	Grüner Strom	OK power	Nat basic	Nat star
Country	EU	AT	SE	FI	NL	AU	USA	CA	DE	DE	CH	CH
GMO												
Origin biomass fuel												
Agriculture/soil												
Wood residues												
Process: co-generation												
Process: co-firing												
Auxiliary energy												

Source: Derived from Oehme 2006

- > Requirements on biomass: often selections from FSC or organic farming.
- > 'meta standard' Eugene endorsed only two systems so far (OK Power & Nature Made Star)

Certification and emission trading

> Clean Development Mechanism



Certification and emission trading

- > Model for methodology development
 - Emission reduction calculation tools
 - Distinguish between small and large scale projects
 - Project participants can request changes in methodologies, to be approved by workgroup and executive board
- > Host country approval: compliance with local sustainability policies



Lessons learned

- > **Forestry certification**
 - Standard development
 - Organisation structure
 - Application and impact
- > **Energy crop certification**
 - RSPO good example
 - Opportunities and limitations
- > **Biomass certification in power sector**
 - Good examples of CoC systems
 - Weaker transparency, systems remains company level
- > **Green electricity labels**
 - Consumer oriented: relevance of some criteria questionable
 - Proliferation of different standards



Barrier analysis



Wish list sustainability criteria

> Dutch sustainability criteria (Cramer comm.)

Themes	Principles
1. Greenhouse balance & carbon sinks	1. Positive GHG balance 2. Carbon sinks
2. Competition with food / other indirect effects land use change	3. Not endanger food supply
3. Biodiversity	4. Biodiversity
4. Local environmental effects	5. Soil quality 6. Surface water quality 7. Air quality
5. Local economic effects	8. Local prosperity
6. Social well-being	9. Social well being employees & local population



Sustainability criteria

- > Large diversity of crops and residues: difficult to determine criteria that cover all possible types of biomass



Sustainability criteria

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- > Some criteria not relevant for certain crops in certain countries, criteria lead to increased bureaucracy. On the other hand equal level playing field required.



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- > **Carbon balances new development in certification systems**



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- > Choice of CoC system, and in case of more CoC systems communication between the systems



Sustainability criteria

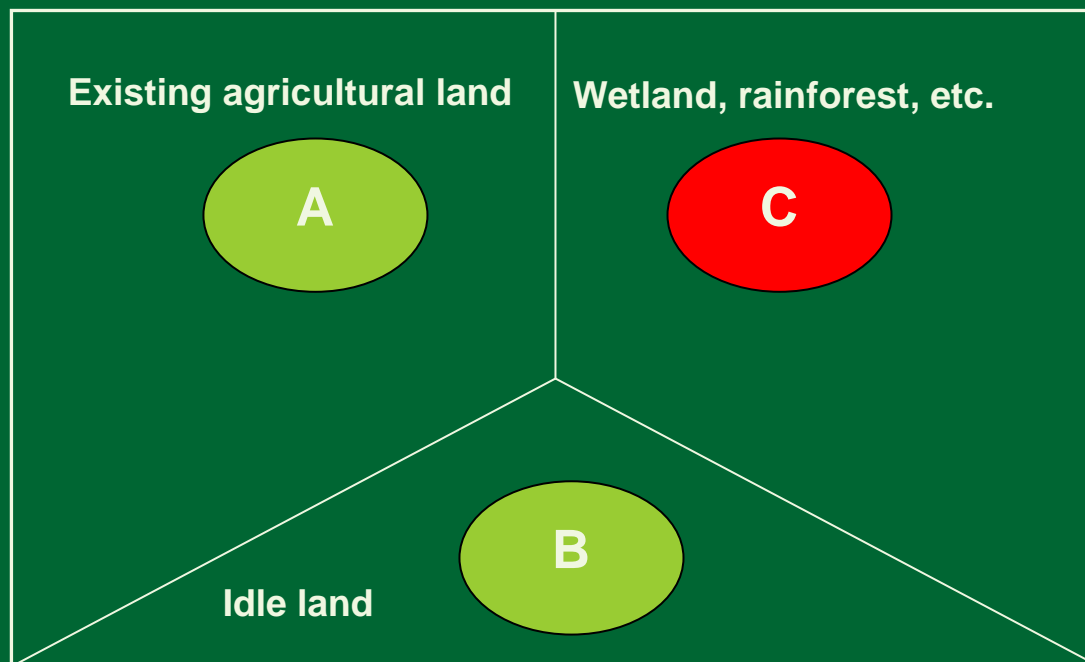
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- > Principles related indirect land/use competition with food difficult to translate into effective criteria & indicators on company level



Barrier analysis

Indirect land use

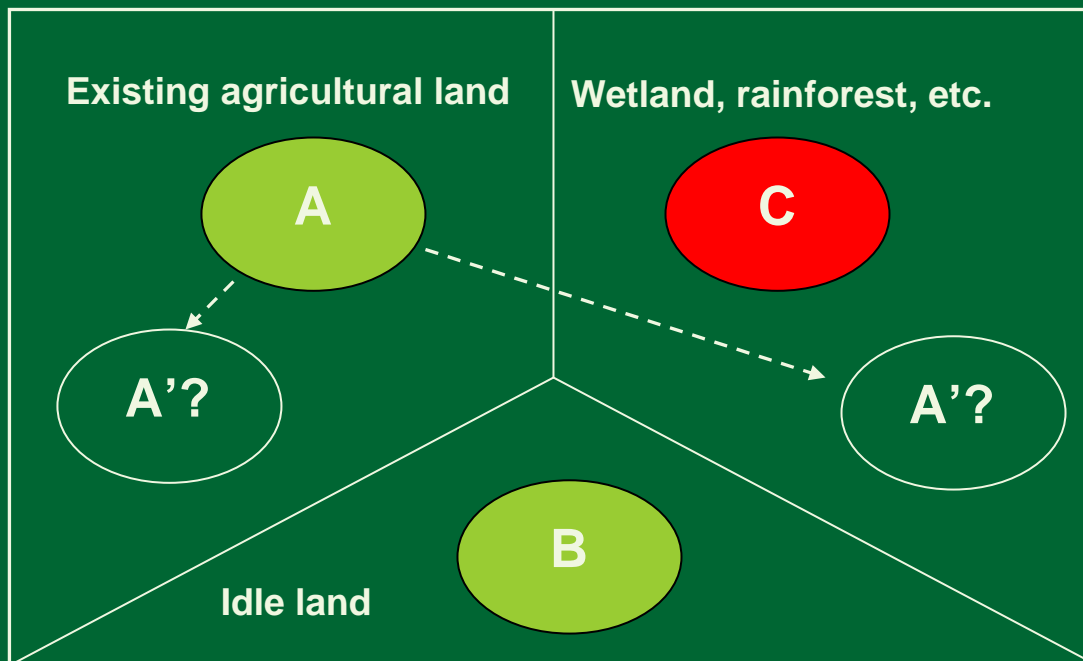
- > Direct land use change
 - A = OK
 - B = OK
 - C = not OK!



Indirect land use

> Indirect land use change

- A = maybe OK, may not! – possible solution: risk adder
- B = OK
- C = not OK!



Effect on sustainability criteria

Principle	Effectiveness
1. Greenhouse balance & carbon sinks	+
2. Competition with food / other indirect effects land use change	-
3. Biodiversity	+
4. Local environmental effects	+
5. Local economic effects	+
6. Social well-being	+



Sustainability criteria

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- > **Part of the criteria likely to conflict with WTO-regulations**



Barrier analysis

WTO

- > Agreement on Technical Barriers to trade
 - Possibly not applicable to non-product related processes
- > General Agreement on Tariffs and Trade 1994
 - Art I: Most Favored nation principle
 - Art III: Treat imported products similar to 'like' domestic products
 - Art XI: no quantitative restrictions on import/export
- > GATT 1994, Article XX exceptions
 - Measure necessary to protect human, animal or plant life or health
 - Effective measures for conservation of exhaustible natural resources
 - Protection of public morality



Barrier analysis and possible way forward

WTO legality Cramer criteria

Principle	WTO-risk
1. Greenhouse balance & carbon sinks	White
2. Competition with food / other indirect effects land use change	Black
3. Biodiversity	Gray
4. Local environmental effects	Gray
5. Local economic effects	Black
6. Social well-being	Black *

Source: Marks as given by Bronkers, Verberne et al 2007.

White: Low risk (implementation of criteria seems possible, but implementation carefully and well justified)

Gray: Medium risk (implementation criteria problematic, but does not seem to conflict with WTO per se)

Black: High risk (implementation criteria seems not to be possible in a manner that does not conflict with WTO law)

* = only possible exception for human right violations 'protection of public morality'.



Summary effect barriers

Principle	Voluntary	WTO-risk	Obligatory
1. Greenhouse balance & carbon sinks	+		+
2. Competition with food / other indirect effects land use change	-		-
3. Biodiversity	+		+/-
4. Local environmental effects	+		+/-
5. Local economic effects	+		-
6. Social well-being	+	*	- *

- > Voluntary certification systems can apply stricter sustainability criteria than obligatory systems
- > Indirect land use need to be addressed in another way

External barriers

- > Biomass exporting country might shift supply to non-EU countries, only already sustainable biomass to EU
- > Situation non sustainable biomass producers and workers might deteriorate.
- > Developing countries might perceive sustainability criteria as form of eco- or labour protectionism
- > Various reasons of limited uptake forestry certification in developing countries could be valid for biomass certification as well.



Possible way forward



Possible way forward

- > Obligatory certification can address
 - GHG savings
 - Protection of biodiversity
 - Protection of local environment
- > EU can do what individual member states cannot do: create an equal level playing field for sustainable biomass within the EU.
- > Moreover, EU certification systems gives clear signal to other countries that biomass sustainability issues need to be addressed!
- > **Development of sustainability criteria & certification system therefore recommended!**



Possible way forward

- > Issues not covered by EU sustainability criteria need to be addressed in alternative ways:
 - > Voluntary certification
 - Can formulate stricter criteria to biodiversity and local environmental effects than obligatory systems
 - could address social well being
- Promotion of voluntary EU+ certification systems recommended



Possible way forward

- > Careful monitoring of effect EU targets on *land use change/competition with food* and make adjustments where necessary. This not necessarily means an adjustment of the overall target.
- > Make use of existing and upcoming agreements, treaties to improve biodiversity, social issues etc.
 - for instance forest protection (biodiversity + carbon stock), could be included in Post Kyoto climate agreement
 - To be further explored



Outline minimum criteria

- > Set and publish generic minimum criteria in new or adjusted EU Directive.
- > EU generic minimum criteria development using three chamber approach (economic, social & environmental) stakeholders (min. public consultation exercise)
- > GHG emission reduction depends on
 - GHG emission during production and transport
 - Conversion efficiency
 - Type of fuel that is replaced.
- > Set max allowable GHG emission per MWh_e or GJ useful heat
- > Develop CEN standard to promote minimum criteria throughout the EU.



Possible way forward

Outline certification systems

- > Create conditions such that market will develop new certification systems for specific biomass types/classes that meet at least generic minimum requirements.
- > Possible certification system developers:
 - Biomass user organisations: need to comply
 - NGOs: introduction of 'plus' standard
 - Specialised certification companies: income
 - Groups of different actors



Outline certification systems

- > EU directive should set rules related to
 - Type of verification process (Independent third party certification vs internal reporting obligation)
 - Exclusion biomass types from certification that are sustainable anyway, taking into account competition with other biomass sources with similar function.
 - Possible special treatment of small biomass producers (e.g. group certification, simpler standards, less stringent verification requirements)

- > Accreditation of certification systems by EU
 - Accreditation process according to ISO standards or equivalent.

- > Accreditation certification bodies:
 - EU requirements
 - Requirements of the certification system
 - ISO standards to guarantee transparent procedure.



