

# Sourcing of sustainable forest biomass in Scandinavia

**Inge Stupak**

University of Copenhagen

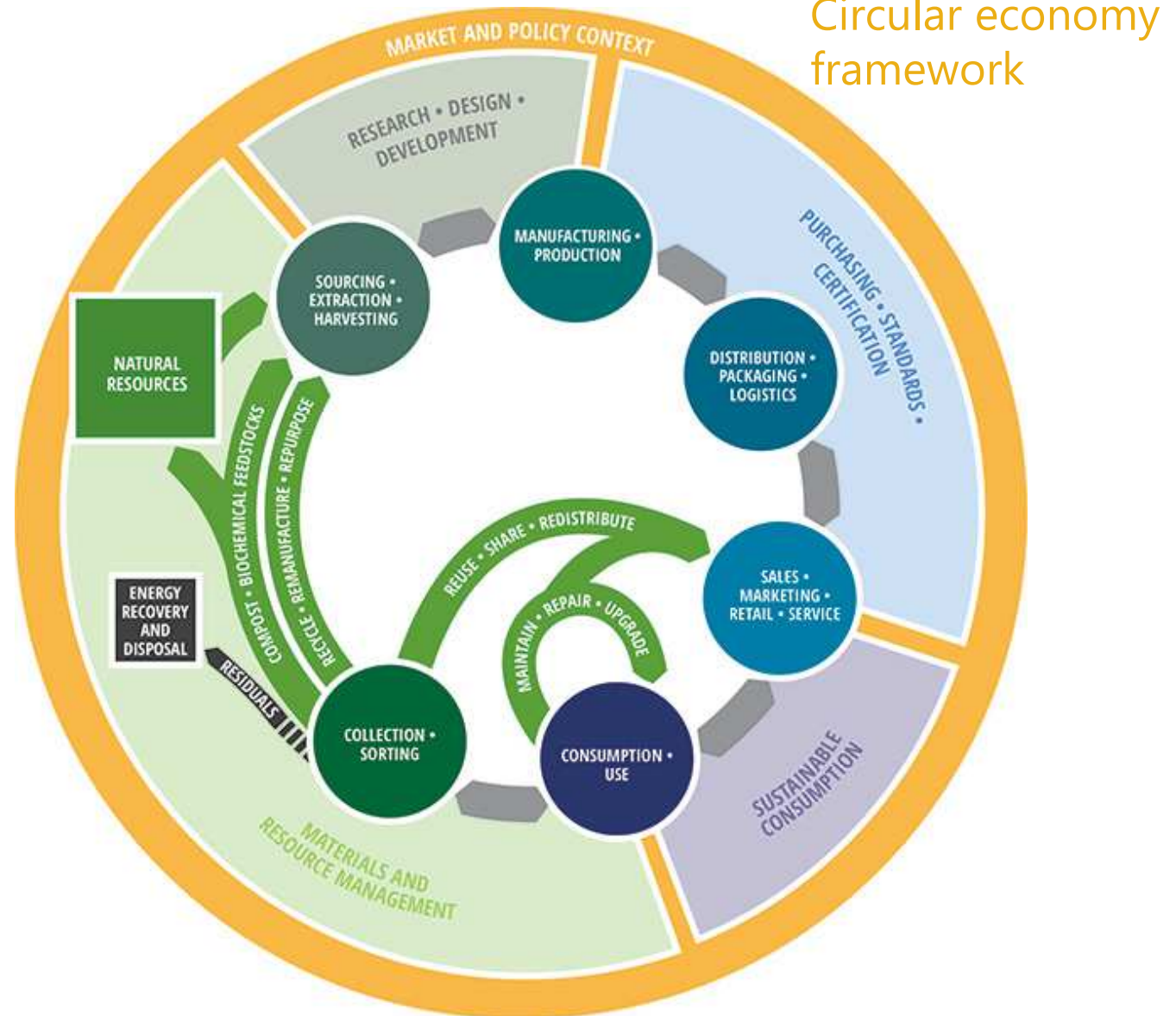
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Circular Convention, 'Agrifood, chemical and energy sectors all heading towards a circular economy', Amer Centrale, Geertruidenberg, Netherlands, 14-15 March 2018.

# How do we ensure the sustainability of supply chains and whole landscapes in a circular bioeconomy?

This presentation is about how we, in practice, can connect:

- natural resource management
- sourcing and harvesting
- standards and certification

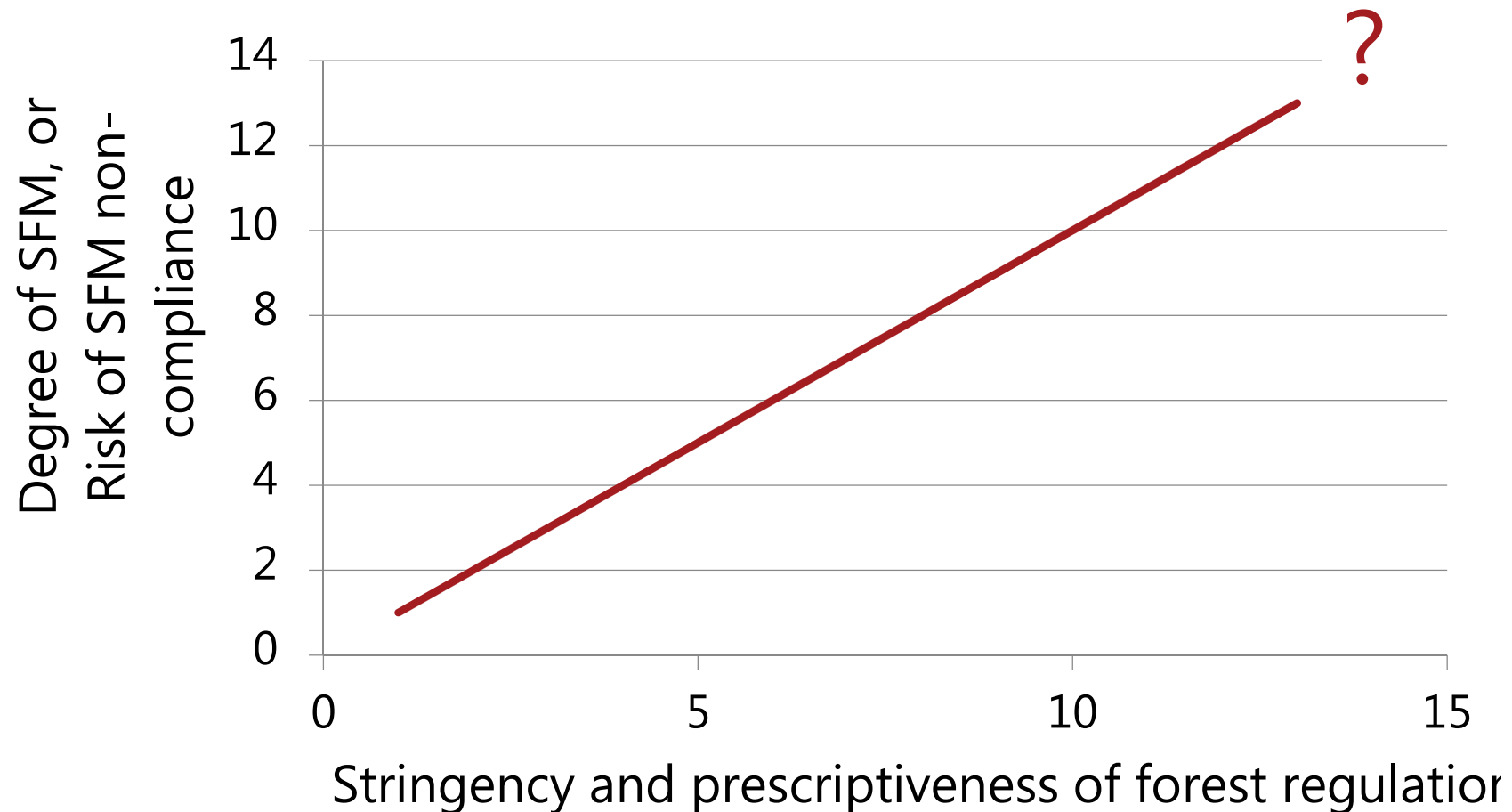


# Some key sustainability concerns

- Deforestation
- Forest degradation
- Soil fertility
- Hydrology and water quality
- Biodiversity
- Climate impacts

# Which types of regulation, standards and certification are critical to ensure sustainability?

– the Scandinavian case



Stringency: voluntary versus mandatory measures

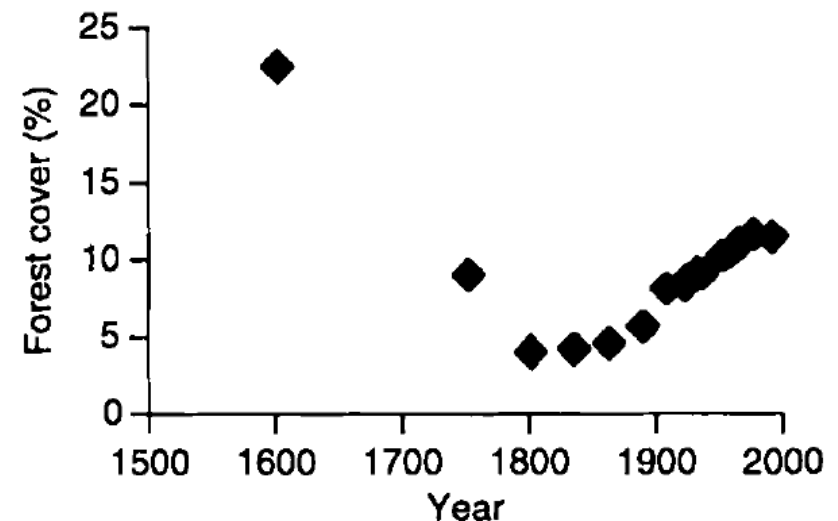
Prescriptiveness: performance-based or process-based

# Over-utilization and deforestation

## Firewood collection in Denmark - 1879



## Trends in forest cover in Denmark



**Figure 1** Trends in forest cover in Denmark. Source: compiled from data in FAO, 1993; Fritzboeger, 1992a; Fritzboeger and Søndergaard, 1995; Helms, 1919; Jakobsen, 1996; Jensen, 1993; Kiøboe, 1919; Kjærgaard, 1994; Sabroe, 1954; Streiffert *et al.*, 1956; Troup, 1938 and Zon and Sparhawk, 1923

It is expected that the negative after-effects of over-utilization on the soil can take several centuries years.

# Dealing with concerns - Forest Acts

- 1805: The Danish Forest Act – securing regeneration, regulating logging, forest property rights, prohibiting grazing.
- 1859: Establishment of a forest management authority to restore the state of the forests and to improve their management
- 1886: The Finnish Forest Act - prohibiting the destruction of forests and striving to safeguard the regeneration of forests after felling
- 1903: The Swedish Forest Act - regulating logging and forest property rights, maintenance of timber production.
- 1939-: Restrictions were introduced for forest management during the same period in Norway.



# Stringency and prescriptiveness of forest legislation changed over time – the case of Sweden

**Until mid 1983: Far-reaching regulation** to create a strong forest industry sector and ensure its supply of raw material

- 1800s: property rights and logging regulation, privatization, motivation of land owners to improve forest management
- 1903 Forestry Act: sustainable timber production, implementation via County Forestry Boards.
- 1923: Forestry Act: A more rational and sustainable silviculture, including regeneration.
- 1948: Forestry Act: Sustainability in economy and timber production, principle of even yield to ensure even supplies for the industry.
- 1979 Forestry Act: A satisfactory economic gain and an even yield.
- 1983: Forestry Act: Compulsory felling of mature stands, **compulsory management plan**.

1900: Environmentalism ensuring nature preservation through national parks, reservations etc. - small set aside areas.

**After 1993: Deregulation**, focus on biodiversity and multiple-use, even if not abolishing obligations to regeneration and protection of forest growth.

1990: New environmental policy, biodiversity and multiple-use forestry

- 1993 Forestry Act: Deregulation, but not abolishing fundamental obligations to ensure regeneration and protecting forest growth.
- 1993: Emergence of forest certification.
- 1998: Every forest owner must have **a formal description of forestry and environmental goals** - a simple substitute for the previous mandatory management plans.

# Classic conflict

Private forest  
owners

NGOs,  
environmentalists



Less regulation,  
voluntary, process-  
based preferred

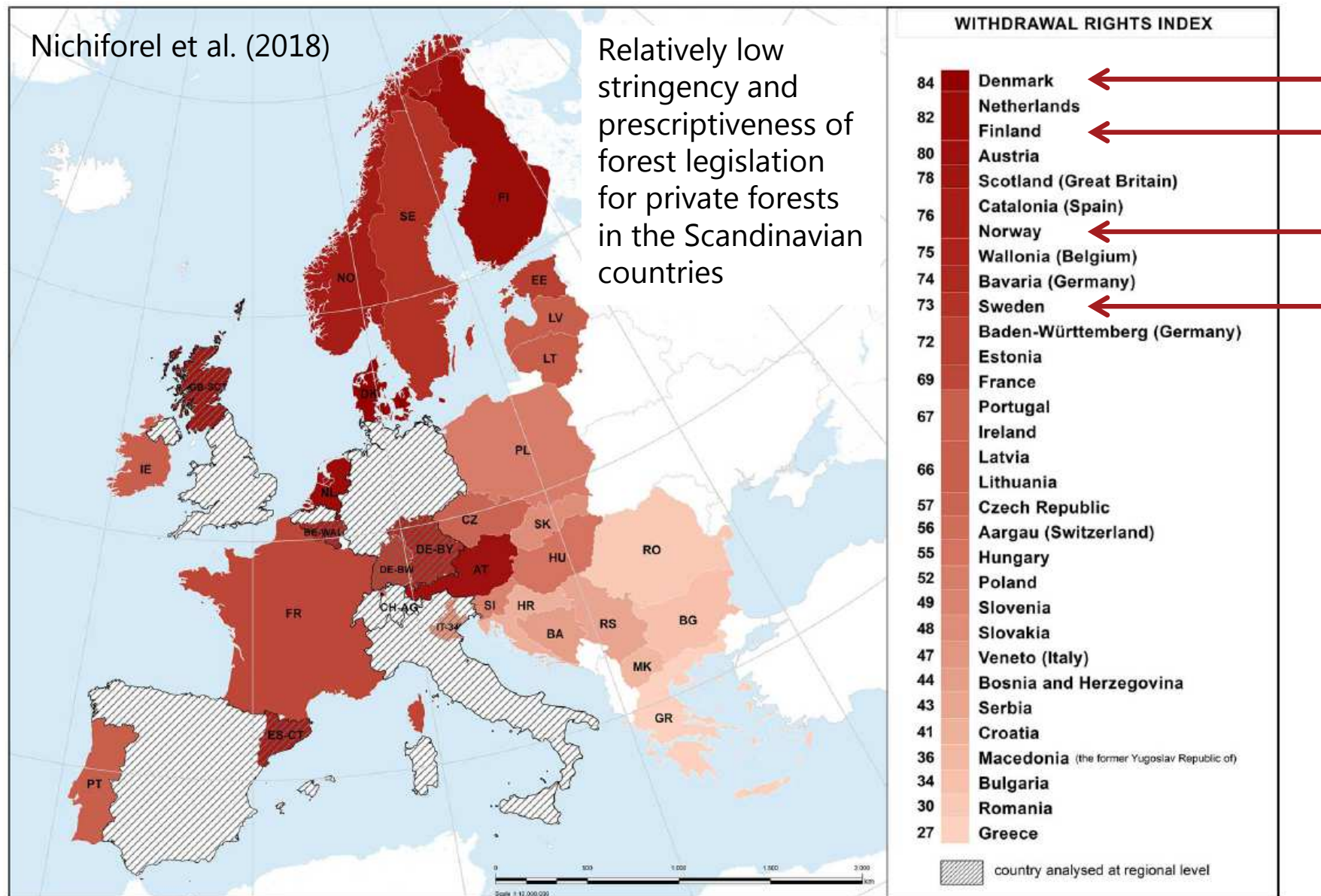
More regulation,  
mandatory,  
performance-  
based preferred



# Stringency and prescriptiveness of forest withdrawal rights in private forests in Europe: approval to harvest, amounts to harvest, and harvest trees yourself, mushrooms, game grazing

Less requirements, less strict

Many, strict requirements

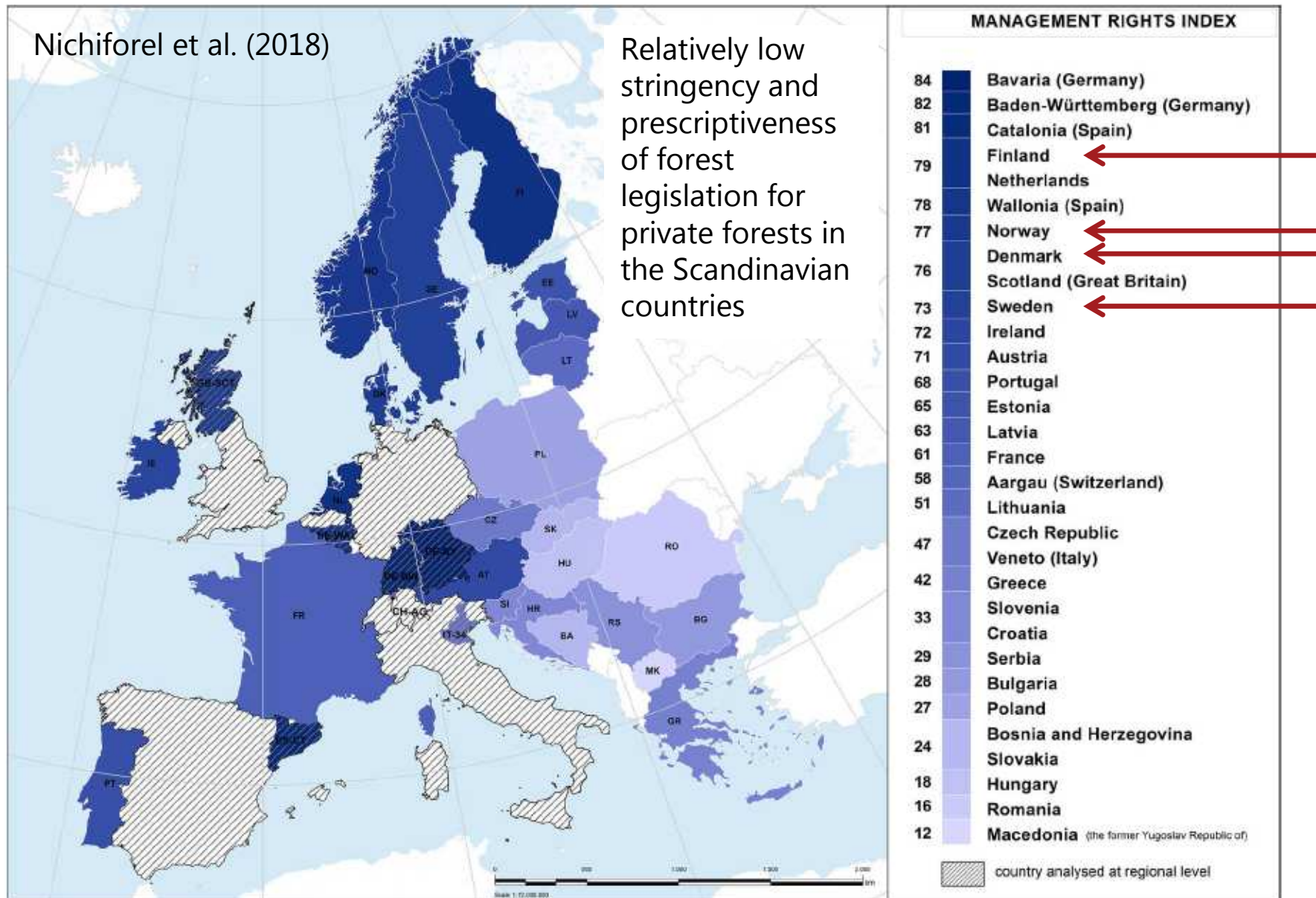


# Stringency and prescriptiveness of private forest management rights: Land use change, Forest Management Plans, management goals, select trees to be harvested, species choice

Less requirements,  
less strict



Many, strict requirements

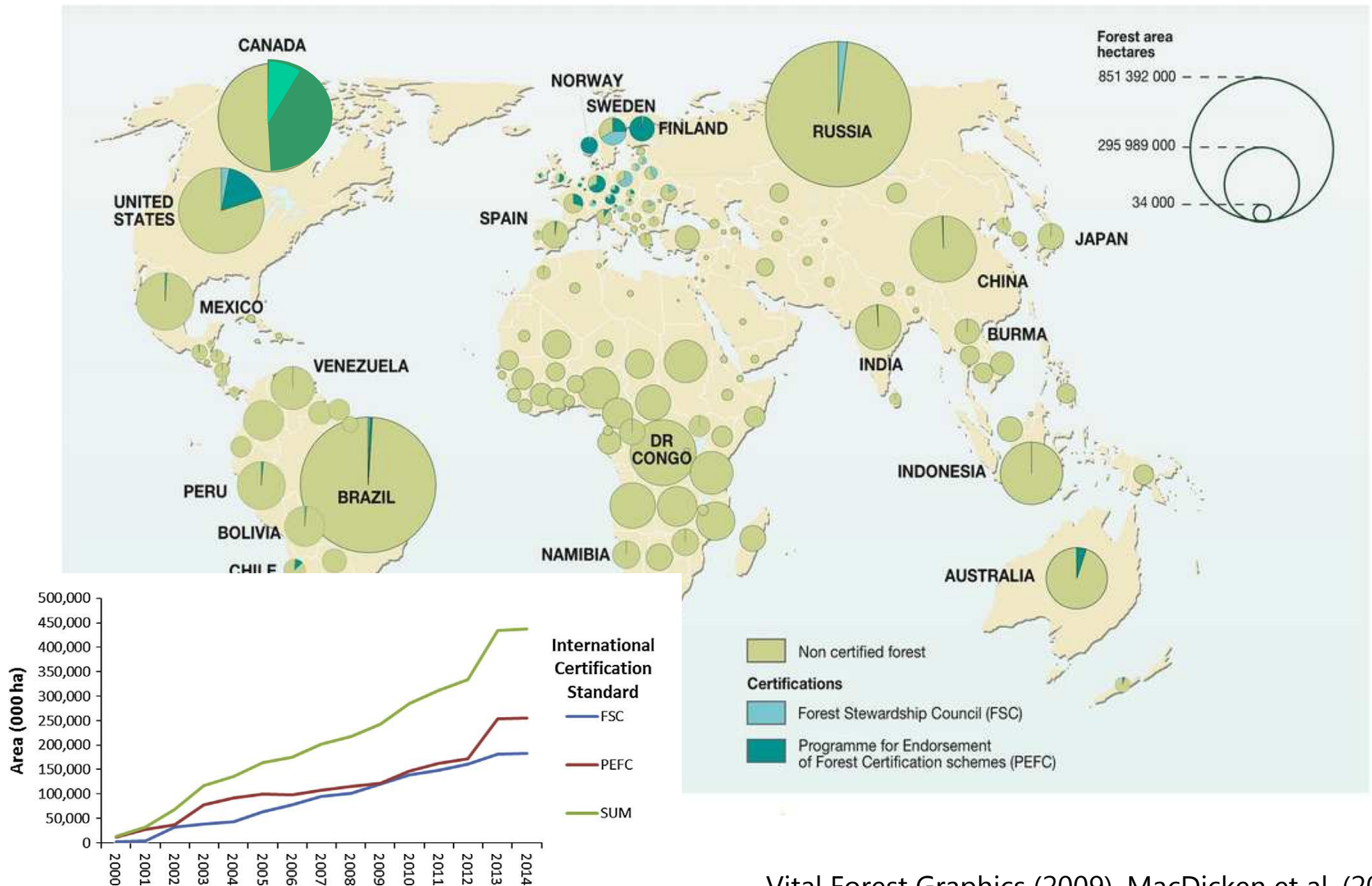


## Driver of voluntary forest certification: traditional wood export (but not everywhere)





# Certified forest area (11% globally, increasing at a slow rate)

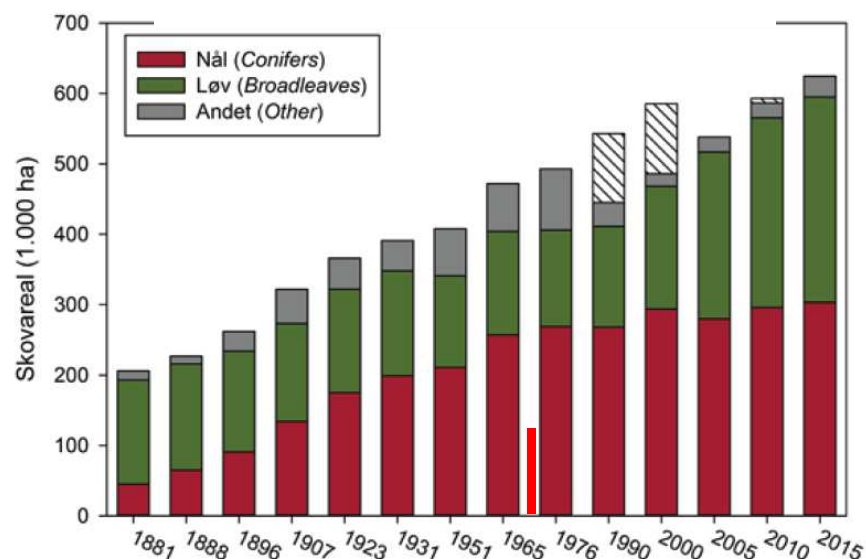


# New 'old' issue: wood fuel use - Denmark

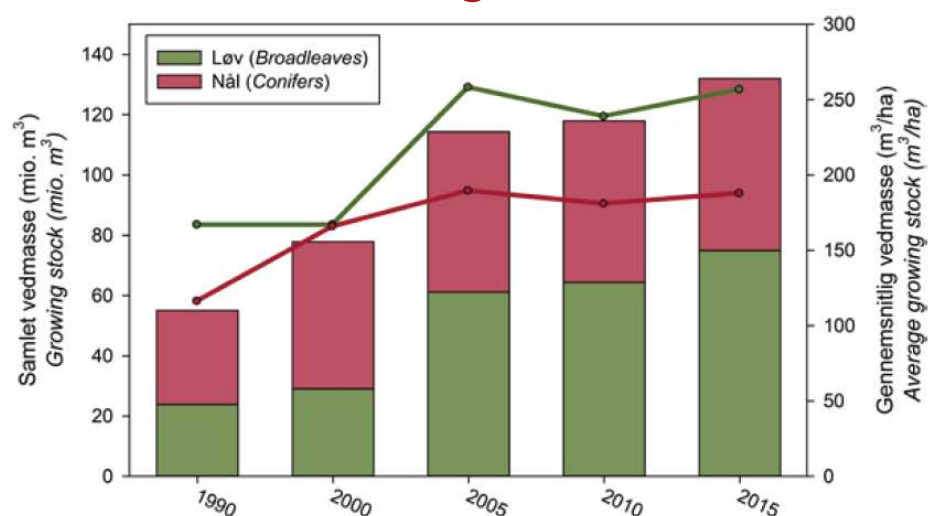
No deforestation and forest degradation

Concerns over soil fertility, water, biodiversity etc.

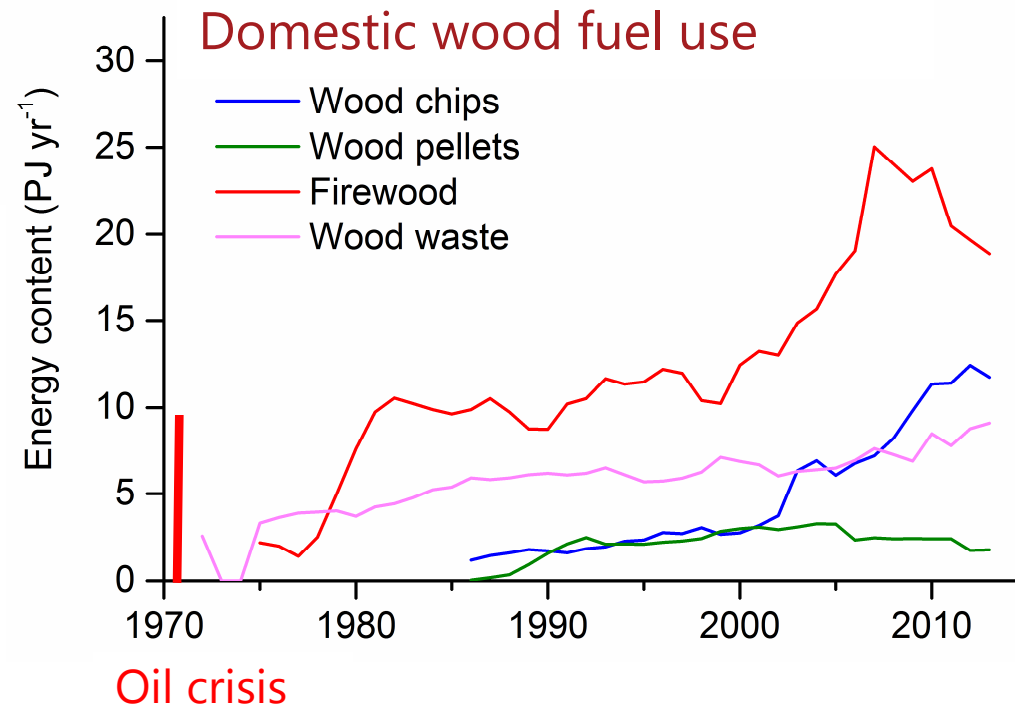
## Forest area



## Standing volume

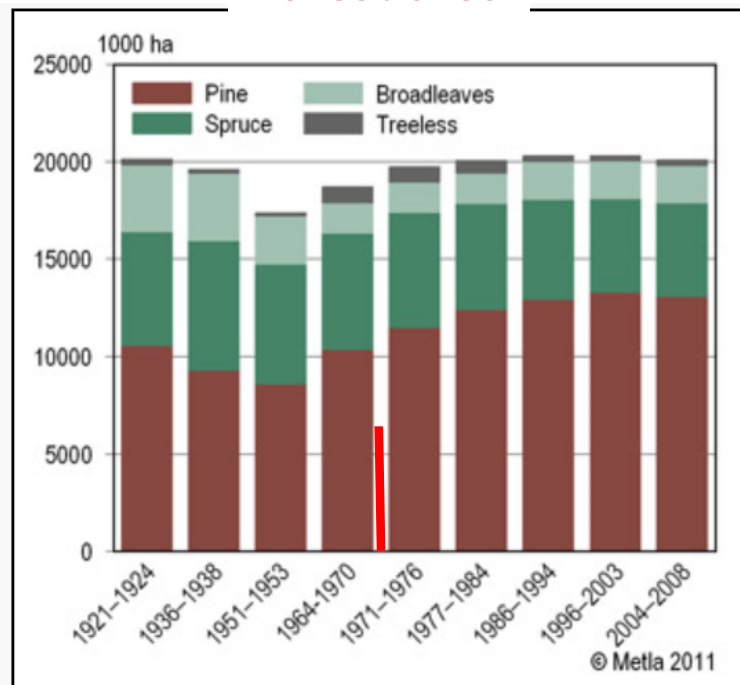


## Domestic wood fuel use

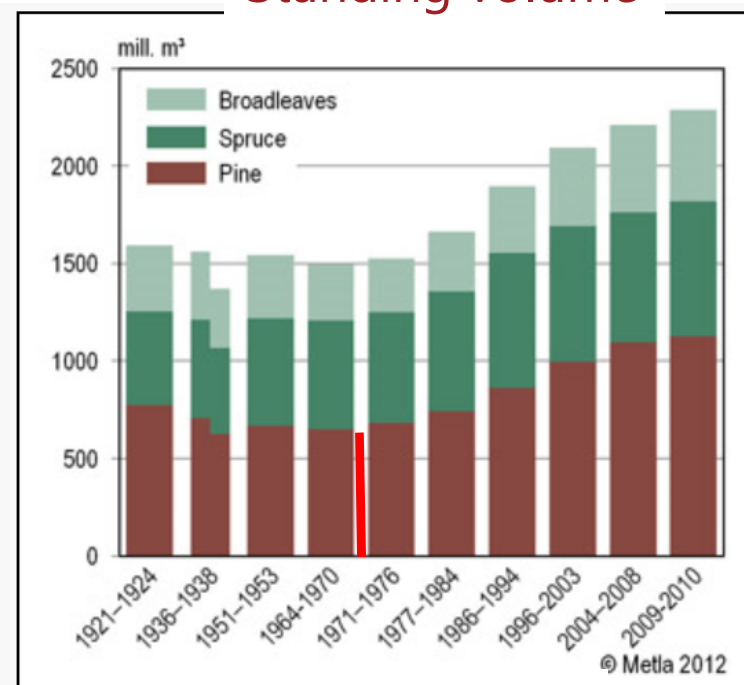


# New 'old' issue - wood fuel use in Finland

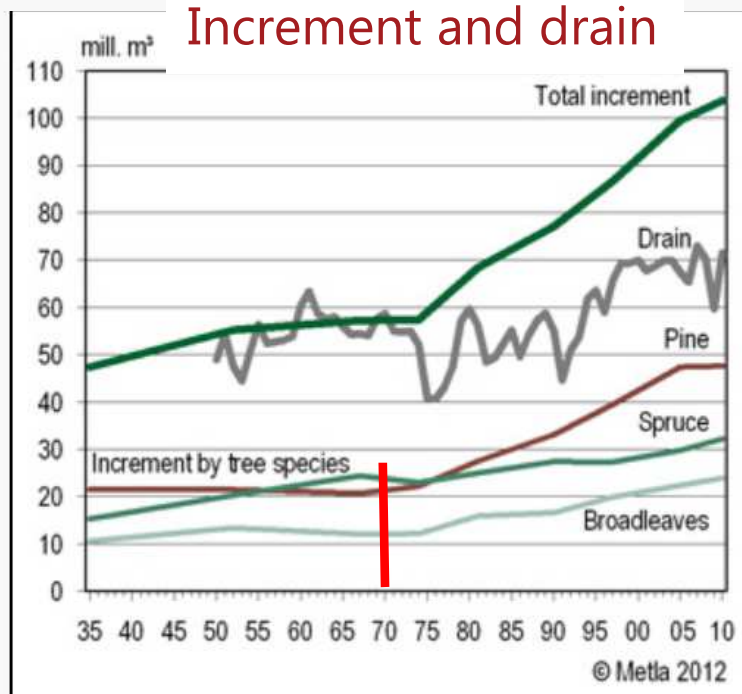
## Forest area



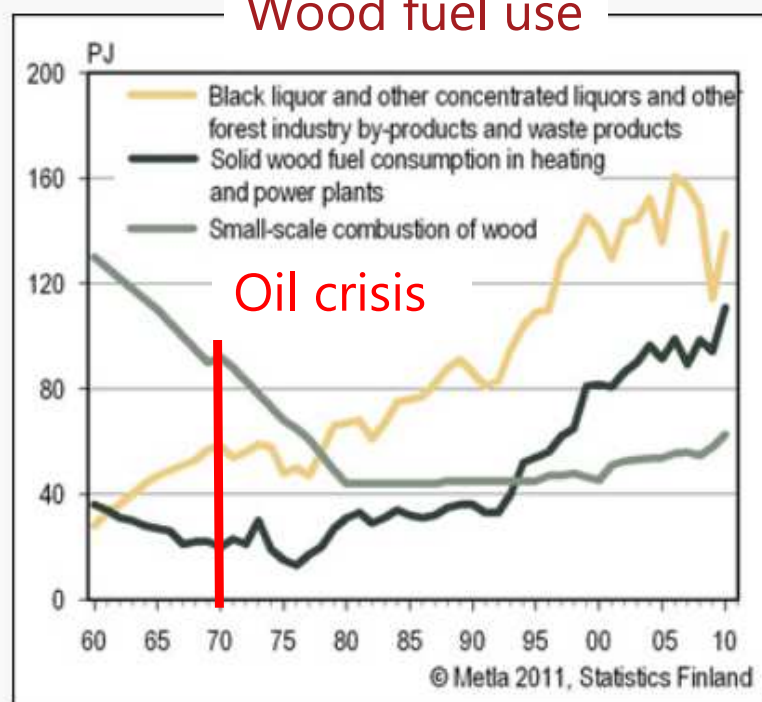
## Standing volume



## Increment and drain



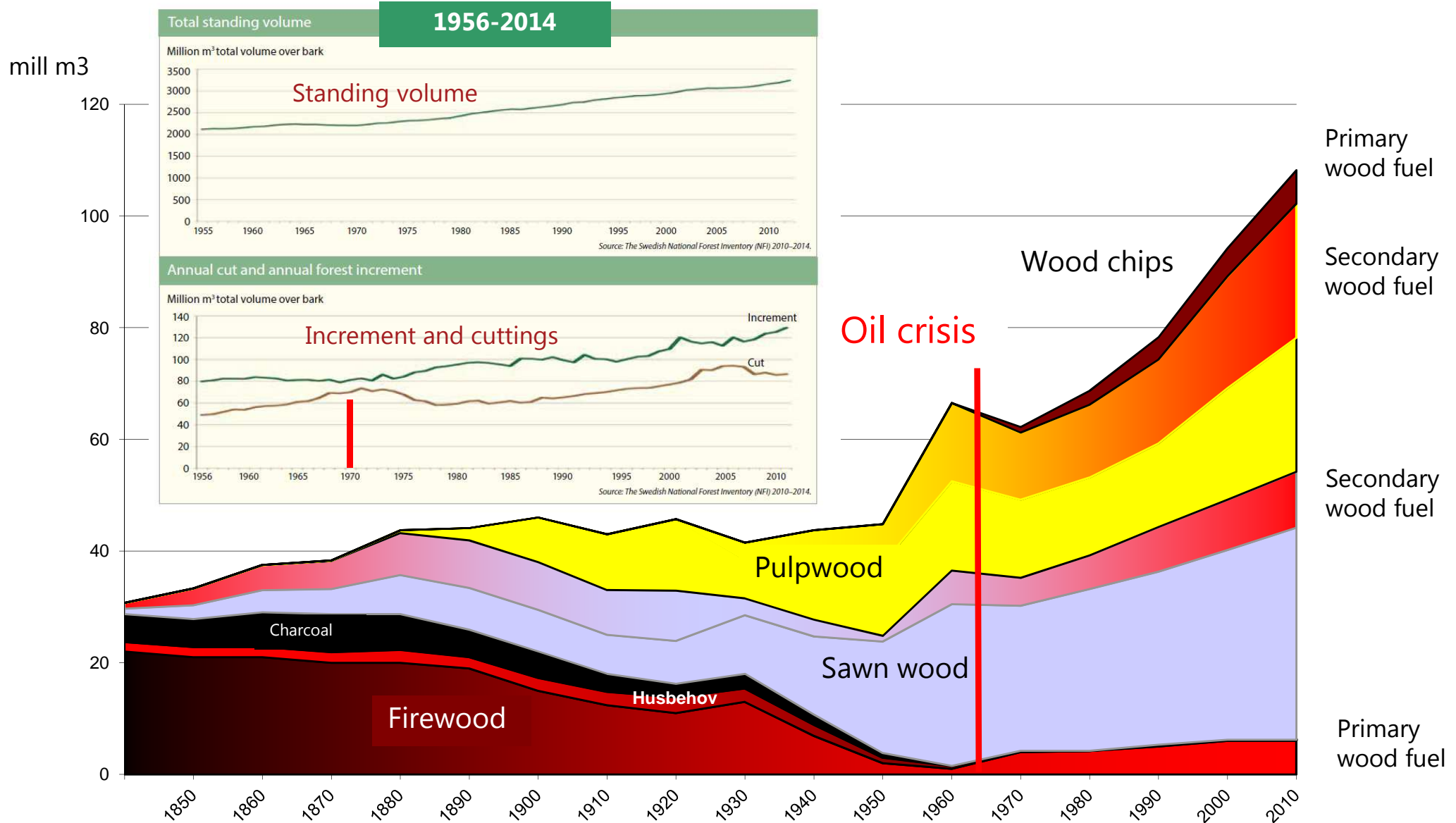
## Wood fuel use





# New 'old' issue: wood use in Sweden

Volumes in **red** and **black** colours are used for energy, about 45%



## Dealing with concerns – Recommendations, best management practice guidelines (BMPs)

- Sweden
  - 1970s: Recommendations for sustainable forest biomass harvesting. Revisions and additions:
  - 2001: including best practice for compensatory fertilisation
  - 2008: including best practice for wood ash recycling
  - 2009: recommendations for sustainable stump harvesting
- Denmark
  - 1985: Guidelines for wood chip harvesting in Denmark, mandatory in state forests
- Finland:
  - 2005: Recommendations for sustainable forest biomass. Revisions:
  - 2008, 2016: (in Finnish)

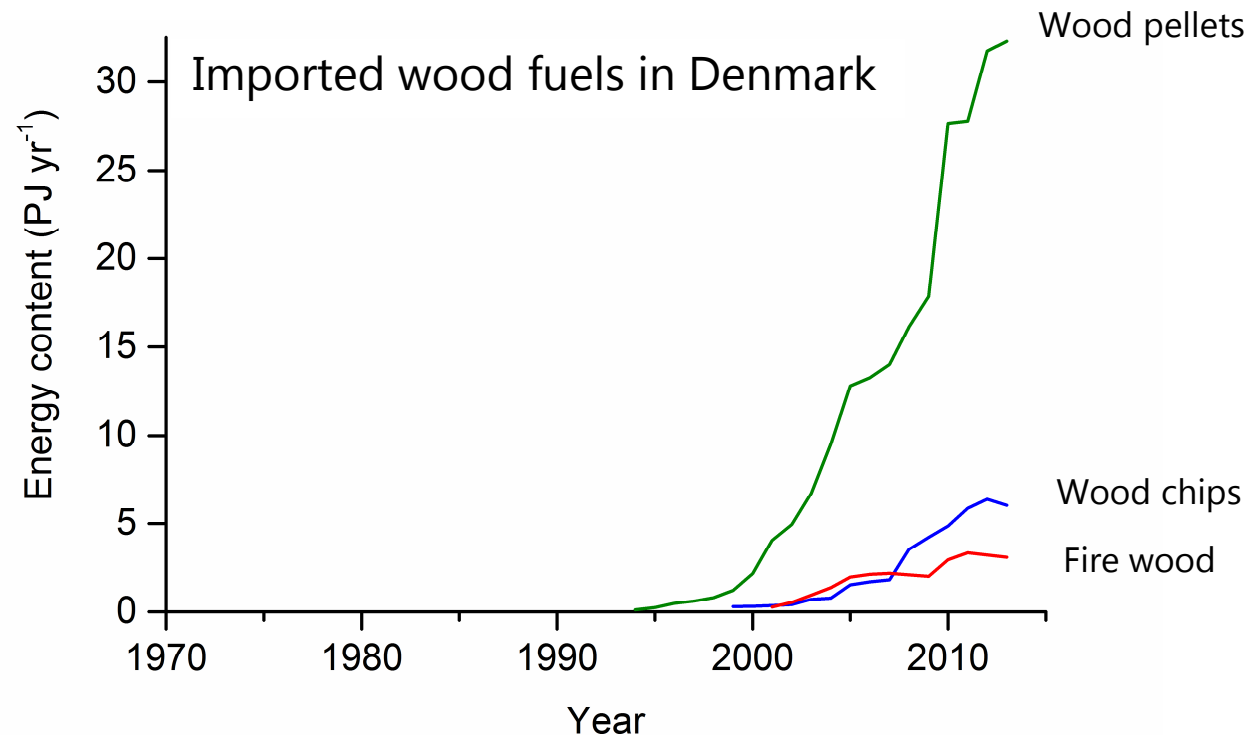
(Voluntary measures)

# Dealing with concerns - Forest biomass harvesting BMPs in Europe and North America



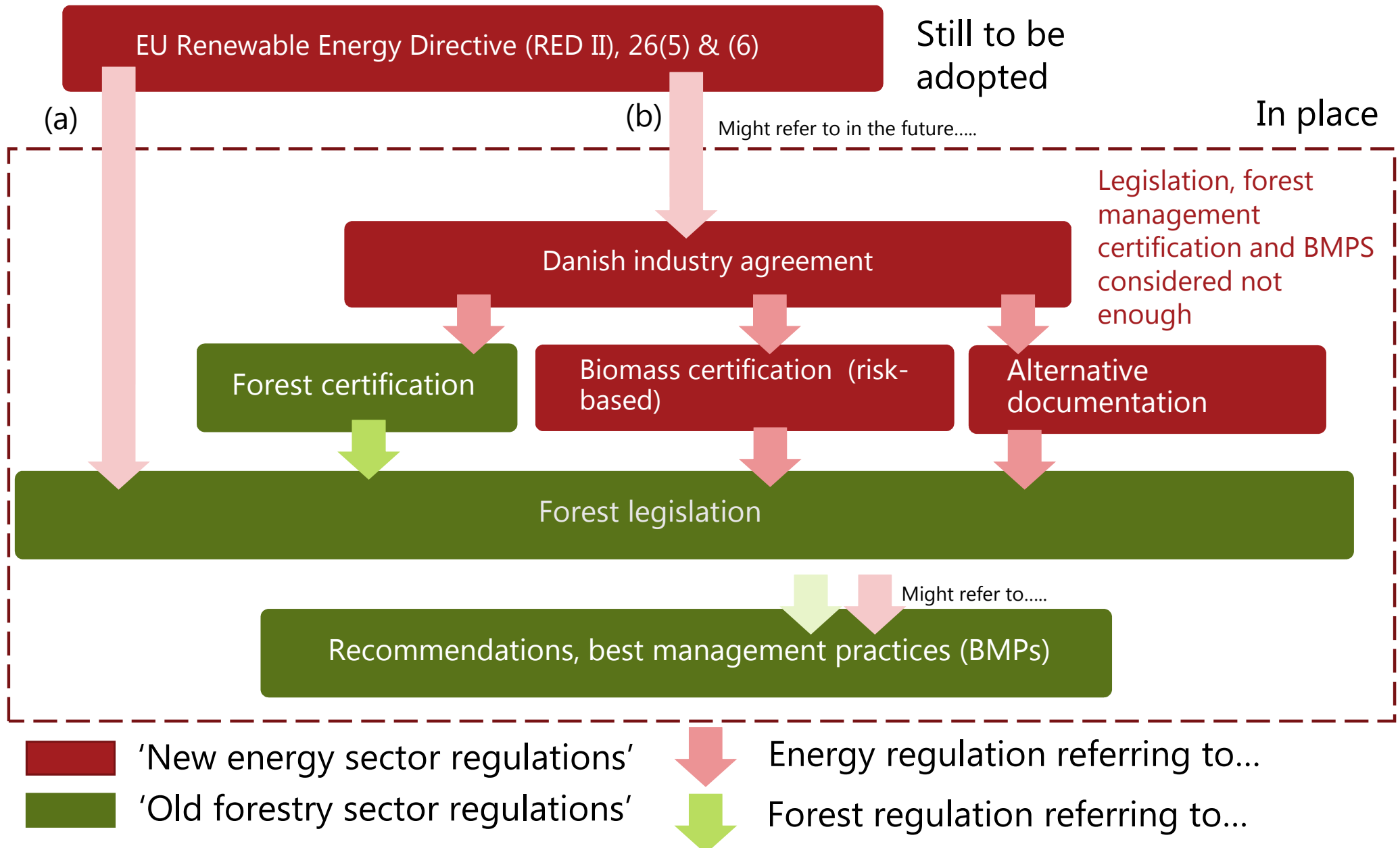
(Mandatory or voluntary BMPs, depending jurisdiction)

## New issue: increasing imports of wood fuels (in Denmark and other European countries)

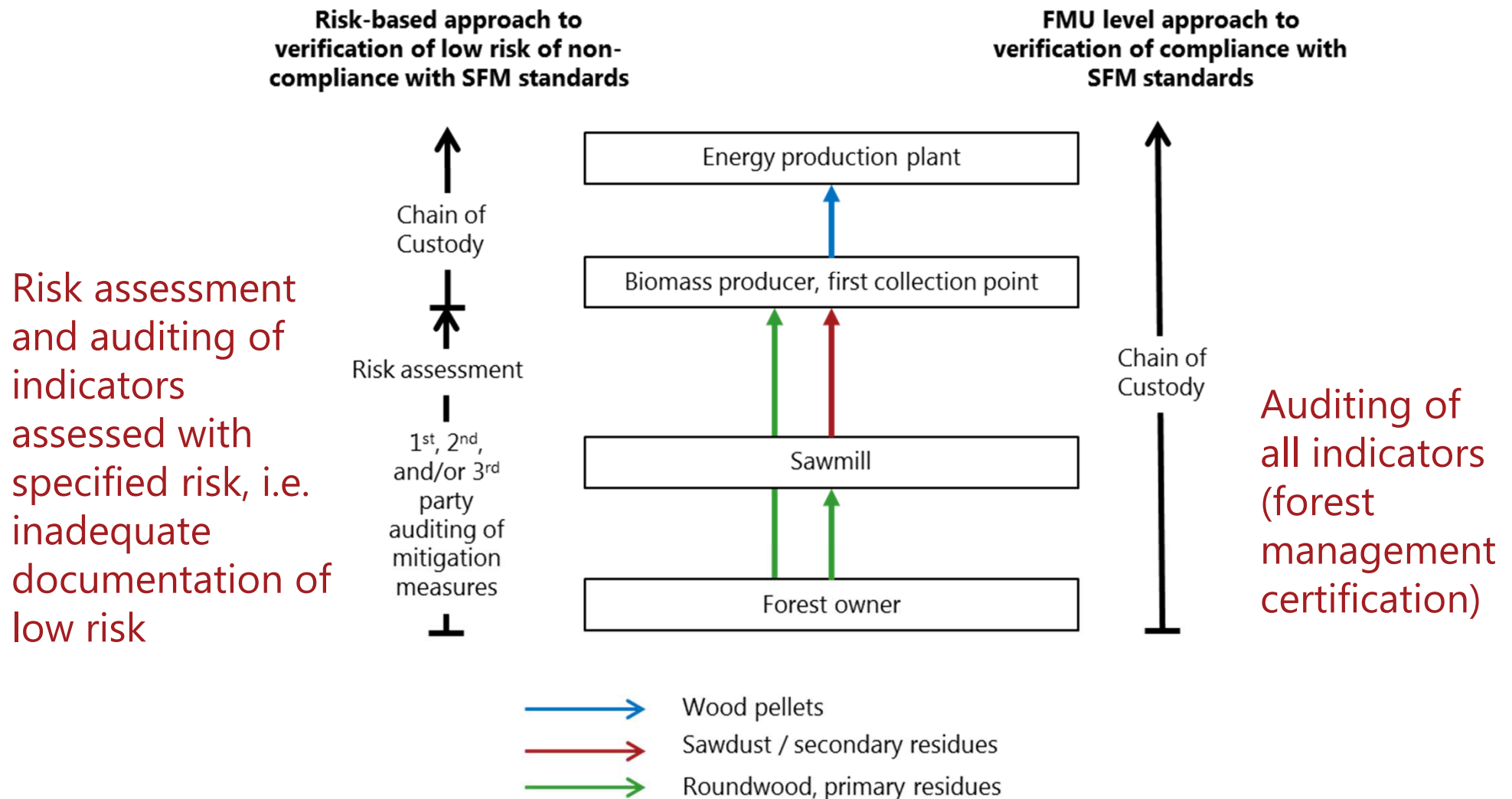


- Concerns over the deforestation, forest degradation, climate benefits, biodiversity, soil and water in new energy biomass sourcing areas
- Call for regulation of high stringency and prescriptiveness by NGOs and environmentalists in exporting and importing countries

# Dealing with concerns: 'new energy sector' forest regulation linking to 'old forestry sector' regulation



# Risk-based approaches to verify sustainability as current legislation and certification is not enough – *differences in stringency and prescriptiveness?*





# Conclusions

- Scandinavian countries started to use wood fuels again in connection with the oil crisis in the 1970s - Sustainability concerns have to a large extent been dealt with, through 'old forest sector regulation': legislation and BMPs
- Certification is relatively popular in Scandinavia, presumably with timber exports as the main driver - In regions where forest certification is less popular, concerns may have been addressed in other ways, e.g. via logger training and BMPs.
- Scandinavia is an example that concerns may have been addressed, even if this 'old forest sector' regulation is of relatively low stringency and prescriptiveness.
- Scandinavia is an example that new regulatory goals can be achieved with a high degree of freedom and voluntary means; building of trust and good working relationships is crucial, including motivating and educating relevant actors, and offering resources and support for capacity building.
- There are several examples in the world showing that legislative goals cannot always be achieved through stringent and prescriptive designs.
- Risk-based approaches to verification of sustainability is a way to try to capture those cases where concerns have been or can be dealt with in 'other ways' than stringent and prescriptive legislation or certification.
- Consider sustainable biomass sourcing at an early stage; history shows that introducing new regulation and documentation requirements may take time, sometimes many decades.

# Thank you!





# References

- Björheden R (2013). Biobränslets möjligheter i framtidens skogsbruk. Presentation, Energidalen, Sollefteå 30-31 October 2013. SkogForsk, Uppsala, Sweden.
- MacDicken KG, Sola P, Hall JE, Sabogal C, Tadoum M, Wasseige C de (2018). Global progress toward sustainable forest management. *Forest Ecology and Management* 352: 47–56.
- Mansoor M, Stupak I, Smith CT (2017). Trust and Legitimacy in Sustainability Governance of Bioenergy Supply Chains. Presentation at the workshop 'Sustainability of Bioenergy Supply Chains', arranged by IEA Bioenergy and Chalmers University of Technology, 18-19 May 2017. <http://itp-sustainable.ieabioenergy.com/iea-publications/> (3. Presentations on Objective 2 and 3: Bioenergy Governance & Stakeholders' Perception: – part 1, Thursday 18 May)
- Mather AS, Needle CL, Coull JR (1998). From resource crisis to sustainability: the forest transition in Denmark. *International Journal of Sustainable Development & World Ecology*, 1998, 5:182–193.
- Nichiforel L, Keary K, Deuffic P, Weiss G, Thorsen BJ, Winkel G, Avdibegović M, Dobšinská Z, Feliciano D, Gattok P, Mifsud EG, Hoogstra-Klein M, Hrib M, Hujala T, Jager L, Jarskyn V, Jodłowski K, Lawrence A, Lukmine D, Malovrh SP, Nedeljković J, Nonić D, Ostoić SK, Pukall K, Rondeux J, Samaraz T, Sarvašová Z, Scriban RE, Šilingienė R, Sinkou M, Stojanovska M, Stojanovski V, Stoyanov N, Teder M, Vennesland B, Vilkriste L, Wilhelmsson E, Wilkes-Allemand J, Bouriaud L (2018). How private are Europe's private forests? A comparative property rights analysis. *Land Use Policy* (in press).
- Nord-Larsen T, Johannsen VK, Arndal MF, Riis-Nielsen T, Thomsen IM, Suadcani K, Jørgensen BB (2017). Skove og plantager 2016. Institut for Geovidenskab og Naturforvaltning, Københavns Universitet, Frederiksberg, 104 pp.
- Nylund J-E (2009). Forestry legislation in Sweden. The Swedish University of Agricultural Sciences. Department of Forest Products Uppsala. Institutionen för skogens produkter, Report No 14, 43 pp.
- Royal Swedish Academy of Agriculture and Forestry (2015). Forests and Forestry in Sweden. Royal Swedish Academy of Agriculture and Forestry, 24 pp.
- State of Finland's Forests (2011). <http://www.metla.fi/metinfo/sustainability/index.htm>
- Statistics Denmark (2016). <https://www.statistikbanken.dk/>
- Stupak I, Raulund-Rasmussen K (2016). Historical, ecological, and governance aspects of intensive forest biomass harvesting in Denmark. *WIREs Energy & Environment*. doi: 10.1002/wene.206
- Stupak I, Smith CT (2018). Feasibility of verifying sustainable forest management principles of secondary feedstock to produce wood pellets for co-generation of electricity in the Netherlands. IEA Bioenergy Task 43 report (in review).
- Titus B, Stupak I, Helmisaari H-S, Vanguelova E, Bruckman V, Clarke N, Guidi C, Varnagiryte-Kabasinskiene I, Armolaitis K (2014). Survey of guidelines for intensive forest biomass removals from around the world: lessons and recommendations. Presentation at the IUFRO World Congress, Salt Lake City, Utah, 5-11 October 2014.