

# The role of plantations in bioenergy supply

Don J Mead

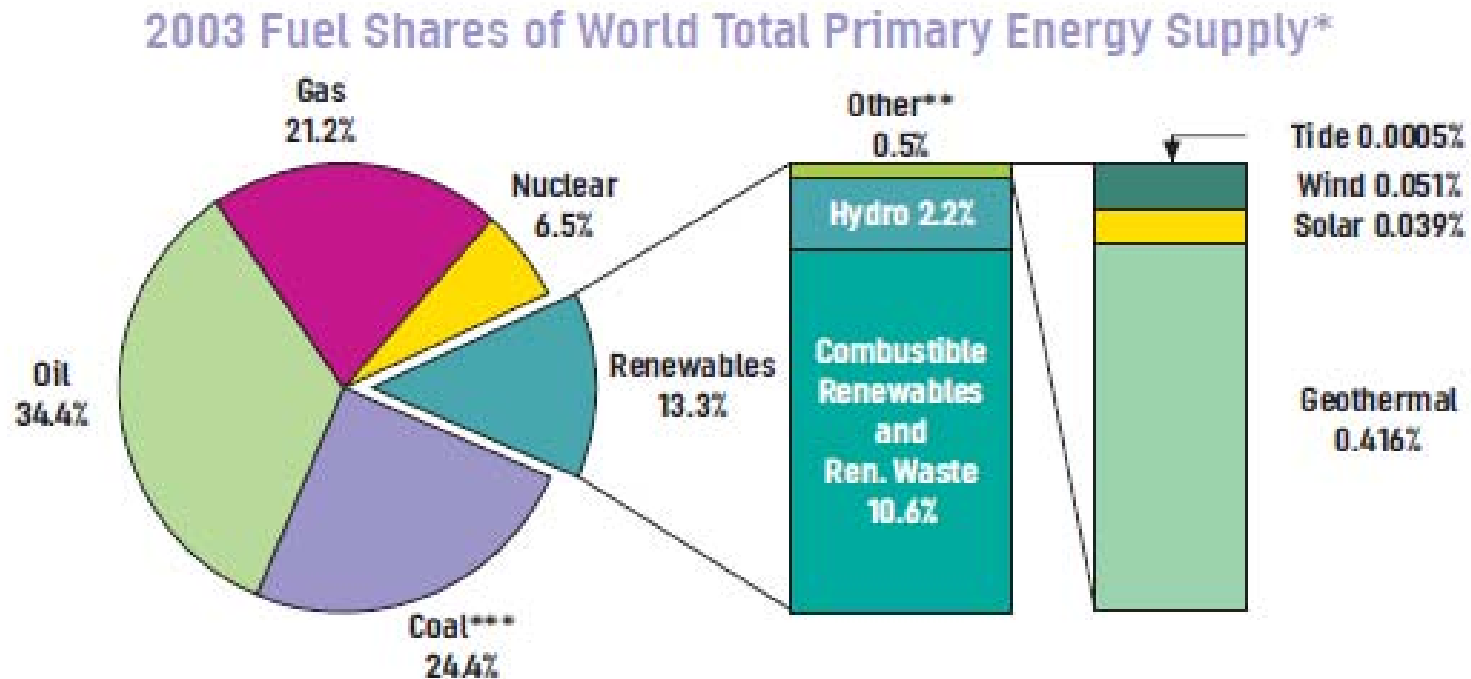
Silviculture adviser





# Overview

- ◆ Woodfuels supply 5% of world energy use



\* TPES is calculated using the IEA conventions (physical energy content methodology). It includes international marine bunkers and excludes electricity/heat trade. The figures include both commercial and non-commercial energy.

\*\* Geothermal, solar, wind, tide/wave/ocean.

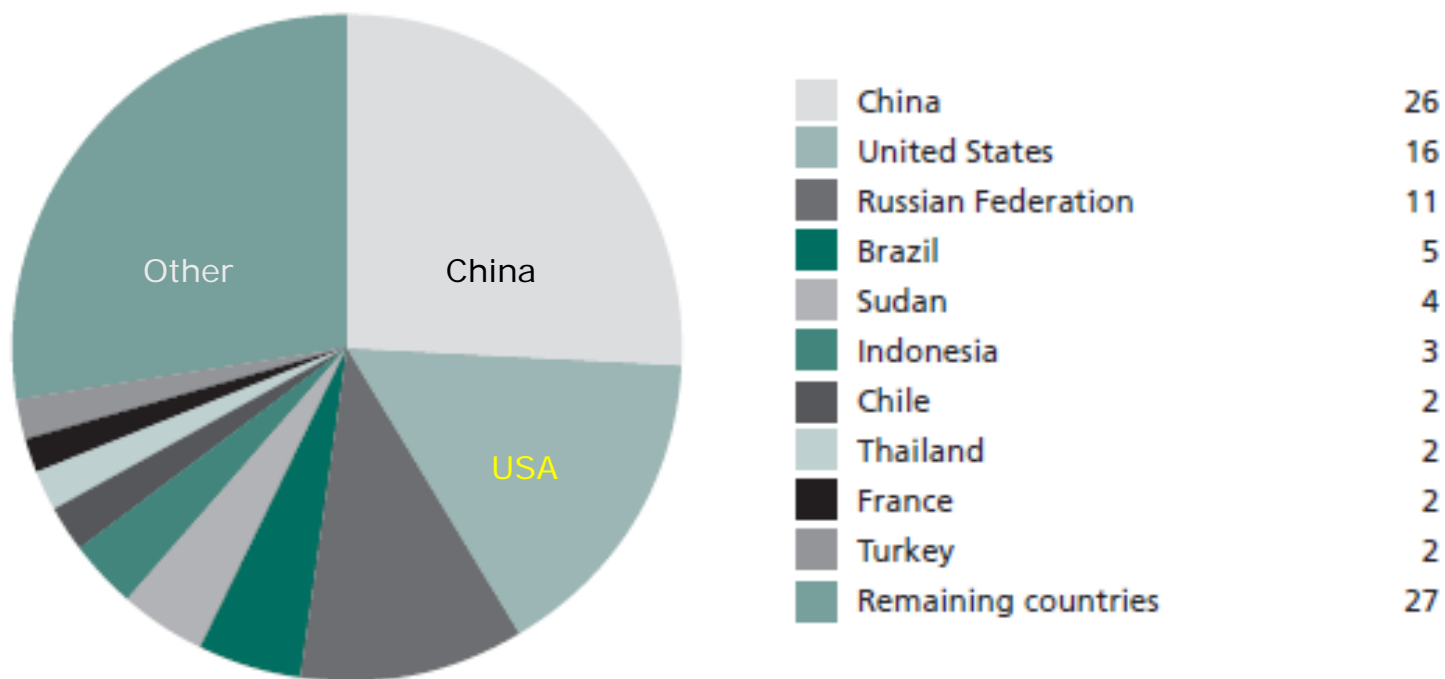
\*\*\* Includes non-renewable waste.

Source: IEA Energy Statistics

# Forest plantation area

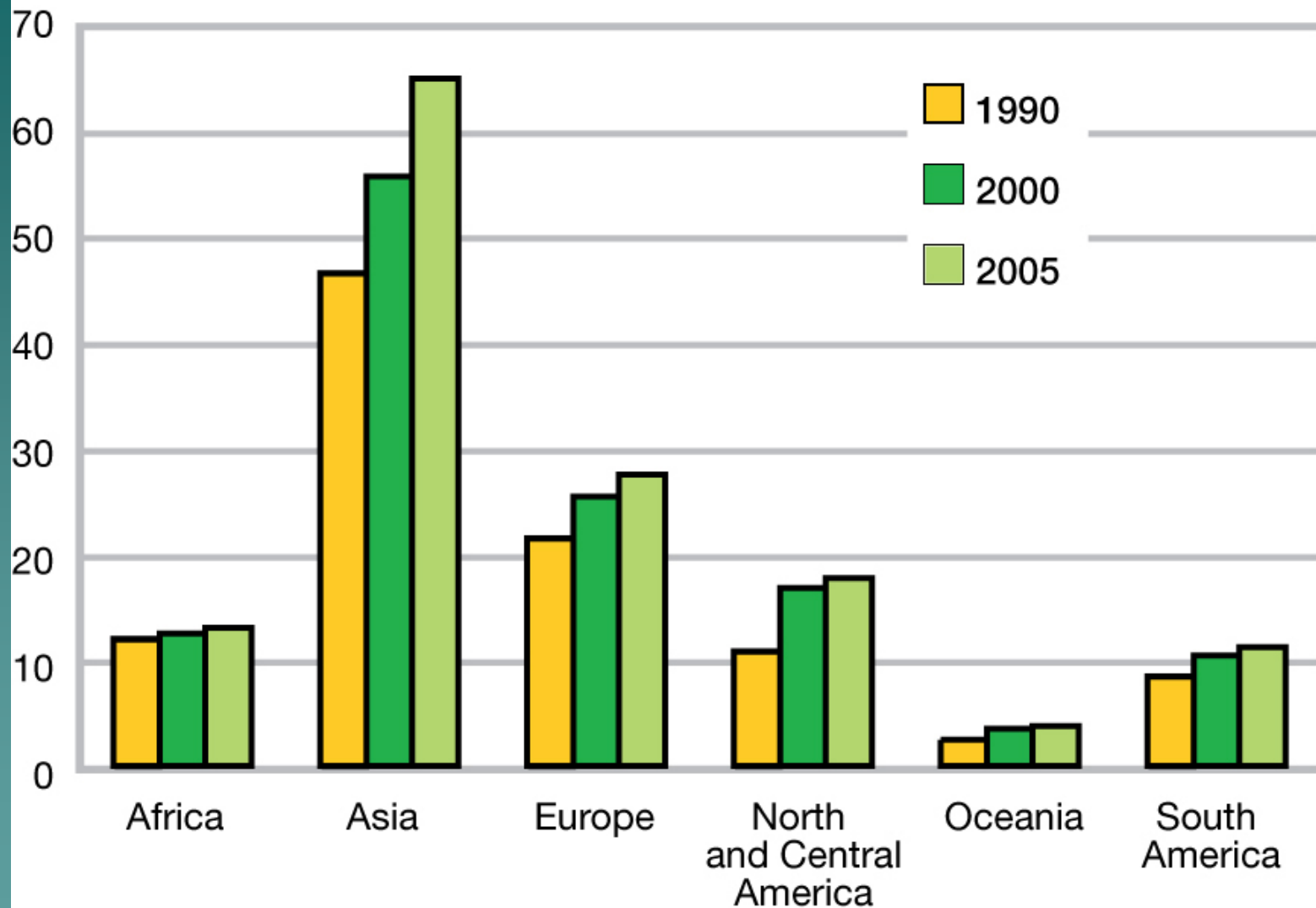
- ◆ Forest areas (2005) (source FRA 2005):
  - Total forests - 3,952 million ha (30% of land area)
  - Total plantations – 140 million ha (3.8% of total forests)
    - ◆ Productive plantations – 109 million ha
    - ◆ Other plantations: largely for soil and water conservation
    - ◆ Area is increasing at 2.8 million ha yr<sup>-1</sup> (87% productive plantations)
- ◆ Plantation figures will be revised soon
- ◆ Data do not include planted trees outside forests (e.g. agroforestry or urban trees) but do include agricultural tree crops

**FIGURE 5.5**  
**Ten countries with largest area of productive forest plantations 2005**  
**(%)**



# Changes in plantation area, 1990–2005

(million ha)



# Production (all forests)

- ◆ Global wood removals are 3.4 billion m<sup>3</sup>
- ◆ ~50 % of logs are used as fuelwood

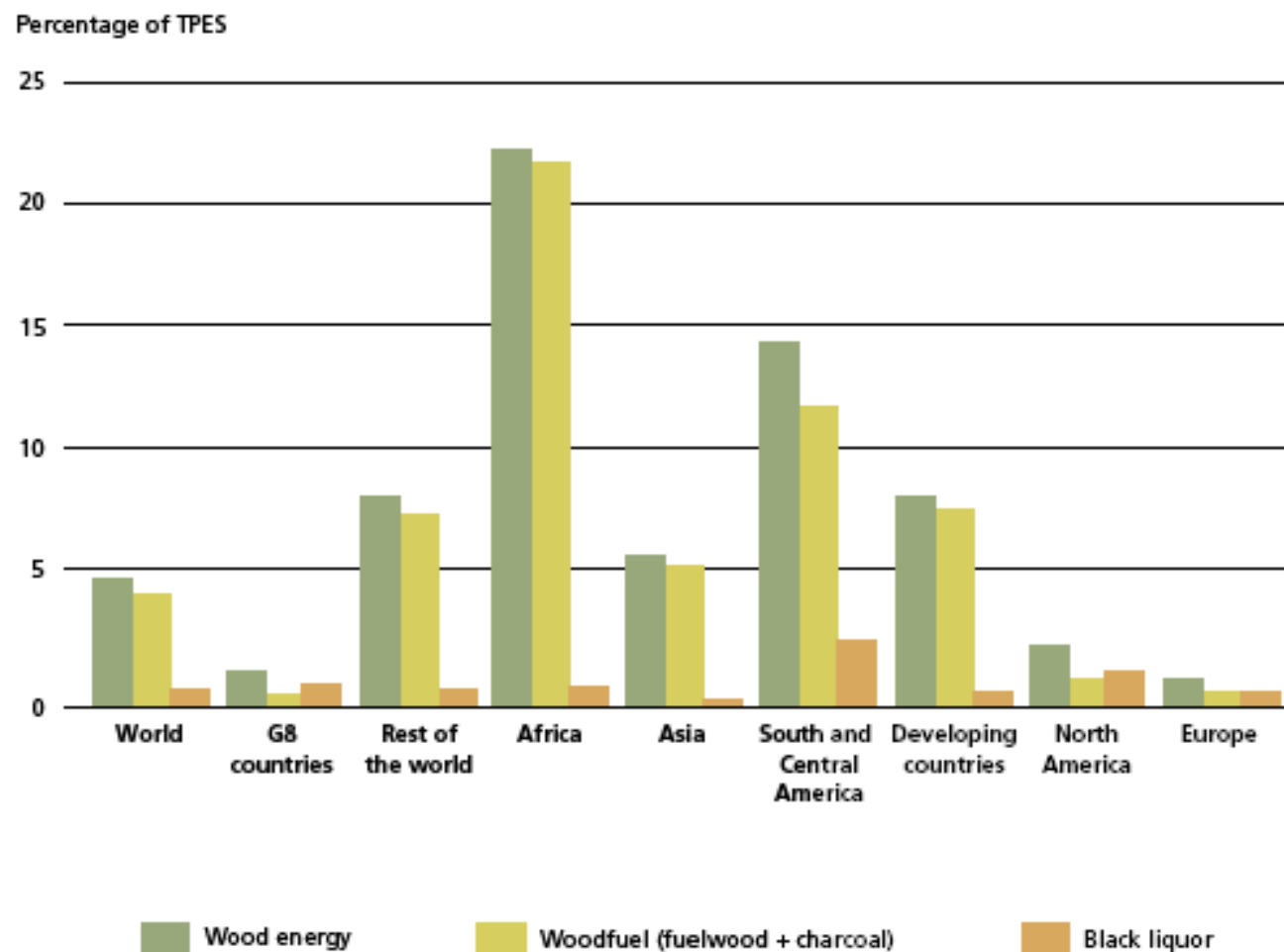
Region	Fuelwood: % of all removed	Million m <sup>3</sup> Fuelwood	% of world fuelwood
Africa	89	550	31
Asia	77	774	44
Europe	19	117	7
N. America	7	47	3
Latin America & Caribbean	61	276	16








## Contribution of wood energy to total primary energy supply, 2001



Source: International Energy Agency, 2003.

- ◆ FRA 2005 estimates for fuelwood are 30% below FAOSTAT 2004 estimates
  - ◆ Fuel also comes from waste of the industrial logs
  - ◆ These supply 30-40% of energy of the wood using industries
  - ◆ 20-25% of industrial logs become an energy source
  - ◆ Black liquor dominates
  - ◆ Thus **>60% of all roundwood are used for energy** (not 50%)
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- A stylized, dark teal silhouette of a mountain range is positioned in the bottom right corner of the slide, extending from the right edge towards the center.

# Woodfuel from plantations

- ◆ Estimates crude – FAO currently collecting better estimates
- ◆ Plantations provide about 30% of industrial logs – **fuel from log residues is ~130 million m<sup>3</sup> / yr.**
- ◆ ‘Non-industrial fuelwood’ logs – **perhaps 145 million m<sup>3</sup> / yr**
- ◆ Equivalent to about 55 million TOE or **0.5% of world energy use**
- ◆ Plantations currently provide ~10% of all wood energy



# Bioenergy thinning





# Residue harvesting






# 2020 Plantation potential

- ◆ Plantation industrial wood production is increasing
  - ◆ ~40% of world production in 2020 years
  - ◆ Thus more log residues
- ◆ Industrial plantation area expanding at 2.5 million ha / year
- ◆ Potential for improving the use of log wastes and logging residues
- ◆ Optimistic 2020 estimate: **plantations may supply 20-25% of wood-energy or 1% of current world energy use.**
- ◆ Energy plantations - an additional option

# Energy plantations

- ◆ How would planting 100-120 million ha of short-rotation energy plantations impact world energy use?
- ◆ Assuming MAI of 8-10 t/ha/year production would be 1 billion t/year
- ◆ Equivalent to about 200 million TOE, or **~2% of current world energy use**
- ◆ However, the impact would depend on utilization of the biomass (e.g. heating vs liquid fuels).

# Conclusions

- ◆ Data on plantation potential is inadequate
  - ◆ However, probably 10% of all wood based energy comes from plantations, and supply 0.5% of current world energy use
  - ◆ This will expand with increased plantation wood supply and increased use of residues
  - ◆ Massive planting of energy plantations could have a small impact on world energy supplies
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- A stylized, dark teal silhouette of a mountain range is positioned in the bottom right corner of the slide, partially overlapping the text area.

Thanks

