# Sustainable agriculture, forestry and fishery

Sustainable Baltic Region Course

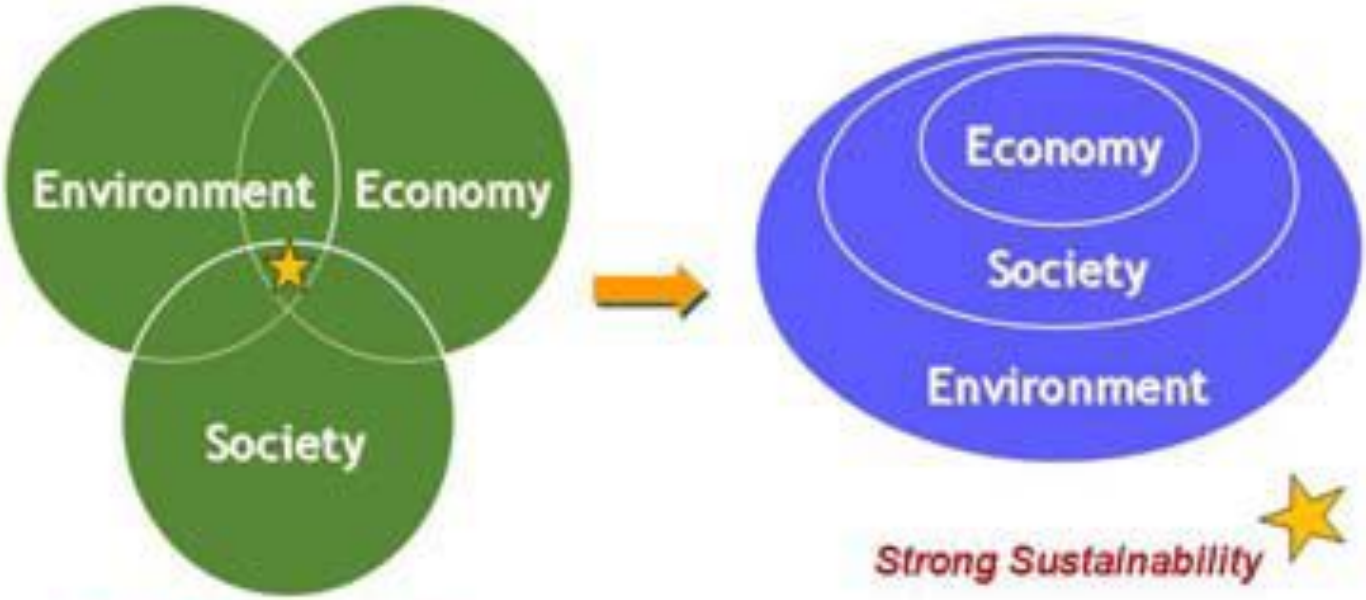
Session 4.

**Definition of "Sustainable"**

"Sustainable" means to create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations.

# Triple Bottom Line

*Interconnected and Interdependent Benefits*




Source: Maureen Hart—Sustainable Measures

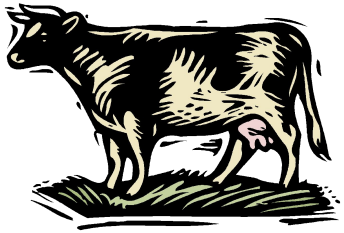
- Early thinking about sustainability, shown on the left side of Figure 1 (***Weak Sustainability***) envisions the environmental, social, and economic realms as intersecting, yet separate parts of a system.

- A more recent depiction of sustainability is shown on the righthand side of Figure 1 (***Strong Sustainability).*** This model reflects the understanding that the environmental realm provides natural goods and services which cannot be duplicated through other means.

# Introduction

***What is sustainable agriculture?***

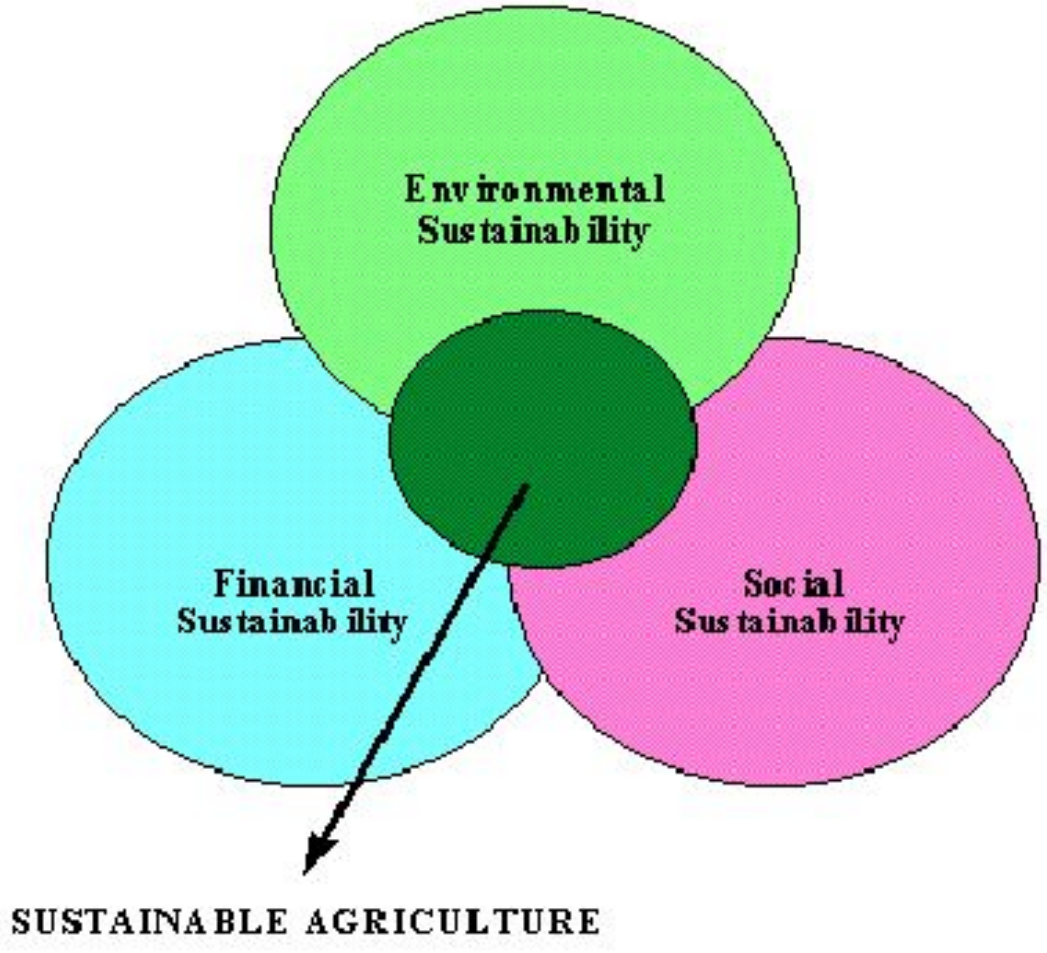
- Biodynamic?
- Organic?
- Intensive?



***Sustainable agriculture* - is a reasonable relationship** between economy, ecology, environmental conciseness and social development of rural territories. It should be:

- economically beneficial
- environmentally sound
- meeting good social standards and to be just

# Sustainable Agriculture Aspects



# Traditional Methods

- Today 80% of crop production worldwide relies on rainfall.

- Meso-American farms are often looked upon as proof of past functioning sustainable agricultural systems.
  - Crop Rotation
  - Natural Fertilizers
  - Raised Fields
  - Terraces
  - Irrigation Canals
  - Swamps/Lakes
  - Home Gardens
  - Tree Culture

# Negative Impacts

Our current mass production style of farming has resulted in numerous negative side-affects:

- Environmental damages
  - Reduced biodiversity
  - Habitat destruction
  - Deforestation
  - Water, air and soil pollution
  - Salinization, desertification
  - Decline in water resources and land subsidence
- Human impacts
  - Farm land destruction
  - Damage to soil fertility
  - Reduced nutritional value of food
  - Decreased economic, social and cultural values

**For the past several years research has looked at sustainable agriculture as a potential solution to correct and prevent these problems.**

# Environmental problems of conventional (intensive) agriculture

- Drainage
- Mechanization
- Over-use of chemicals
- Intensive livestock breeding
- Soil degradation
- Human health

# Challenges for Sustainable Agricultural Production and Farming Systems Dev.

- Abundant food insecurity (*FAO*, 2006)
- Demand for food will increase (*Evans*, 2009, and others)
- Unsustainable use of natural production factors such as soil, biological diversity and water (*Pimentel et al.,* 1995; FAO, 2003)
- 60 % of ecosystem services are degraded (*Millennium Ecosystem Assessment*, 2005)
- Intensive agriculture is depends on high energy but could be energy self-reliant and could mitigate GHG emission considerably (*Smith et al.,* 2007)
- Agriculture is insufficiently prepared to cope with unpredictability and adaptation to climate change *(Lobell et al.,* 2008)

# Sustainable agriculture definition

- **Sustainable agriculture** is the practice of farming using principles of ecology, the study of relationships between organisms and their environment. It has been defined as "***an integrated system of plant and animal production practices having a site-specific application that will, over the long term:***
- *Satisfy human food and fiber needs*
- *Make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls*
- *Sustain the economic viability of farm operations*
- *Enhance the quality of life for farmers and society as a whole*

# The four basic principles of organic agriculture

Endorsed by IFOAM, September 2005

PRINCIPLES of ORGANIC AGRICULTURE

### *Principle of* HEALTH

Organic Agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible.

### *Principle of* ECOLOGY

Organic Agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.

### *Principle of* FAIRNESS

Organic Agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.

### *Principle of* CARE

Organic Agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment.

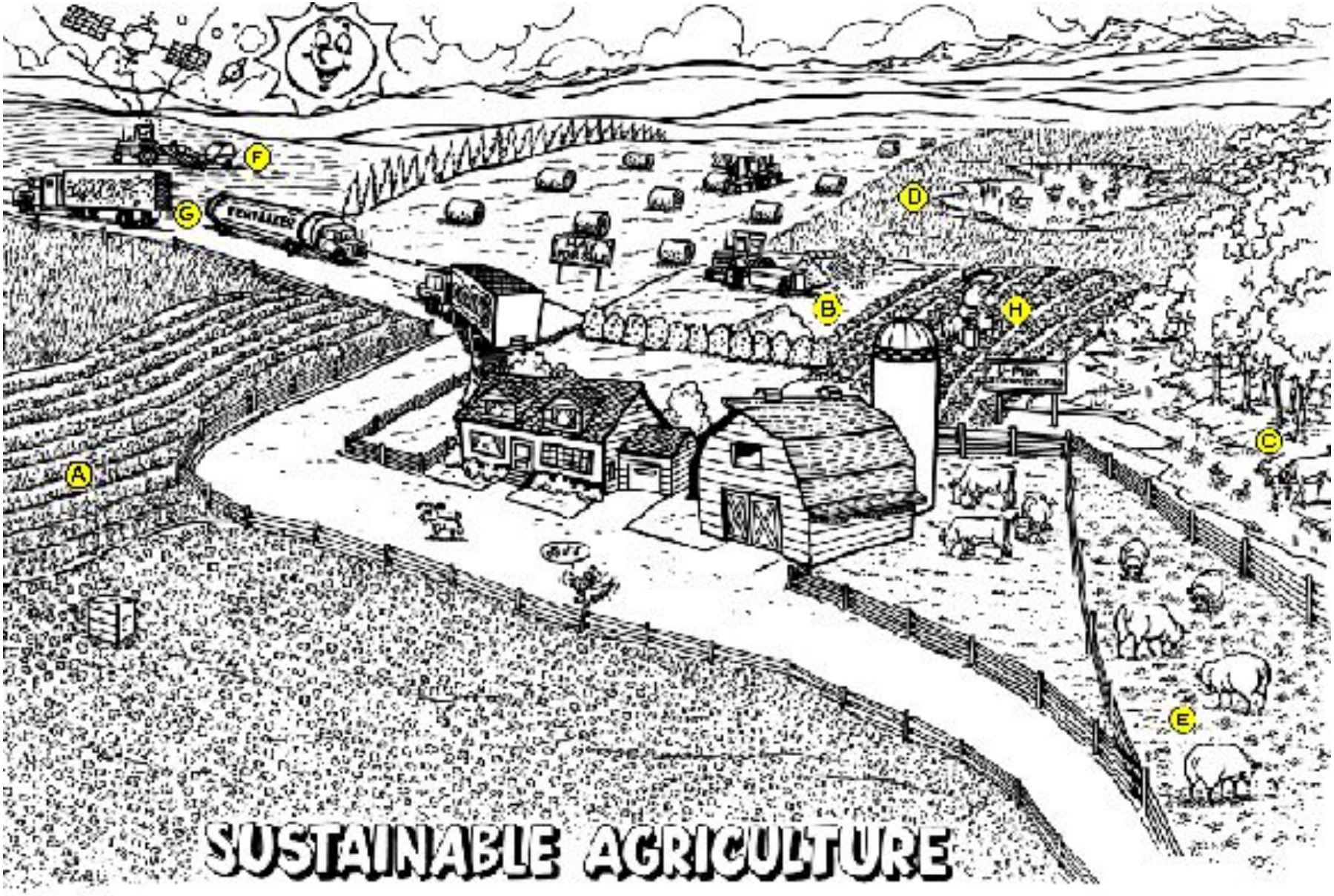
**Healthy soil**
**Healthy crops**
**Healthy livestock**
**Healthy people**

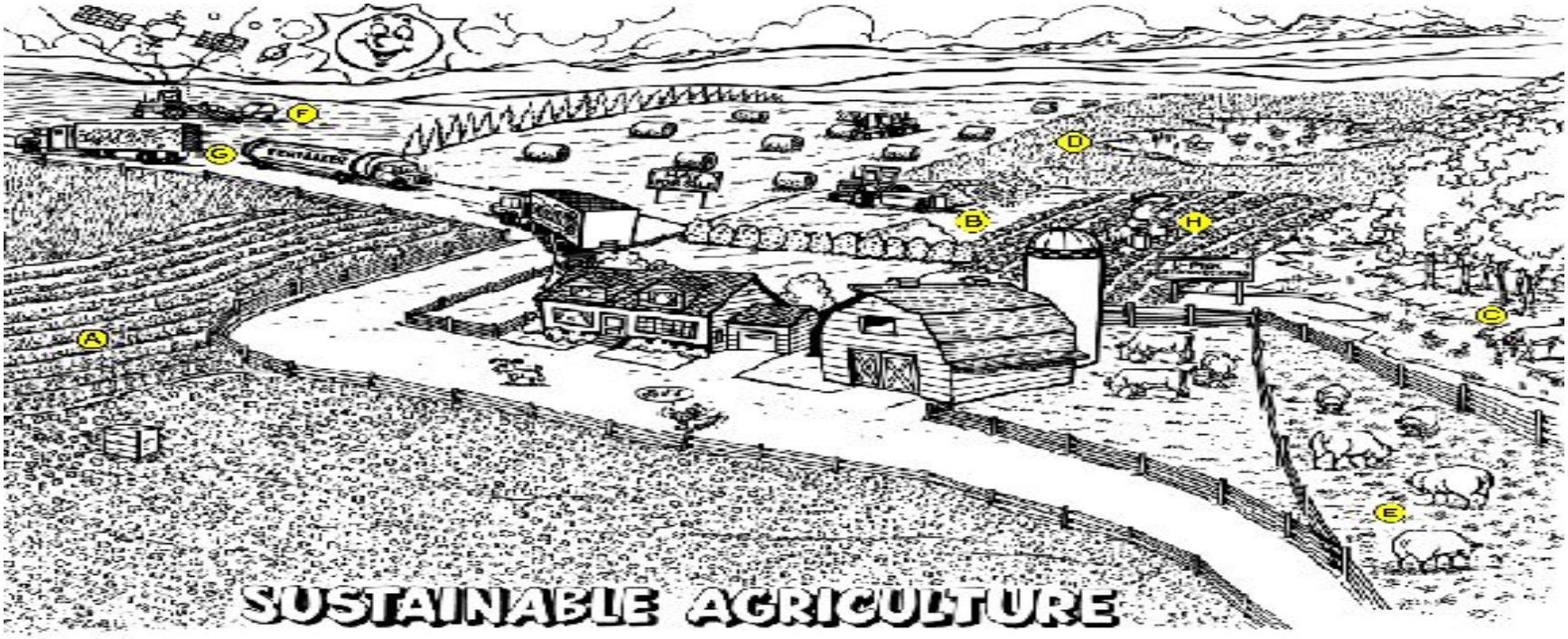
**Agro-ecology**
**Diversity**
**Recycling**

**Ecological and social justice**
**Fari Trade?**

**Precaution**

# Sustainable Agriculture Poster






- **A.** Crop rotation keeps the soil healthy.
- **B.** Mixed farms allows the uses of livestock manure.
- **C.** Conserving natural areas protects our environment.
- **D.** Small changes in practices can help, rather than harm, the environment.
- **E.** Grass-fed livestock control weeds without chemicals or mowing.
- **F.** Science can determine the right amount of fertilizers and pesticides.
- **G.** Farming removes nutrients and fertilizers or manures replace them.
- **H.** Farming multiple crops allows farmers to reduce their financial risks by having multiple products to sell.

# “Hot topics” of Sustainable Agriculture

- Sustainable agricultural management (positive case studies analysis from international experience)
- Economic instruments of environmental policy
- Farm business management
- Machinery and technologies for cleaner production
- Environmental protection through best farm practices
- Agricultural and forestry extension education
- Soil management
- Water management
- Labor management
- Food and products quality and safety
- Eco-marketing and eco-labeling
- Pest control
- Control of  pollution and degradations of agro ecosystems
- **Ecological ethics as source of changing behavior**

# The ways of teaching SAM

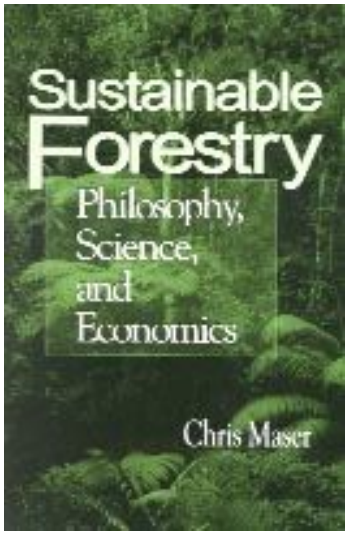
- Multidisciplinary approaches

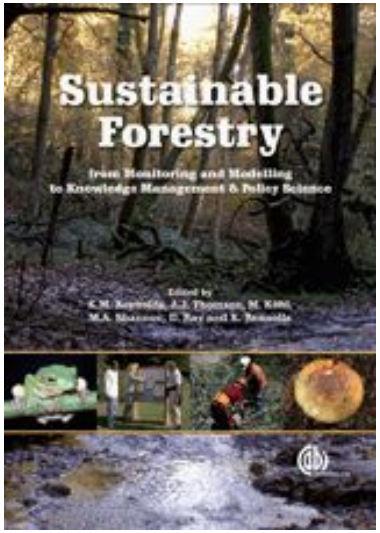
- **The main goal of education** – to teach the way, tools and mechanisms of an integration of all possible social, economic and environmental factors which could help to achieve the sustainable agriculture

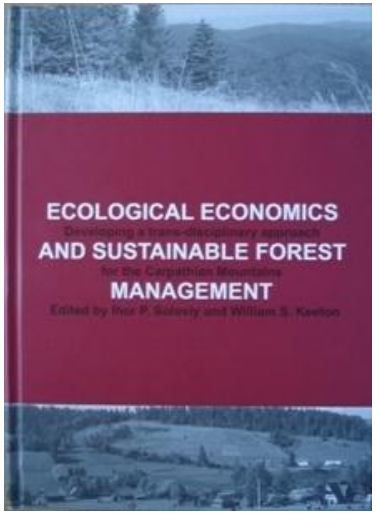
# Rules and Regulations

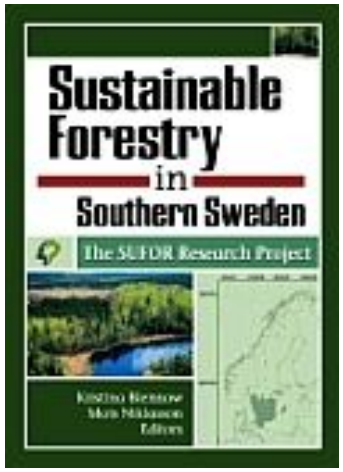
- While the goal of **sustainable agriculture** is similarly defined by numerous organizations, there are **no** strictly defined rules or regulations for farmers to abide by.
- There are standards and certifications for **organic farming**, which has similarities to sustainable agriculture, but the two not synonymous.

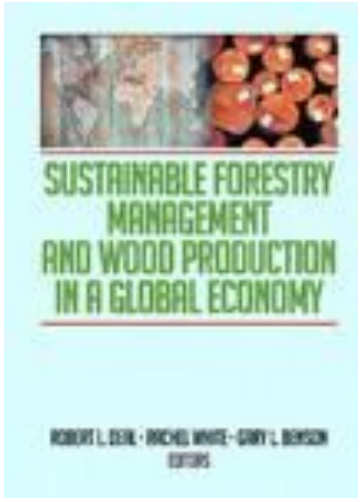

# Sustainable forestry - Scientific Publications

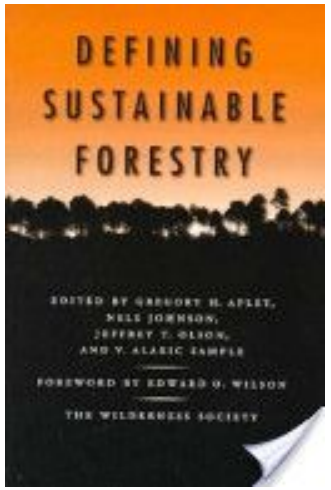


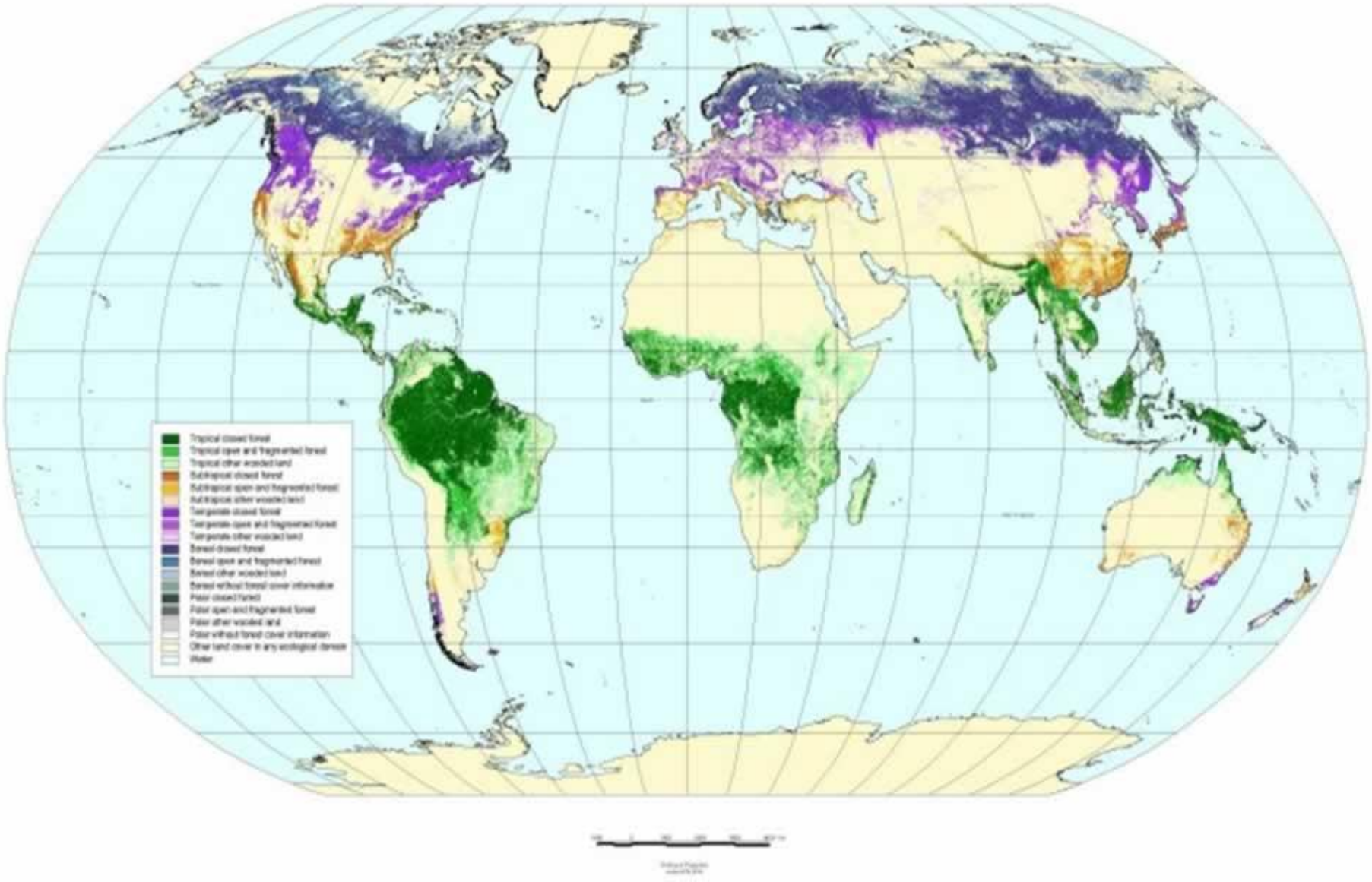
# Definition of Forest Land

**FAO definition**

- 1.A minimum area of land of 0.05 –1.0 ha
- 2.Tree crown cover > 10 –30 %
- 3.Trees with the potential to reach a minimum height of 2 –5 m at maturity in situ

- **Swedish definition**
- Land suitable for forest production with no other use and with
- a potential mean production> *1 m3 ha-1 yr-1*

# FORESTS 2000 BY MAJOR ECOLOGICAL DOMAINS



# Wildlands

## Peruvian Amazon, Peru


Wildlands
Virgin Beech Forest, Ukrainian Carpathians

# Wildlands

Alaska, USA

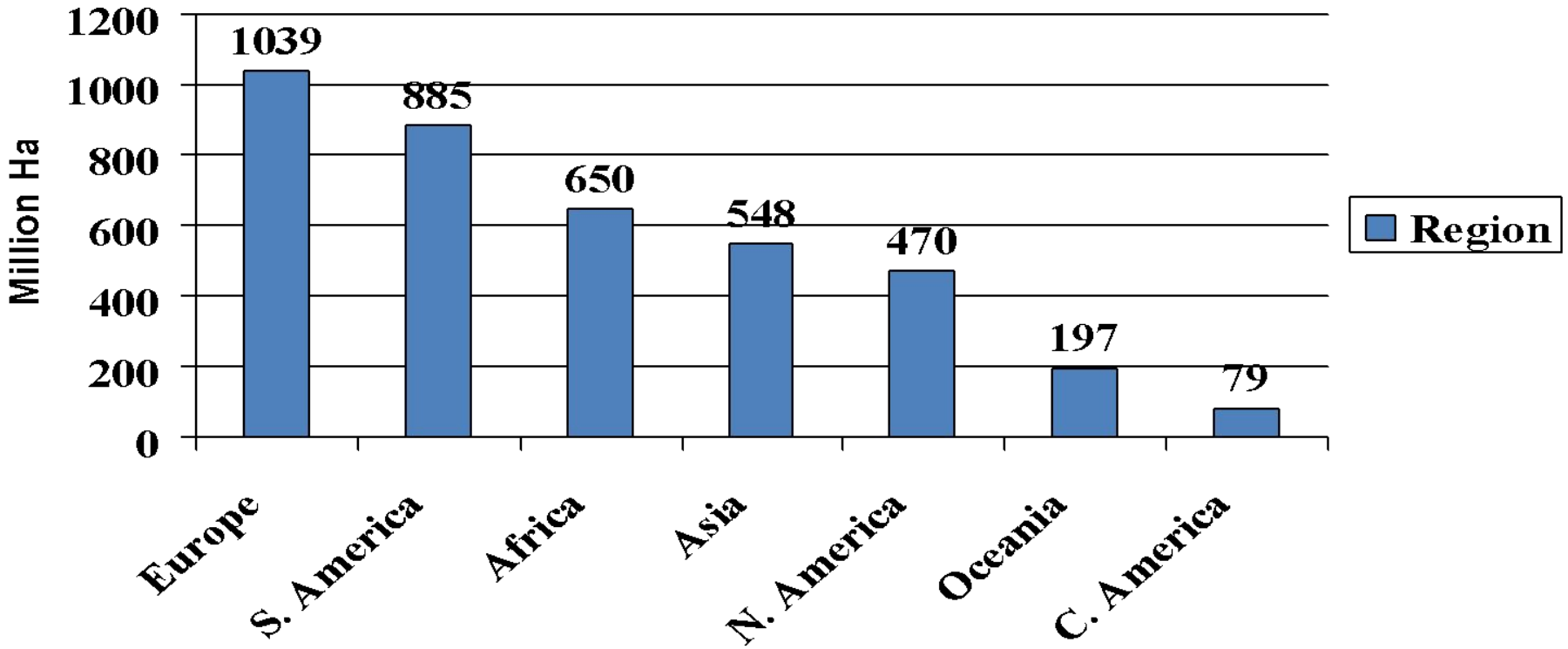

Credit: © Yenit Company Ltd. <http://www.kohsamui.org/seaview.jpg>


Seminatural
Populated Forest
New England, USA


Seminatural
Populated Forest
Carpathians, Ukraine

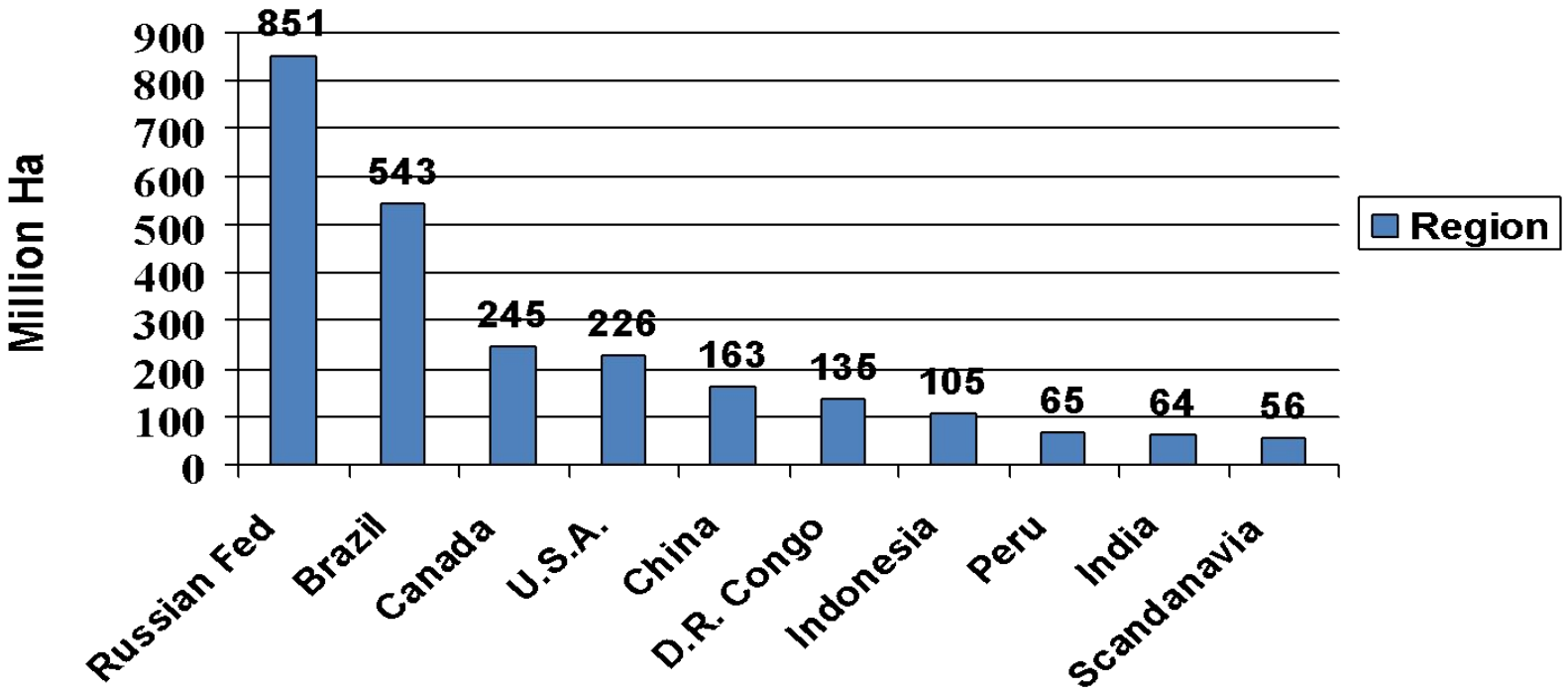

Seminatural
Residential Woodlands
Hunan, China

# Total World Forest Area by Region




FAO; 3.9 billion ha total;
3.7 billion natural; 204 million planted

# Total Forest Area For Major Countries




FAO

# Definition of ”Forest management”

**”Forest management”** *is a* ***system of practices*** *for stewardship and use of forest land aimed at fulfilling relevant ecological (including biological diversity), economic and social functions of the forest in a sustainable manner.*

# **SFM** (1993 Helsinki Declaration )

"the stewardship and use of forests and forest lands in a way, and at a rate, that maintains **their biodiversity, productivity, regeneration capacity, vitality** and their potential to fulfil, now and in the future, relevant **ecological, economic and social functions**, at **local, national and global levels**, and that does not cause damage to other ecosystems"

## What means **"forestry should be sustainable"** ?

*Maintained or increased **production**

***Minimize risks** for production disturbances

*Protection **of biodiversity, soil, water and air quality**

***Economically** viable

***Socially** acceptably (employment, recreation, landscape etc)

# FOREST EUROPE
# (The Ministerial Conference on the Protection of Forests in Europe)


http://www.foresteurope.org

# FOREST EUROPE – Regional policy process

**Sustainable forest management in Europe**

**Voluntary cooperation**


46 European countries + 8 countries and organisations

# Milestones in forest policy development in Europe (1990 – ongoing)

HELSINKI 1993

VIENNA 2003

**V Ministerial Conferences**

**Oslo June 2011**

STRASBOURG 1990

RIO 1992

LISBON 1998

WARSAW 2007

# Targets for Swedish sustainable forestry


- Management should include aspects of **multiple use**
- **Reindeer management** should not be made difficult
- Forest management includes the **entire country**
- **Biomass production** is mainly from conifers but increasing portion deciduous
- Sustainable biomass harvest
- Management adapted to the **site conditions**
- **Regeneration** should optimize the capacity of the land for wood volume and quality
- **Thinning** is done in a correct way
- **Damages** through pathogenic organisms are minimized
- Management without any unwanted **hydrological effects**
- Effective use of **road systems**
- Management with any threats for **long term production**
- **Cultural and landscape** perspective
- Special sensitive areas are protected
- Area **non-managed land** increases
- Land with great culture **heritage values** is protected
- Forestry contributes to **an attractive environment for local people**

# The Helsinki Process Criteria of SFM

1. Maintenance and appropriate enhancement of forest resources and their contribution to global carbon cycles.
2. Maintenance of forest ecosystem health and vitality .
3. Maintenance and encouragement of productive functions of forests (wood and non-wood).
4. Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems.
5. Maintenance and appropriate enhancement of protective functions in forest management (notably soil and water).
6. Maintenance of other socio-economic functions and conditions. (10 I.)

# The Montreal process criteria of SFM

1. Conservation of biological diversity
2. Maintenance of productive capacity of forest ecosystems
3. Maintenance of forest ecosystem health and vitality
4. Conservation and maintenance of soil and water resources
5. Maintenance of forest contribution to global carbon cycles
6. Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies
7. Legal, institutional and economic framework for forest conservation and sustainable management

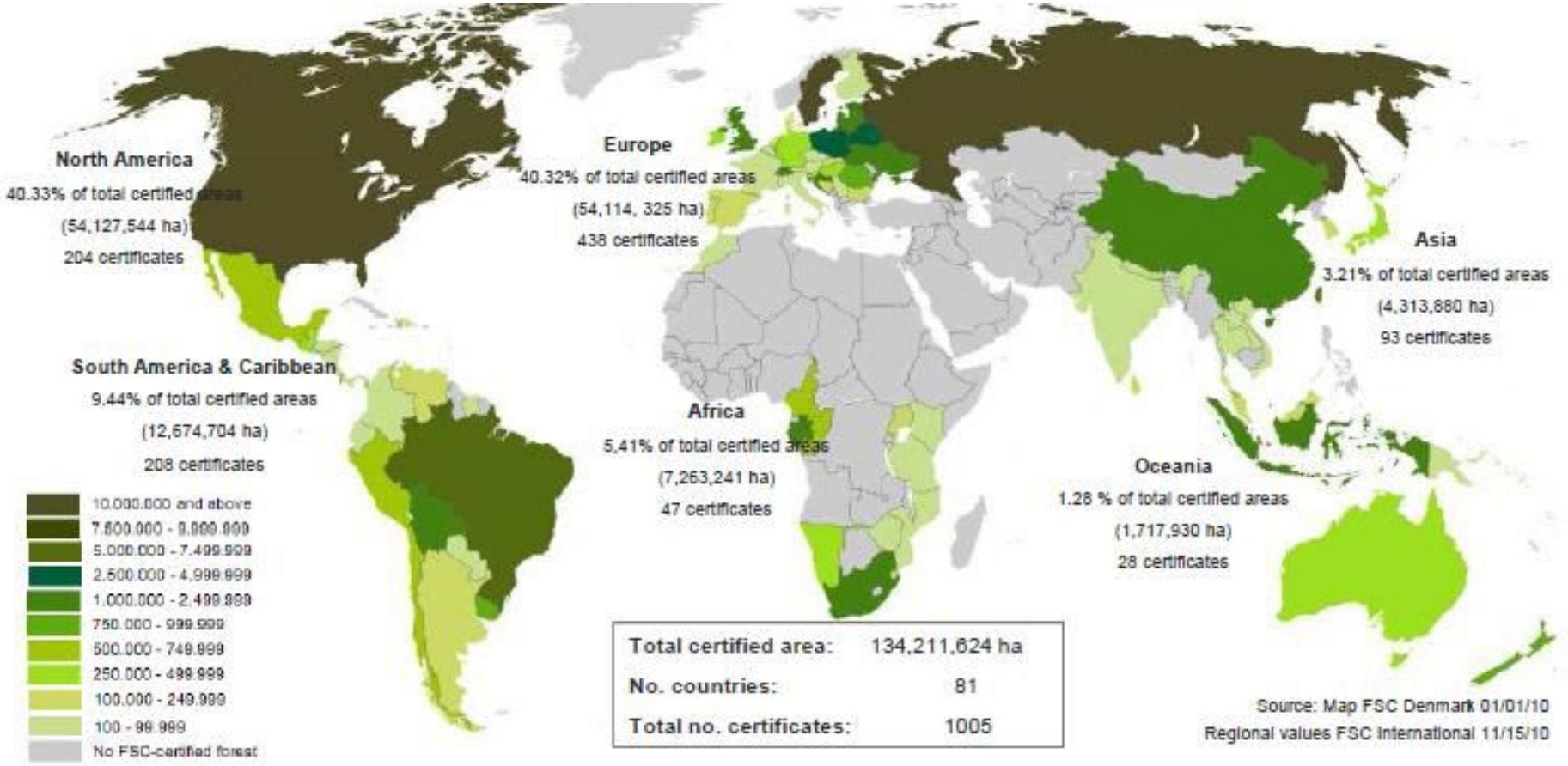
# SFM and Forest Certification

- Sustainable Forest Handling - International Tropical Timber Organization (ITTO) - 1990
- UNCED–Rio de Janeiro (Earth Summit)-1992
- Montreal Process SFM C&I - 1993
- Forest Stewardship Council (FSC) - 1993
- Sustainable Forestry Initiative (SFI) - 1995
- PanEuropean Forest Council (PEFC) – 1999
- CertFor - 2003
- CerFlor - 2004

# Forest Stewardship Council


| | |
|---|---|
| Founded | 1993 |
| Location | BonnBonn, Germany |
| Key people | Andre Giacini de Freitas |
| Area served | Global |
| Focus | Sustainable forestry |
| Method | Certification |
| Website | http://www.fsc.org/ |

# Geographical scope of FSC certification




Source: FSC, *Global FSC certificates: type and distribution, (December 2010)*

# Environmental NGOs Support to FSC



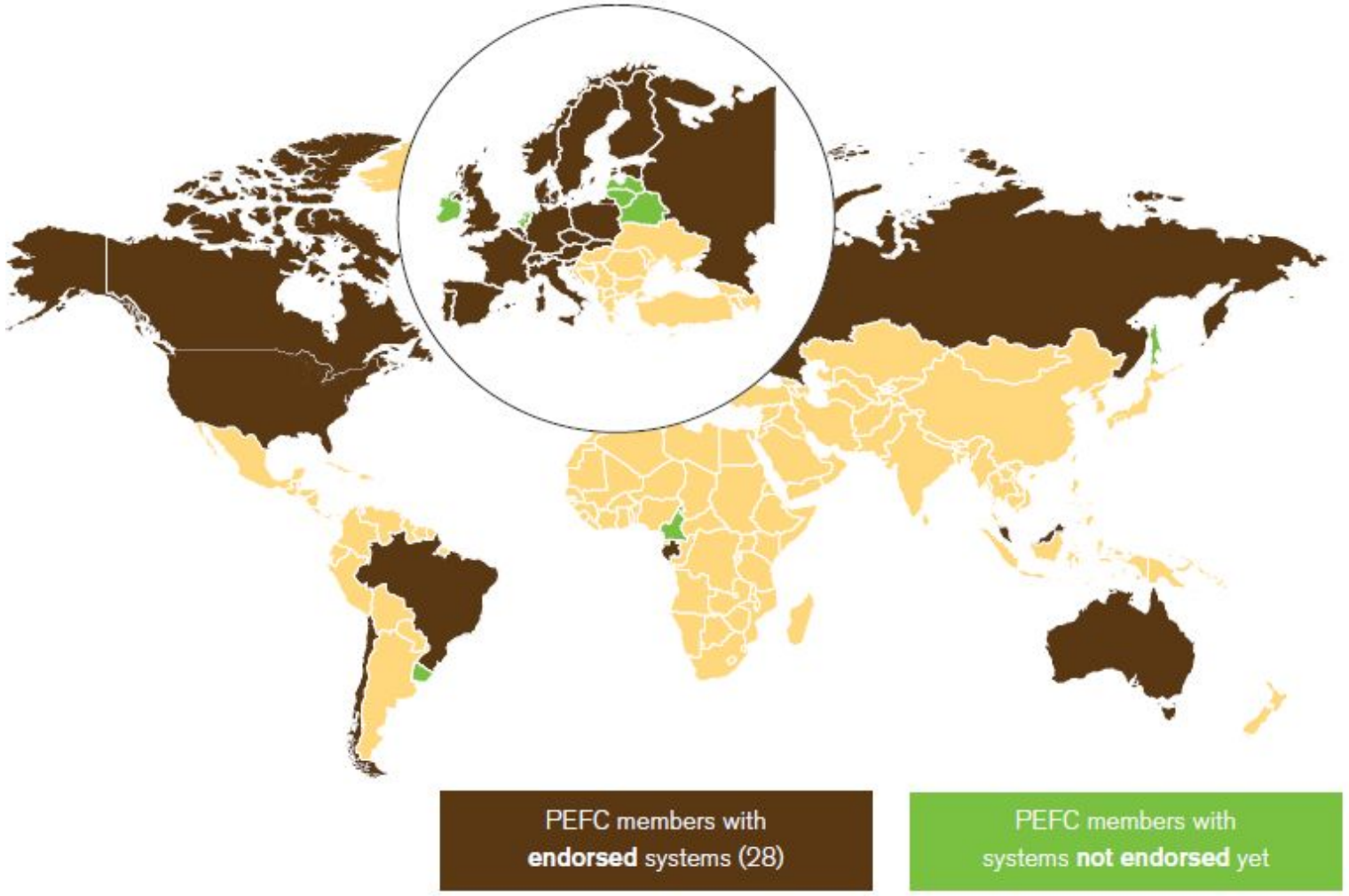




# Programme for the Endorsement of Forest Certification (PEFC)


| | |
|---|---|
| Founded | 1999 |
| Location | GenevaGeneva, Switzerlanc |
| Key people | Ben Gunneberg |
| Area served | Global |
| Focus | Sustainable forestry |
| Method | Certification |
| Website | http://www.pefc.org/ |

# Geographical scope of PEFC certification




Source: PEFC, *Annual Review 2009 (Geneva, 2009)*

# Criticism of PEFC

- Lack of consistency.
- Transparency.
- Indigenous people and environmental groups
- Governed by economical interests.
- Weaker environmental demands.

# Baltic Forest Program- http://www.balticforest.net

- The Baltic 21 (Forestry sector) project ***"Strengthening the role of small-scale private forestry for regional development and spatial planning",***

- The project ***"Northern European Model Forest Network"***, "NEMFN", was developed to encourage regional development in boreal forest landscapes through a transnational network of model forests, based on the Canadian and now world wide Model Forest concept (40 sites on 5 continents).

# Sustainable Fisheries Are Community-Led –

http://www.thesolutionsjournal.com/node/958

# Documentaries to watch

**European Forests: Central to the World We Live in**
http://www.youtube.com/watch?v=MaKKKdoLc2g&feature=colike

**Sustainable Forest Management** (about Sweden) -
http://www.youtube.com/watch?v=MFBjWz1ig_c