

# How the CDM deals with renewable and non-renewable biomass

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# Outline

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- How is biomass energy treated in national GHG inventories?
- When is there a “closed carbon cycle”?
- How does the CDM deal with renewable and non-renewable biomass to replace fossil fuels?
- Could emissions be reduced by replacing non-renewable biomass? (CDM examples)
- CDM tool for estimating other land-related emissions from growing biomass

# Biomass energy in national GHG inventories

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## Sectors in 2006 IPCC Guidelines

- Energy
- Industrial processes and product use
- Waste
- Agriculture, Forestry, and Other Land Use (AFOLU)

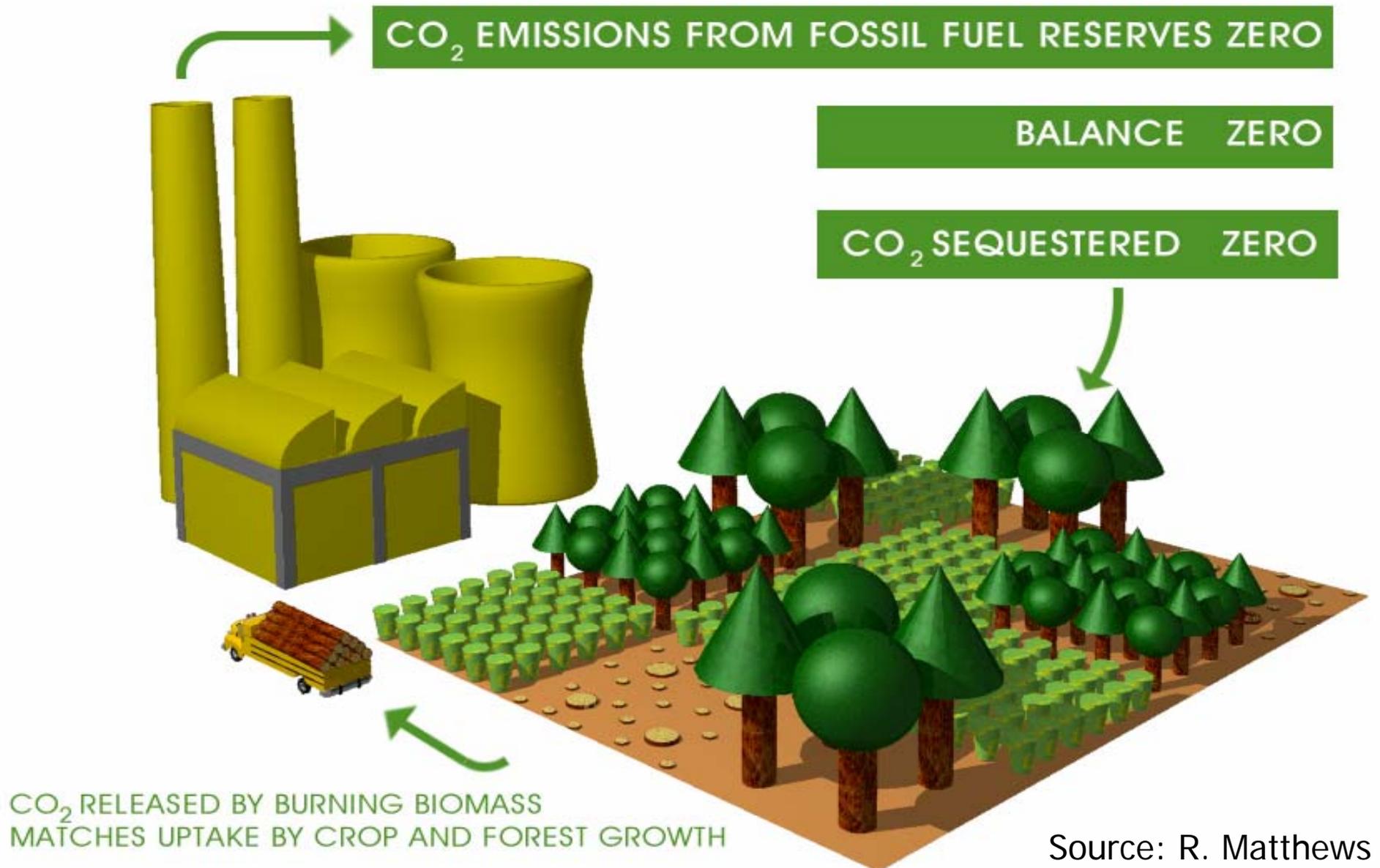
# Biomass energy in national GHG inventories

## 2.3.3.4 TREATMENT OF BIOMASS

Biomass is a special case:

- Emissions of CO<sub>2</sub> from biomass fuels are estimated and reported in the AFOLU sector as part of the AFOLU methodology. In the reporting tables, emissions from combustion of biofuels are reported as information items but not included in the sectoral or national totals to avoid double counting. In the emission factor tables presented in this chapter, default CO<sub>2</sub> emission factors are presented to enable the user to estimate these information items.
- For biomass, only that part of the biomass that is combusted for energy purposes should be estimated for inclusion as an information item in the Energy sector.
- The emissions of CH<sub>4</sub> and N<sub>2</sub>O, however, are estimated and included in the sector and national totals because their effect is in addition to the stock changes estimated in the AFOLU sector.
- For fuel wood, activity data are available from the IEA or the FAO (Food and Agriculture Organisation of the United Nations). These data originate from national sources and inventory compilers can obtain a better understanding of national circumstances by contacting national statistical agencies to find the organisations involved.
- For agricultural crop residues (part of other primary solid biomass) and also for fuel wood, estimation methods for activity data are available in Chapter 5 of the AFOLU volume.
- In some instances, biofuels will be combusted jointly with fossil fuels. In this case, the split between the fossil and non-fossil fraction of the fuel should be established and the emission factors applied to the appropriate fractions.

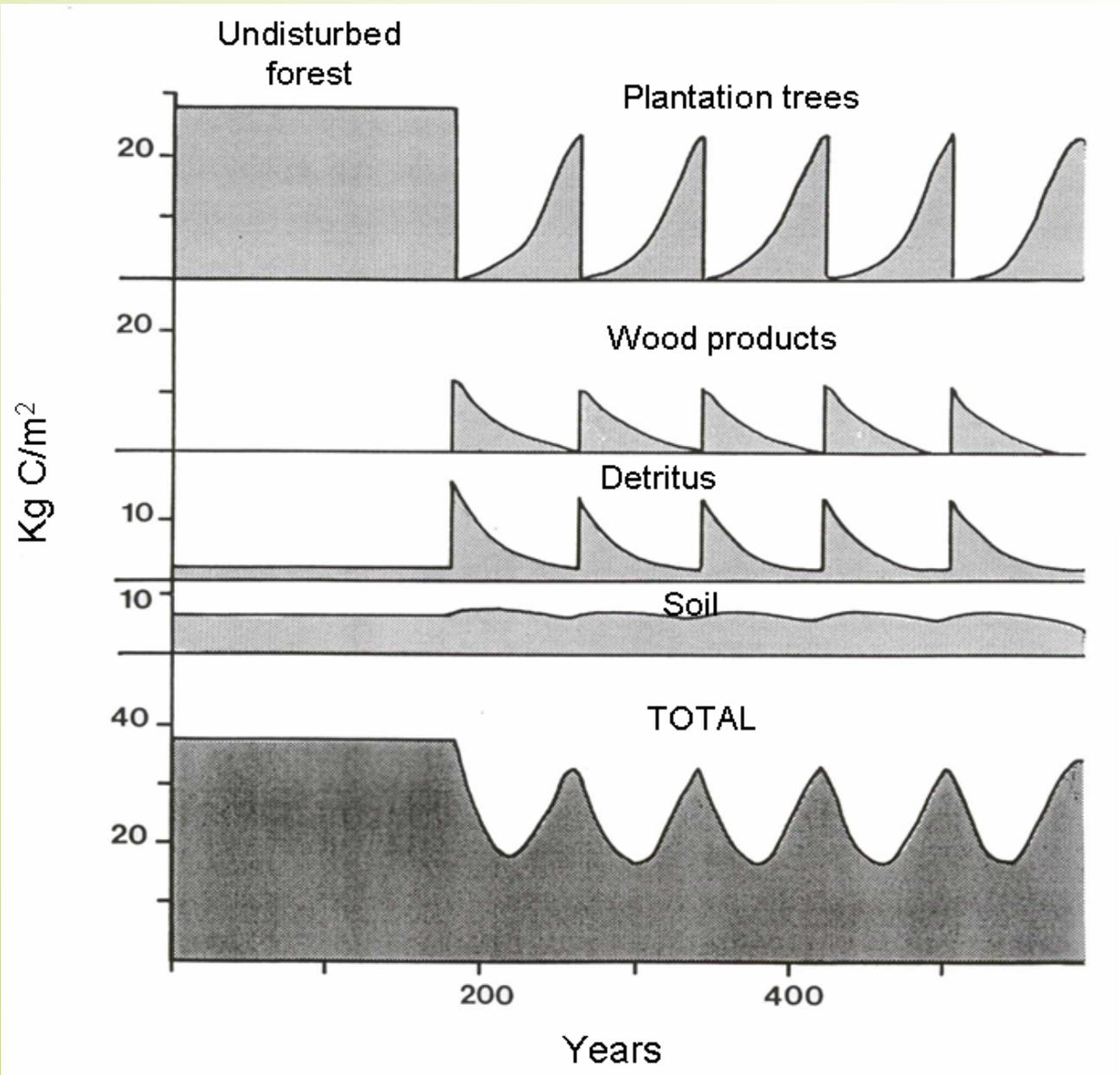
# Bioenergy: closed carbon cycle



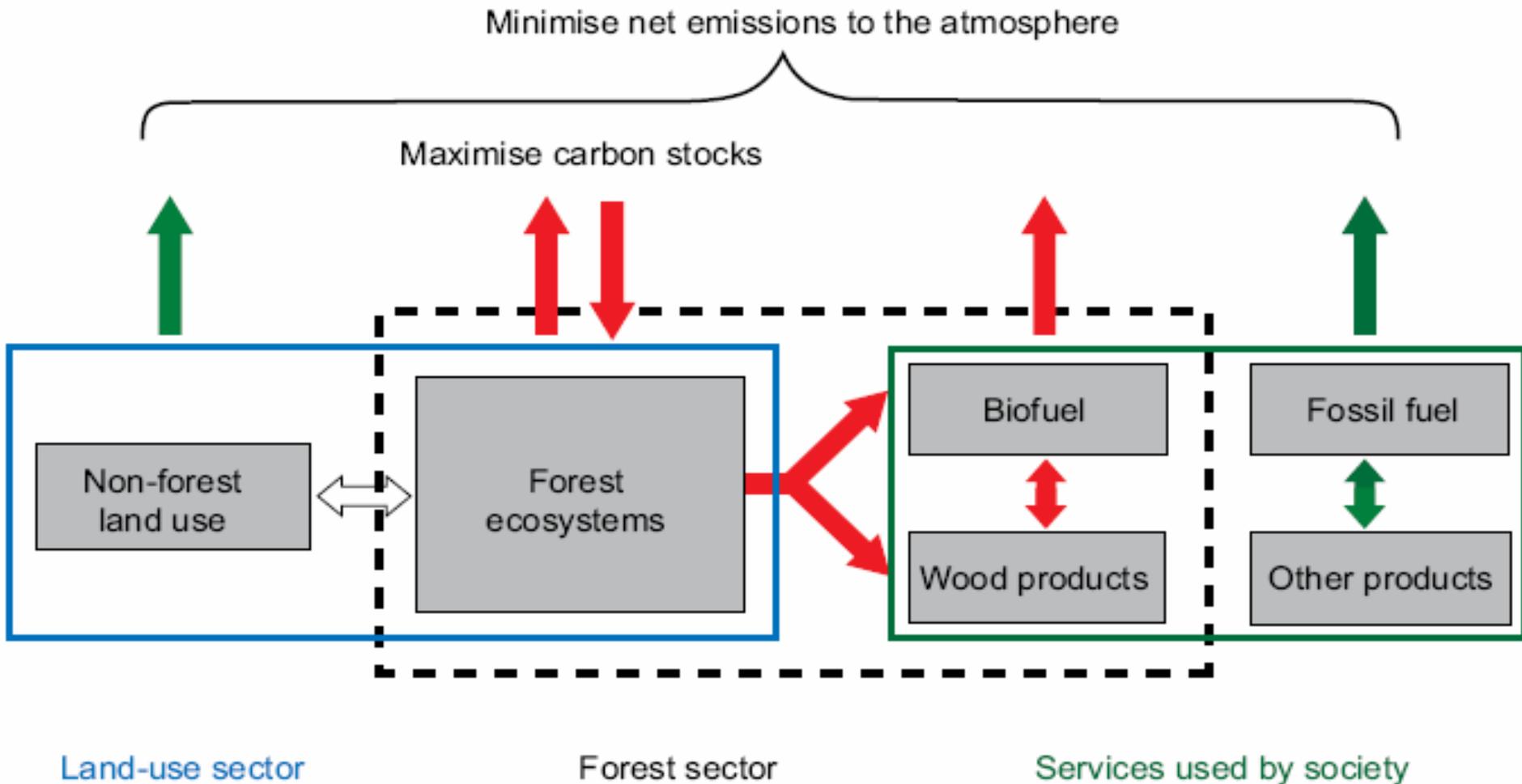
# Technically, bioenergy is CO<sub>2</sub> neutral, if

1. combustion results in lower rates of natural decay (biomass residues)
  2. increased harvesting is accompanied by increased growth (afforestation, reforestation, revegetation, ...)
  3. annual plants are used (corn, miscanthus etc.)
- Simply increasing the use of biomass may lead to net depletion of C stocks

# Example of land-use that depletes C stocks



# Systems view is needed



**Figure 9.3:** Forest sector mitigation strategies need to be assessed with regard to their impacts on carbon storage in forest ecosystems on sustainable harvest rates and on net GHG emissions across all sectors.

# CDM definition: “renewable biomass”

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- Woody biomass from forests or croplands / grasslands where
  - Land remains forest / cropland / grassland
  - Levels of stocks not decreasing systematically
  - Forestry / conservation regulations are adhered with
- Non-woody biomass (conditions apply)
- Biomass residues
- Non-fossil fraction of waste

# CDM Tool: Emissions from biomass production

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- Meth Panel 27, Annex 10
  - Non-forest since Dec. 31 1989
  - No grazing in the project
  - Requires knowledge of land use for last 10 years
- Emissions included
  - Land clearing (CO<sub>2</sub> biomass loss, CH<sub>4</sub> and N<sub>2</sub>O from burning)
  - Soil losses due to changes in practices
  - Fossil fuel consumption in agricultural operations
  - Fertilizer use (upstream, direct and indirect)
  - Urea application
  - Limestone and dolomite application
  - Irrigation (electricity and fossil fuel)
- Emissions not included
  - Leakage

# If non-renewable biomass causes emissions, could these be abated?

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- Since emissions are in AFOLU which is excluded from CDM (only AR), this was not eligible until now
- This excluded most traditional fuelwood and charcoal improvements / replacement projects from the CDM
  - Efficient cooking stoves
  - Solar or biogas stoves etc.
- Solution is a “trick”, taking a hypothetical fossil fuel in the baseline, instead of the non-renewable biomass
- This reduced baseline emissions by factor 4, because fossil fuel more efficient
- Thus needed to combine the fossil fuel emission factor with conversion efficiency of biomass

# New CDM methodologies (SSC), recommended by EB34 for approval at COP13 (Dec 2007)

## ***II.G. Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass***

### **Technology/measure**

1. This category comprises small appliances involving the efficiency improvements in the thermal applications of non-renewable biomass. These technologies and measures include high efficiency cook stoves and ovens using biomass. Project activities, which also involve the switch to renewable biomass, shall apply category I.E.
2. If any similar registered small-scale CDM project activities exist in the same region as the proposed project activity then it must be ensured that the proposed project activity is not saving the non-renewable biomass accounted for by the other registered project activities.
3. Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods.

# New CDM methodologies (SSC), recommended by EB34 for approval at COP13 (Dec 2007)

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## *I.E. Switch from Non-Renewable Biomass for Thermal Applications by the User*

### **Technology/measure**

1. This category comprises small appliances involving the switch from non-renewable biomass to renewable sources of energy. These technologies include biogas stoves, use of solar cookers and measures that involve the switch to renewable biomass.
2. If any similar registered small-scale CDM project activities exist in the same region as the proposed project activity then it must be ensured that the proposed project activity is not saving the non-renewable biomass accounted for by the other registered project activities.
3. Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods.

# Indicators for non-renewable biomass

- Inversion of the previous definition of renewable biomass (to be confirmed through surveys)
  - Statistics
  - Remote sensing
  - Historical data
  - Maps
- Some indicators that may be relevant in surveys:
  - Increasing trend of time spent or distance travelled by users for gathering fuel wood;
  - Increasing trends in fuel wood price indicating scarcity;
  - Trends in the type of biomass collected by users, suggesting scarcity of woody biomass.

# Conclusions

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- Differentiation of renewable biomass increasingly important
- CDM gives practical ways of dealing with it
- But too conservative? (biomass that depletes soil carbon is non-renewable), should there be a gliding scale of "renewability"?
- Task38 will focus on this issue in near future
- Relationship between biomass energy and land use is increasingly recognized
- Recent solutions (to be approved by COP13) also for traditional fuelwood and charcoal improvement