Sustainable forest management and certification

Objectives

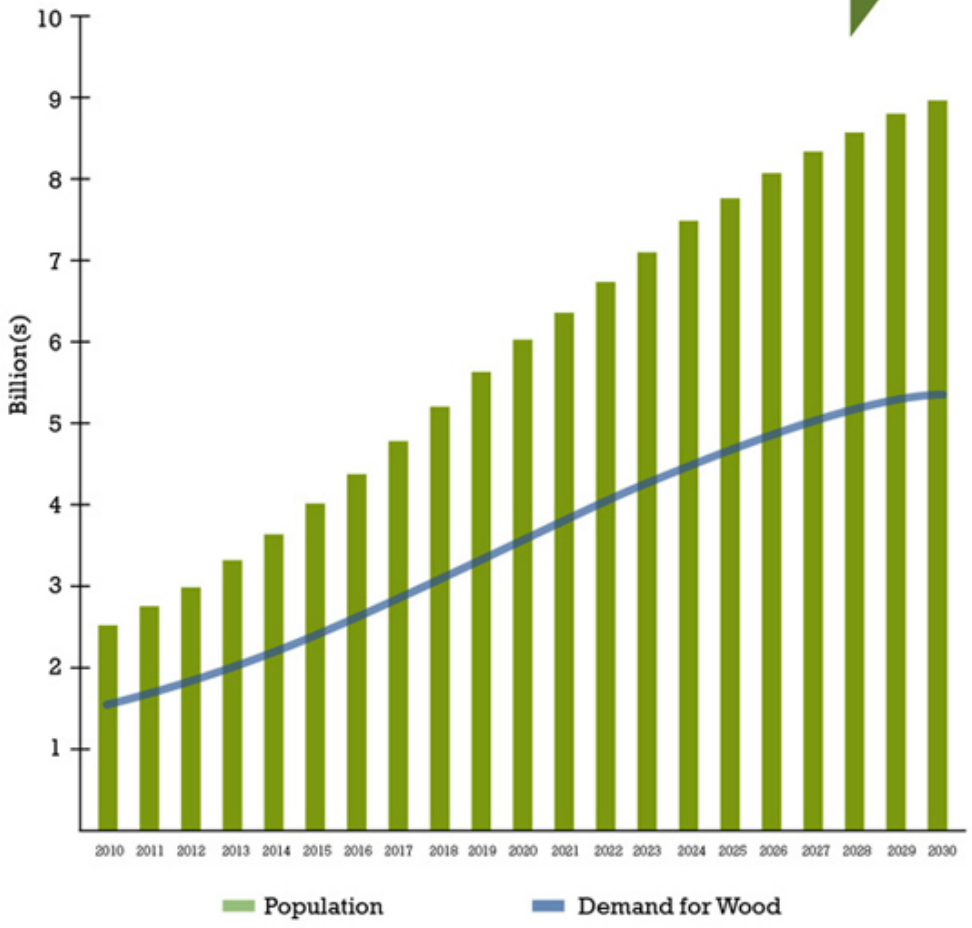
By the end of this presentation, you should be able to:

- Define sustainable forest management (SFM)
- Point out some of the recent changes that have occurred in forest management practices
- List the criteria that are used to assess SFM
- Describe what the certification of forest management involves

Context: Population growth

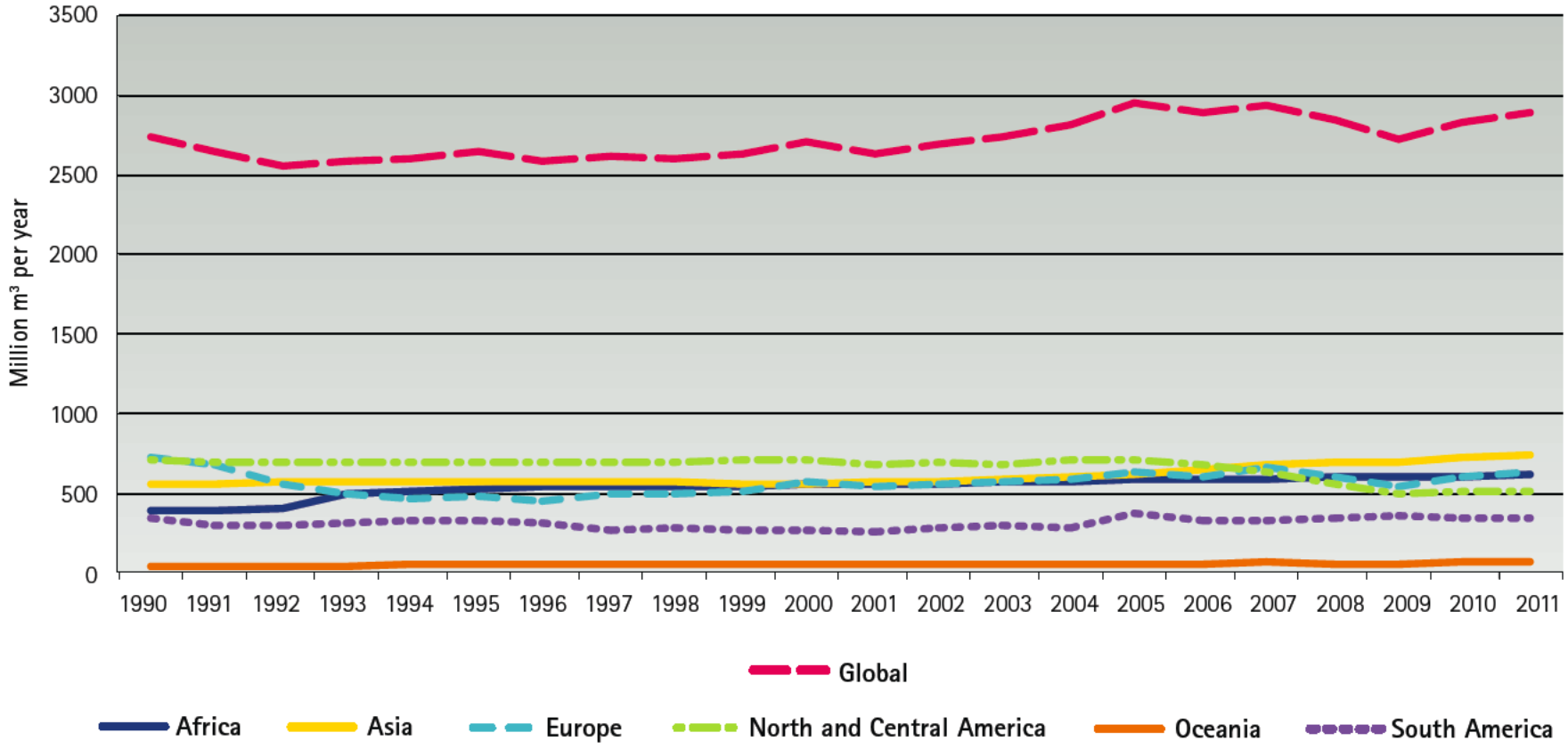
- Between 1950 and 1990, the world population nearly doubled. It reached ca. 7 billion in November 2011 and may reach >10 billion by 2050.
- Demand for wood has progressively increased, and the demand for biomass may accelerate this.
- The increasing population also needs to eat, so forest land is being converted to agriculture at the same time as wood requirements rise, creating huge pressures on the land.

FUTURE DEMAND FOR WOOD 2010-2030



- Global population expansion
- Increase in life expectancy
- Change in consumer behaviour
- Economic growth
- Restrictions on native (non-plantation) wood harvesting
- Wood as energy source

FIGURE 26 **Annual wood removals 1990–2011**



Source: *Global Forest Resources Assessment 2015*

Strategies to meet future demand for timber

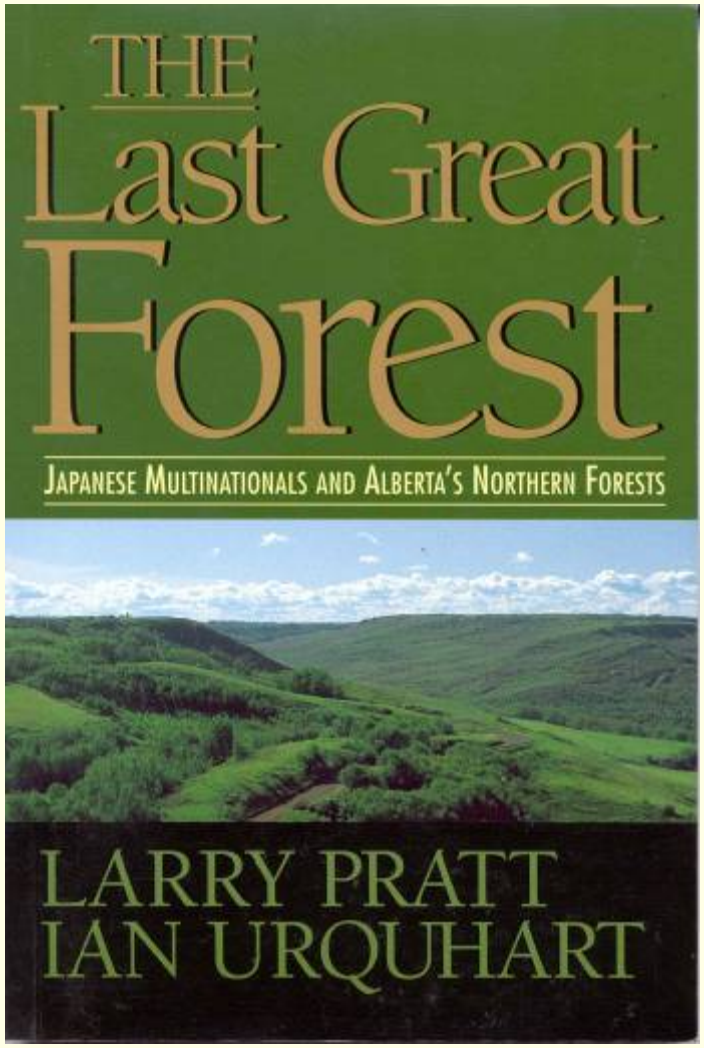
- Reduce the demand for wood
- Cut existing forests more rapidly
- Manage existing forests more intensively
- Revitalize degraded forests
- Plant new forests

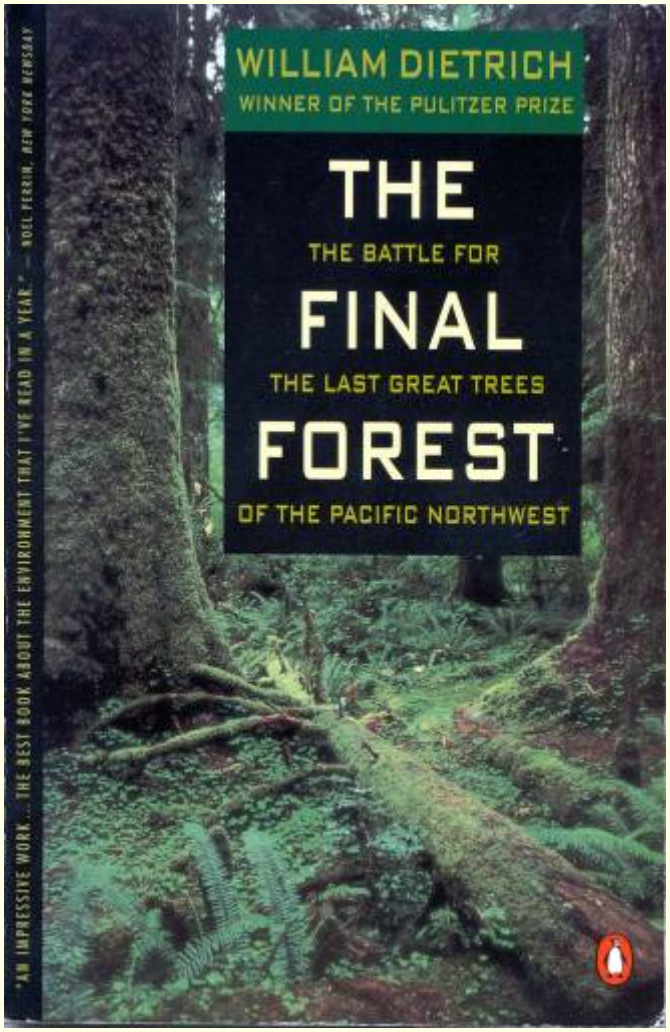
Natural Forests

Concerns cover:

- Loss of forest area
- Fragmentation of remaining forests
- Loss of quality of forest fragments
- In northern countries, environmental organizations are particularly concerned about logging of natural forests

Strong lobby against logging of remaining forests



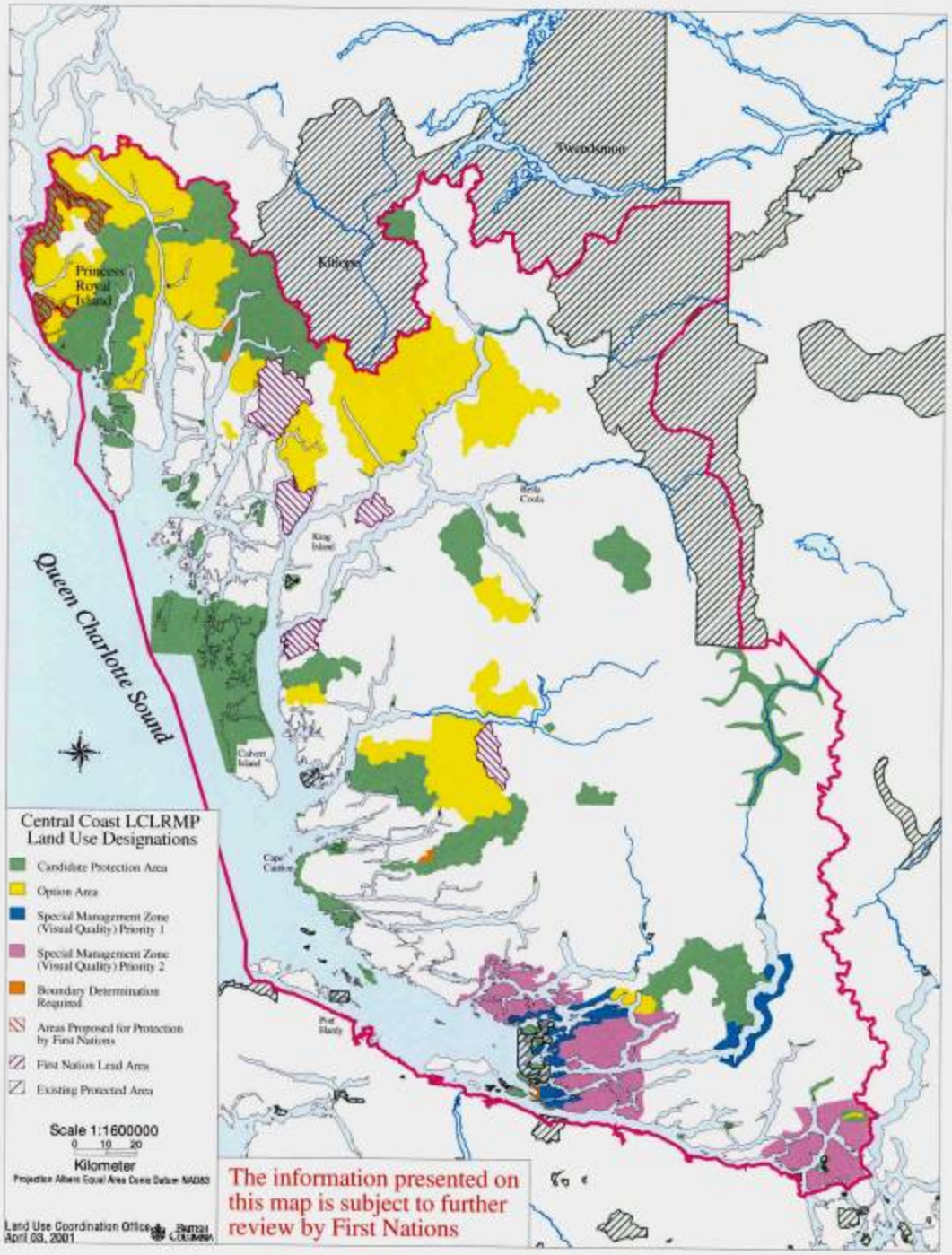


Changing ideas

- Better planning
- Introduction of variable retention
- Better emulation of natural disturbance
- Greater concern for environmental values
- Greater concern for visual values
- Amelioration and rehabilitation

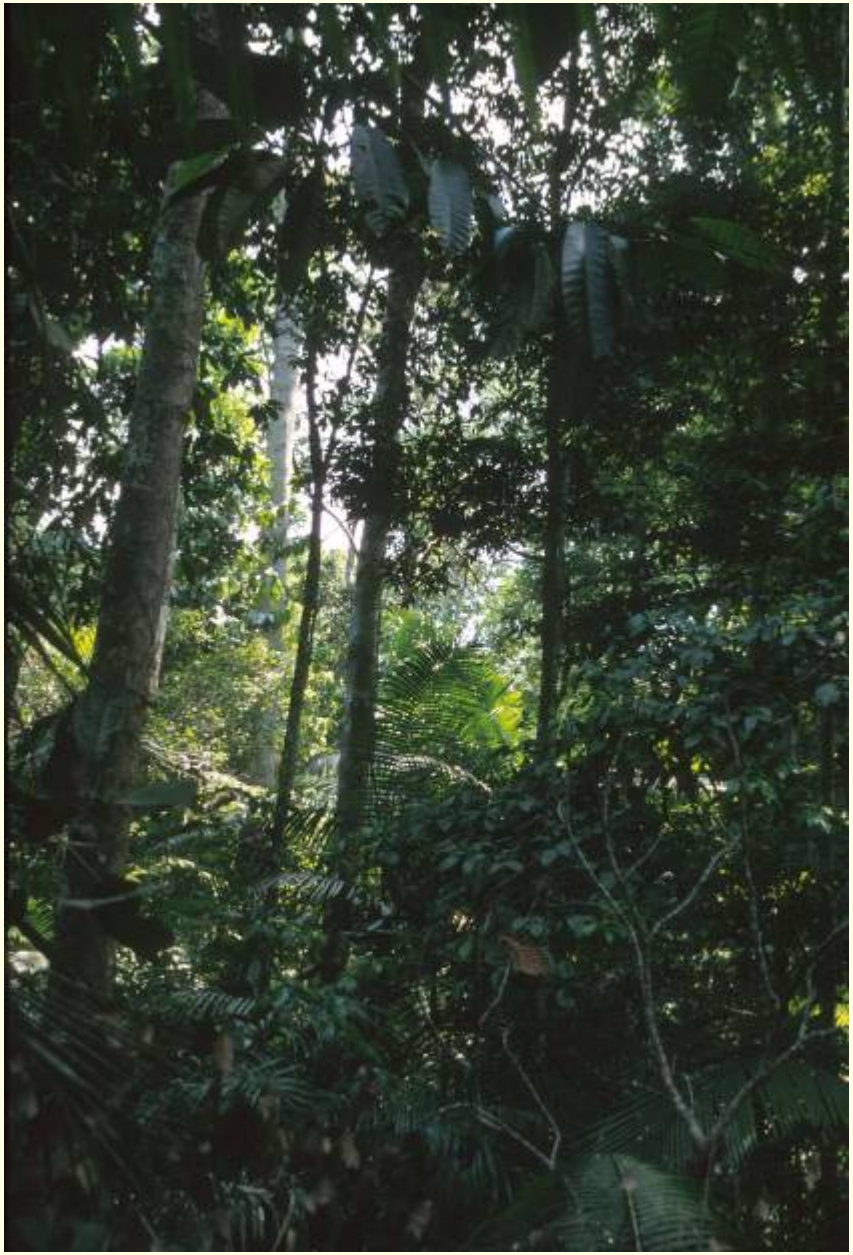
More concern about long-term planning and agreements over forestry developments

Example: The Central Coast Conservation Initiative



Different silvicultural approaches

- Single tree selection
- Small patch cuts
- “Worm” cuts
- Helicopter ‘forwarding’
- Helicopter extraction without falling



Before logging

After logging

Bans on logging

- Philippines – ban on all logging in “old growth and virgin forests” since 1992
- China – ban on all logging in natural forests in some catchments since July 1998. Extended to northeast China in 2015.
- Different from log export ban - Myanmar introduced one in 2014 (but hasn’t enforced it)

Montane rainforest converted to pastures, Costa Rica

Poor regulation of logging

- Favourable deals and policies
- Ambiguous laws
- Bribes, enforcement and loopholes
- Tax evasion
- Illegal logging

Legal and illegal logs, Bintulu, Sarawak, Malaysia

Legal

Illegal

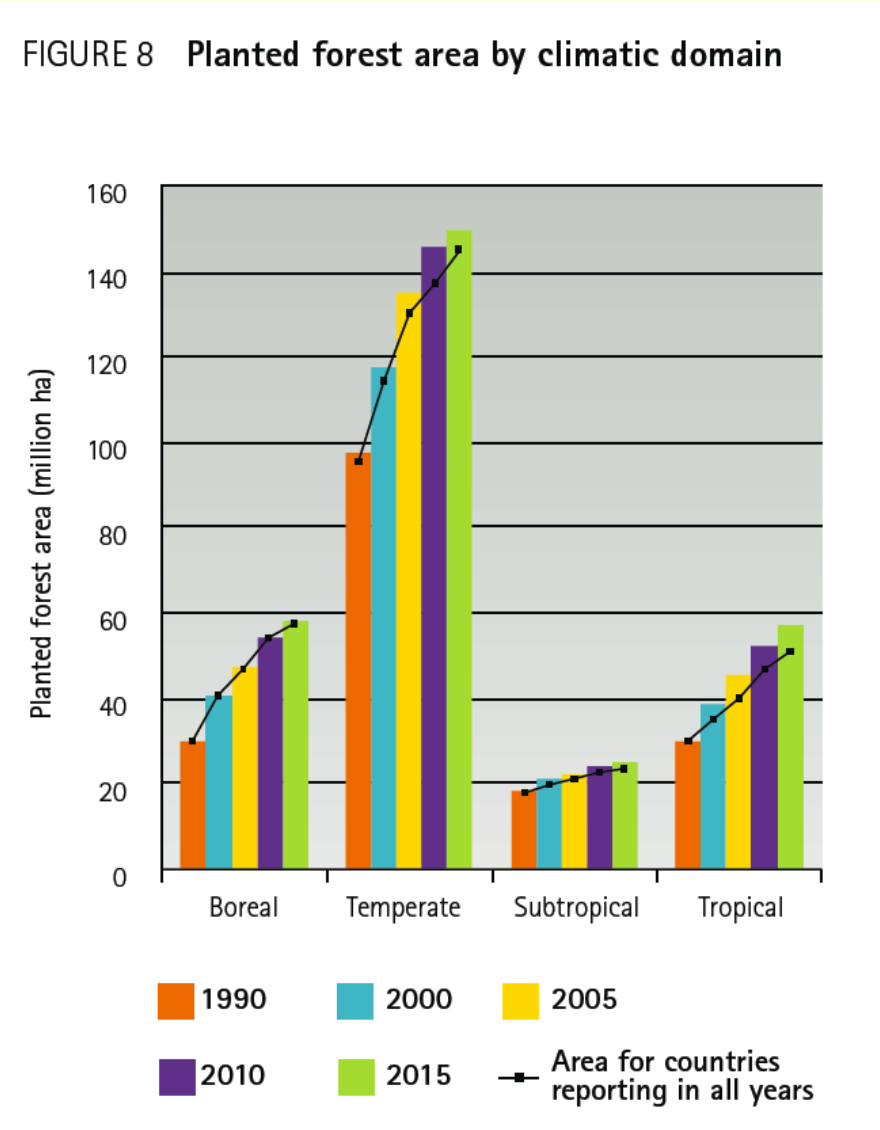
Log tracking
Chain of custody

Precious Woods, Brazil

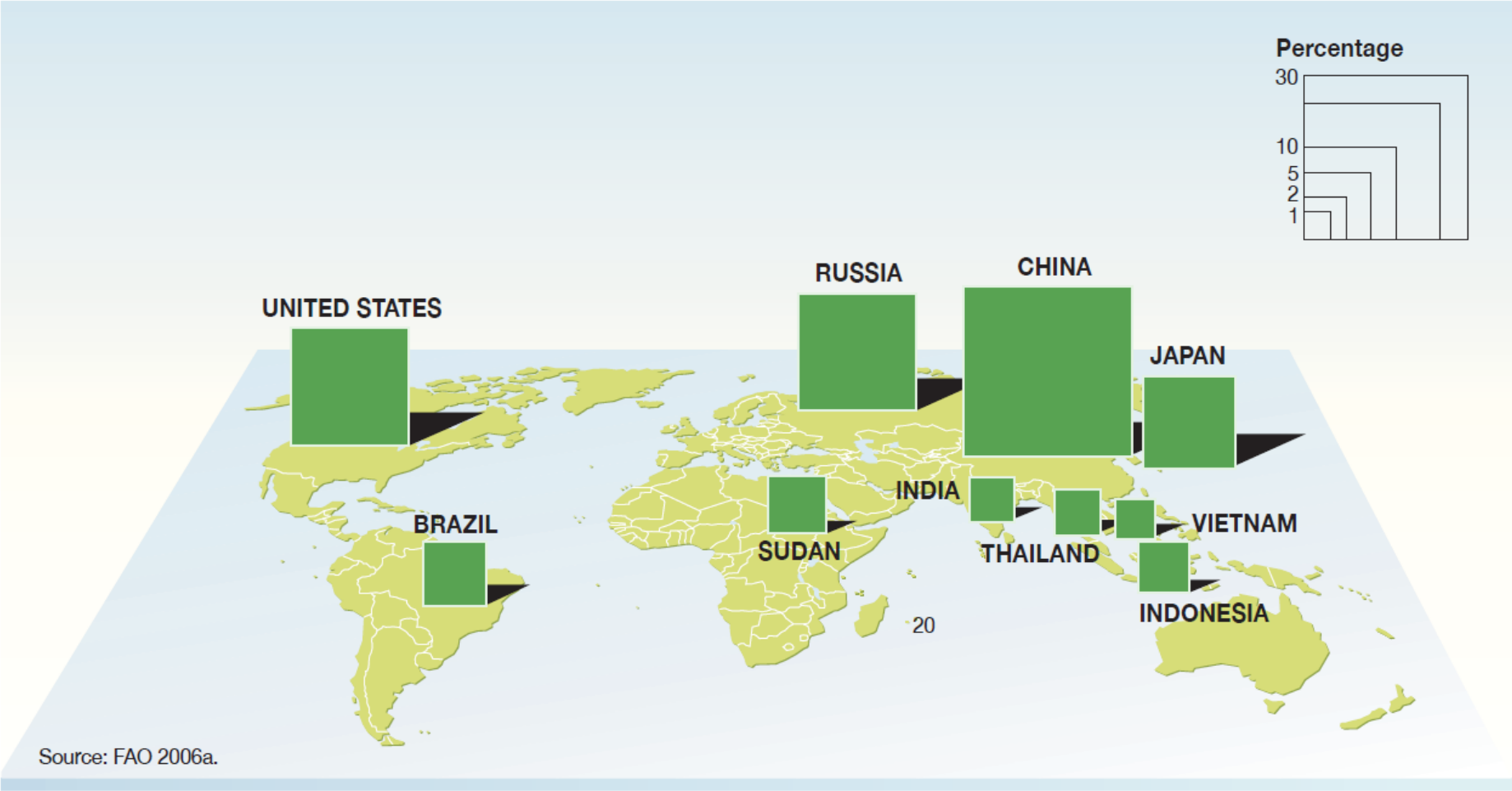
The Alternative: Planted forests

- In the 21st century, documented annual world consumption of wood has been ca. 3 billion m^3.
- 49% of officially documented wood consumption is for fuel, and this is increasing. The real figure is probably much higher.
- In some developing countries, >80% of the harvested wood is used as fuel (Ethiopia: 97.2%)
- In 2015, there were about 290 million ha of productive planted forests worldwide (depending on definition). This is 7% of the global forest area.

Increase in planted forests



Ten countries with the largest area of productive forest plantations



Source: FAO 2006a.


Glen Aroy

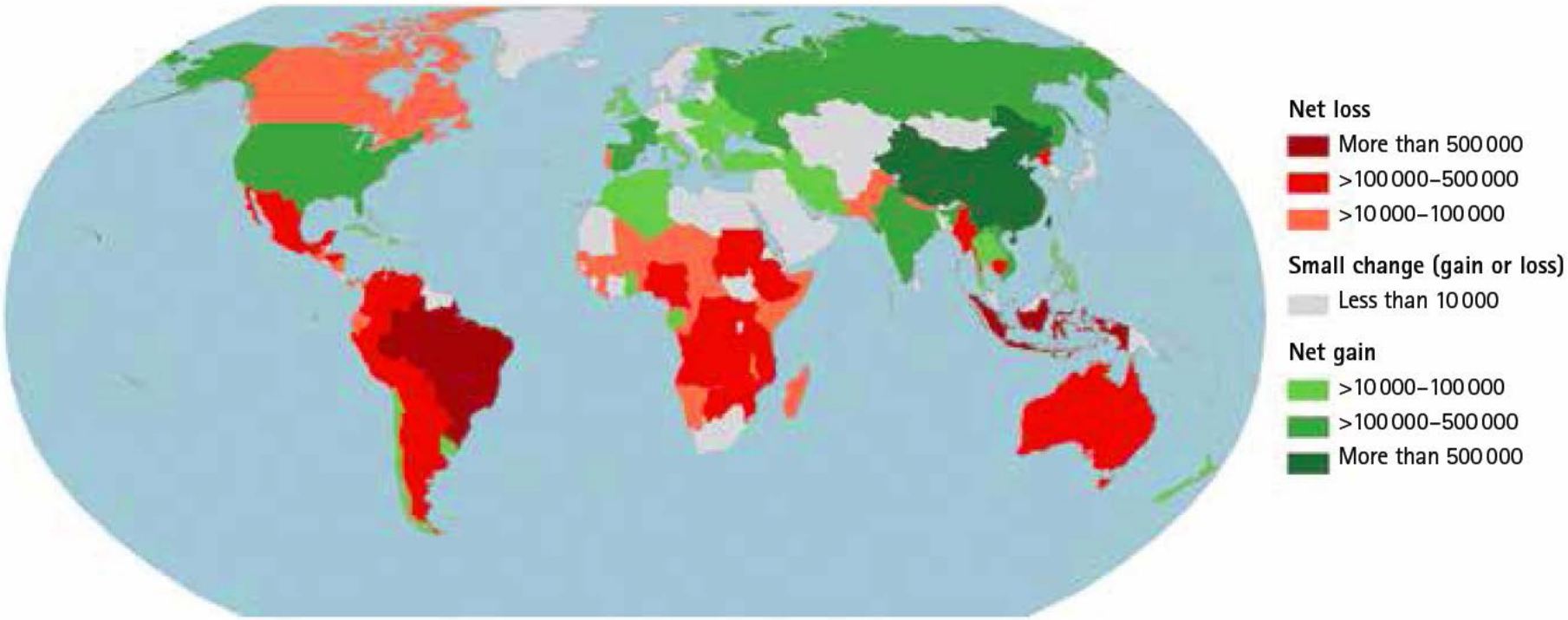
Reasons for planted forests

- Inadequacy of natural forest
- Improvements associated with domestication
- Environmental improvement
- Problems with natural regeneration
- Predictable yields
- Easy control of production processes

Inadequacy of natural forest

Most countries have experienced losses in their natural forest cover. The most efficient way of increasing the forest cover was (and often still is) through planting.

FIGURE 4 **Annual net forest gain/loss (ha) by country (1990–2015)**

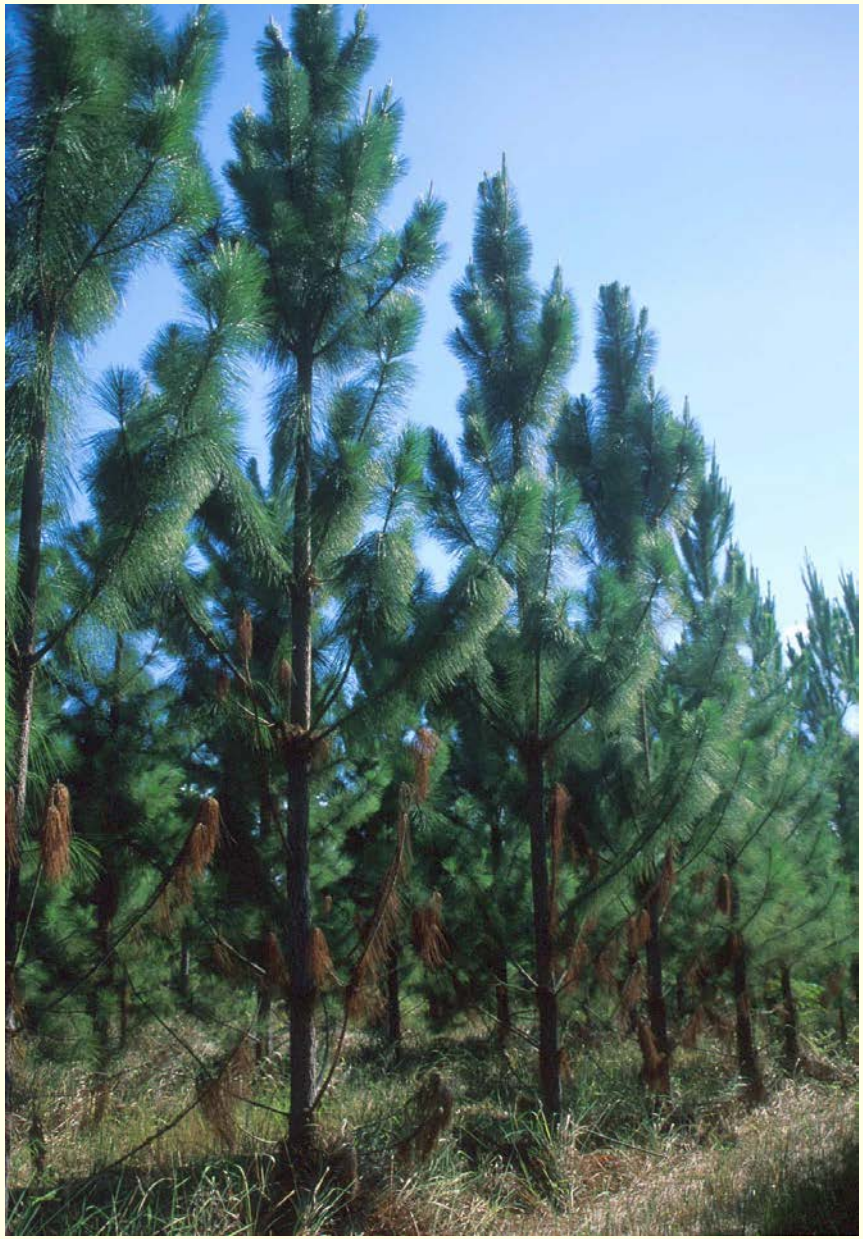


Source: *Global Forest Resources Assessment 2015*

Scots pine (*Pinus sylvestris*) being used to stabilize sand dunes in Chifeng, Inner Mongolia, China

Domestication

Many cultivars have been improved through selective breeding. The most extreme examples are the poplar cultivars for which there is a controlled genetic base. Another example is the “Super Sitka” used in Great Britain.



3.5 year old *Pinus patula x caribaea*, Queensland, Australia

30-month old *Eucalyptus urophylla* x *grandis*, Hainan, China
(DBH: 12 cm; Height 15 m)

Accelerated growth

Transgenic eucalyptus occupies the land for a shorter time and is more productive for the entire paper and conventional cellulose industry

MATURATION TIME

Introduction of a new gene reduces the time between planting and harvesting

CELLULOSE PRODUCTION

The transgenic plant produces 20% more cellulose because it has a wider trunk than the traditional plant

SOURCE FUTURAGENE

Environmental improvement

Planted forests have been established on degraded sites such as landfills and spoil heaps. Other possibilities include the use of planted forests as wind breaks, the stabilization of sand dunes and amenity purposes in urban forestry programmes.

Casuarina forest, Egypt

Afforestation in Qinghai, China

Environmental concerns

- Loss of water
- Water acidification
- Soil degradation
- Loss of biodiversity
- Socio-economic problems
- Escapes
- Landscape impacts
- Replacement of natural forests

Loss of water

Trees have higher water use than grassland or crops. Consequently, in areas where water supply is an issue, care should be taken when establishing new forests. In some cases (e.g., India, Australia) the trees rely on groundwater.

Sabie, South Africa

Water acidification

In some areas, plantation forests accelerate the acidification of freshwaters as the result of their ability to ‘capture’ pollutants. This occurs because of the higher surface area of trees as opposed to grasslands.

Soil degradation

Concerns exist that plantation forestry can damage the soil structure and lead to long-term declines in soil productivity

Productivity declines

Declines in the productivity of teak (*Tectona grandis*) have been recorded in India, Senegal and Indonesia. Various possible reasons exist, including poor management, over-intensive inter-cropping, repeated planting on the same sites and others.

Chinese fir – role of allelopathy?

“Escapes”

Many species used in plantings are exotic. These may be very successful in their new environment, spreading beyond the boundaries of the plantation. Examples include *Pinus radiata* in New Zealand and *Pinus patula* in South Africa.

Radiata pine in *Eucalyptus*, Creswick, Victoria, Australia

Landscape impacts

Afforestation provides the opportunity to design the landscape. This is a major subject area in itself, and beyond the scope of this lecture.

Biodiversity

- Planted forests are often seen as biological deserts. In some cases, this is true, in others it is wrong.
- Edge species and species requiring open areas are generally favoured.

Cotton and poplar agroforestry, Hebei Province, China

Sitka spruce / Douglas-fir,
Novar Estate

Socio-economic impacts

- The problem lies in the land use prior to the planted forests
- Local people may be evicted
- Farming communities may become increasingly isolated

Fujian Province, China

SFM Agreements

- Montreal Process
- Pan-European Operational Level Guidelines
- ITTO C&I
- Regional Initiative of Dry Forests in Asia
- Near East Process
- Lepaterique Process
- ATO/ITTO Principles for Africa

Montréal Process

Criterion 1

Conservation of biological diversity

Montréal Process

Criterion 2

Maintenance of productive capacity of forest ecosystems

Montréal Process

Criterion 3

Maintenance of forest ecosystem health and vitality

Montréal Process

Criterion 4

Conservation and maintenance of soil and water resources

Montréal Process

Criterion 5

Maintenance of forest contribution to global carbon cycles

Montréal Process

Criterion 6

Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies

Montréal Process

Criterion 7

Legal, institutional and economic framework for forest conservation and sustainable management

Forest certification

- Certification provides a market-based approach to improving forest management practices
- Certification provides an independent assessment of the management of a forest area or the management of a mill operation.
- Certification has become necessary to maintain markets under pressure to be ‘more sustainable’

Does a country need certification?

- Do you want your forests to be well-managed?
- Do you need to develop and maintain markets for forest products?
- Do you wish to demonstrate globally that you are managing forests sustainably?

Increased restrictions

- Voluntary Partnership Agreements
- EU Timber Regulation (EU No. 995/2010)
- U.S. Lacey Act and its amendments
- Australian Illegal Logging Prohibition Act

Procurement Policies

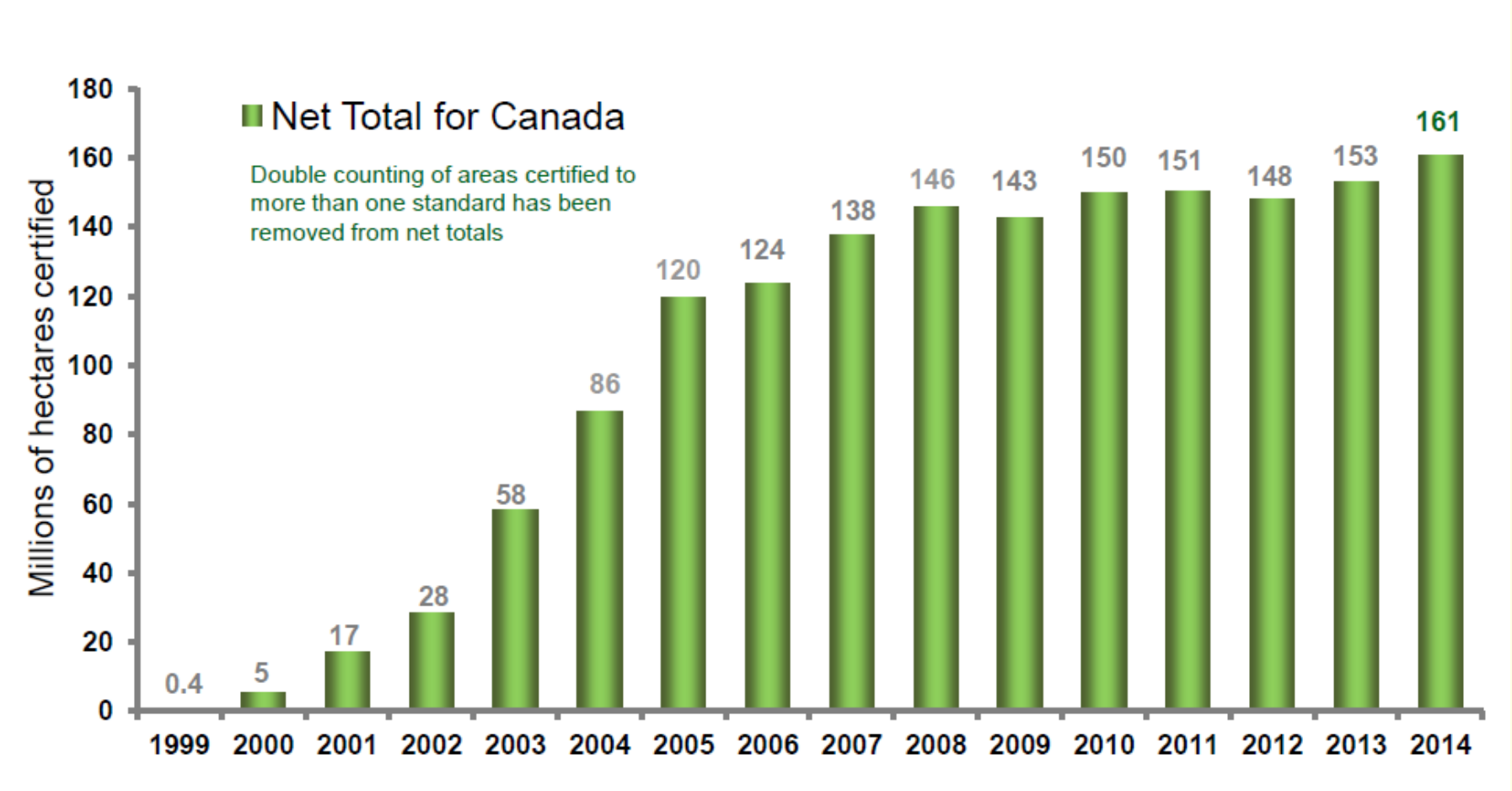
- Since May 2008, the Lacey Act Amendment prohibits trade into and within US borders of any product made from trees or other plants that were logged or traded in violation of a law in the country of harvest. Includes, paper, lumber and furniture.
- Gibson Guitars was one of the first US companies to be investigated

Principles of certification

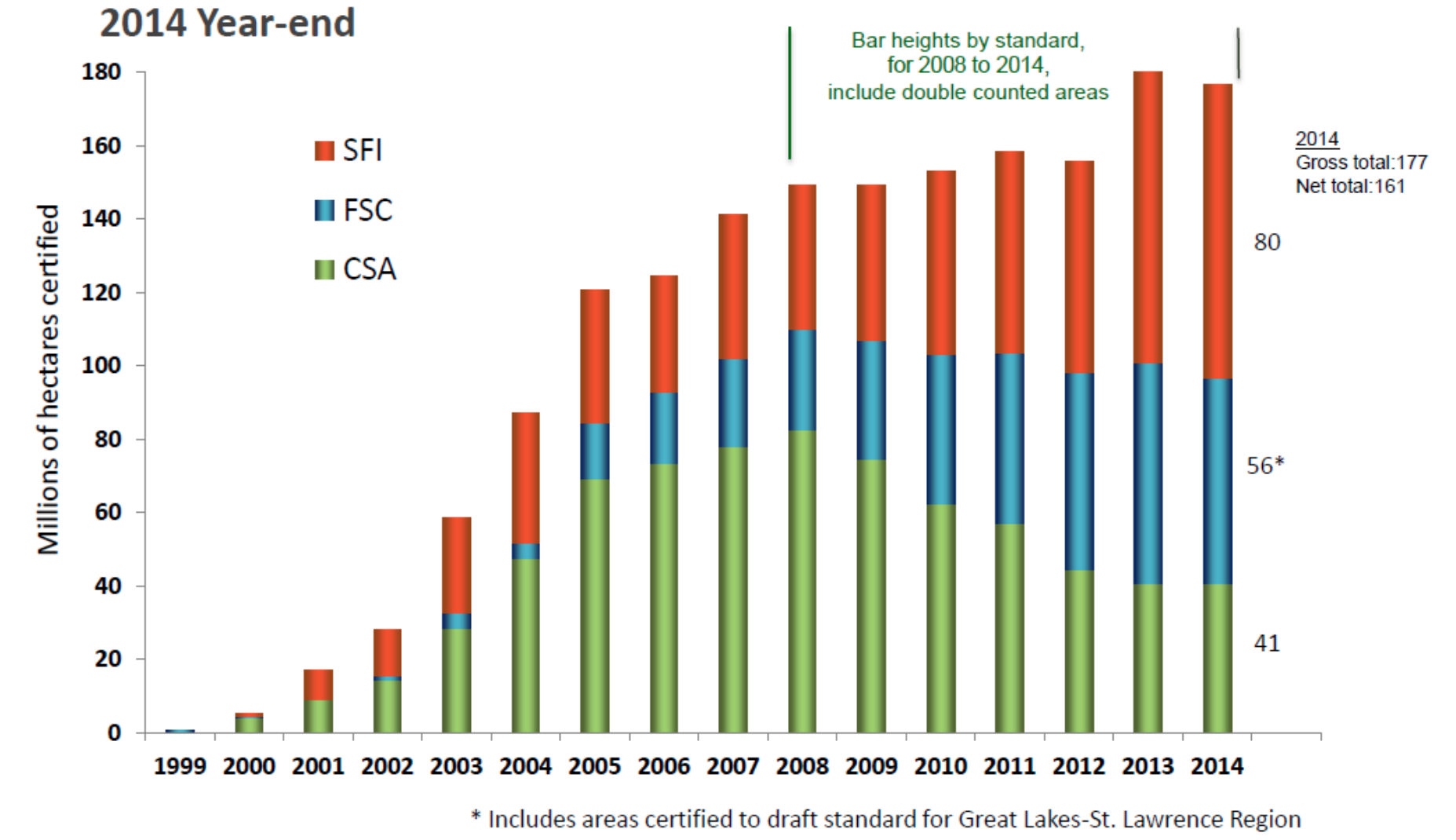
- Developed as a means to determine the extent to which a forest manager meets (or is committed to meeting) the principles of sustainable forest management
- Voluntary, driven by the market-place, but can be driven by others (e.g., governments, associations)

Performance-based approach

- Certification system determines the requirements (standards)
- Generally favoured by ENGOs because of degree of control over standard setting

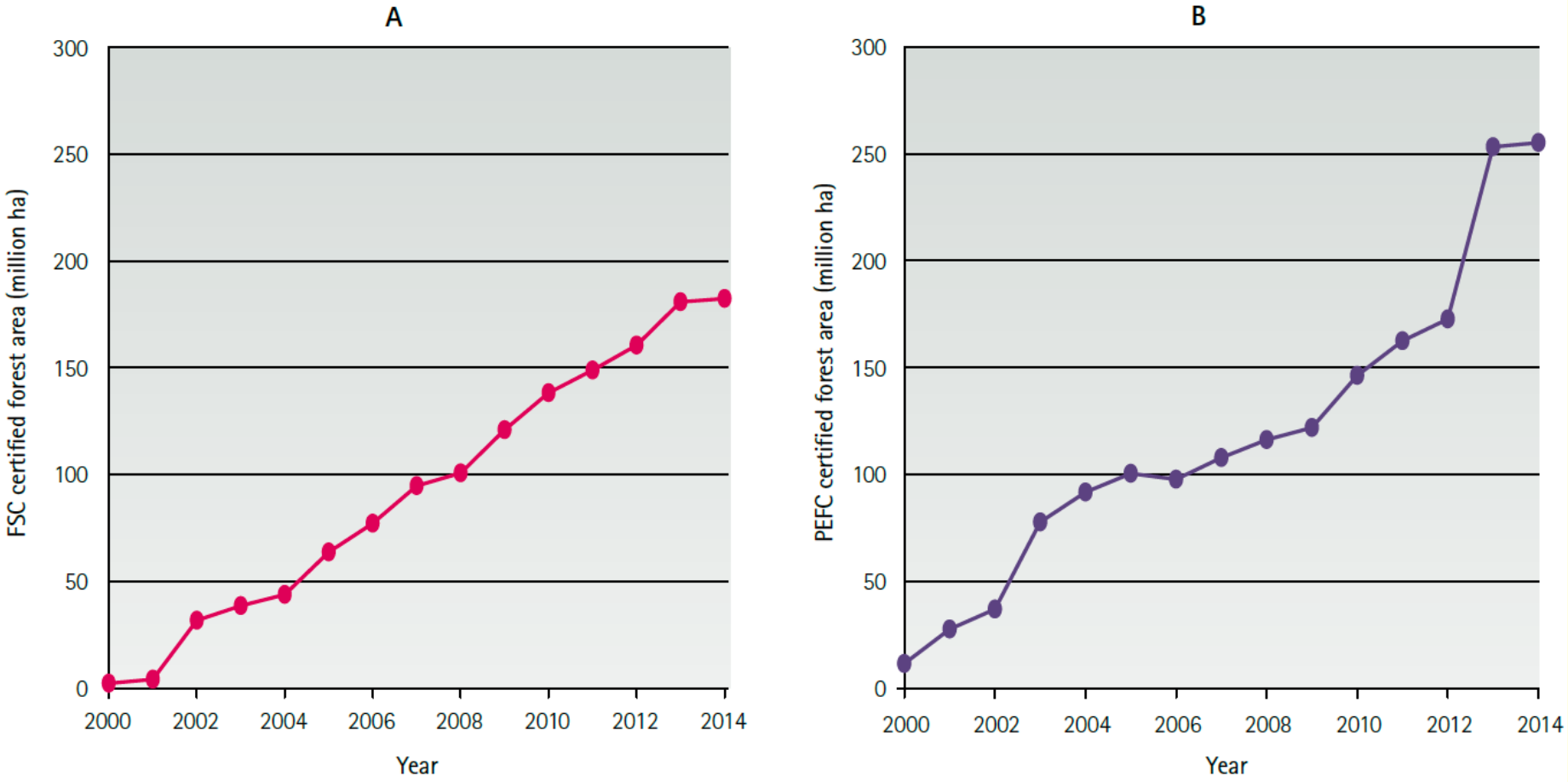


Source: http://www.certificationcanada.org/english/status_intentions/canada.php



Certification in Canada by different schemes

FIGURE 16 A AND B **Area of international forest management certification (2000–2014): (A) Forest Stewardship Council (FSC); (B) Programme for Endorsement of Forest Certification (PEFC)**



Source: *Global Forest Resources Assessment 2015*

Conclusions

- World pressures are encouraging forest exploitation, but there is also a recognition that forests must be used with greater care
- International agreements are providing the broad context for SFM
- Best Management Guidelines and Certification Standards are encouraging SFM