Presentation 2.11: Nature conservation concerns linked to the development of the bioenergy sector

László Máthé
Forest and bioenergy officer
WWF International c/o WWF Hungary

Email: laszlo.mathe@wwf.hu

Abstract
WWF sees bioenergy as one of the most important means to cut GHG emissions in the short term and to provide sustainable energy globally. WWF will continue to actively and effectively promote sustainable bioenergy not just as a solution for climate change but also as a source of additional income for rural communities and contributor to sustainable development.

Modern use of bioenergy, for heat, electricity and transport purposes can greatly contribute to the above mentioned goals. Some scientists estimate that the global bioenergy potential could be as high as 1/3 to 3 times the current global energy consumption1 with woody biomass having a significant share.

However, bioenergies are not automatically environmentally sustainable just because they are a renewable resource. Depending on what kind of biomass is used to produce bioenergy, how and where it was produced can cause significant environmental and social impacts, such as forest degradation, deforestation, forest conversion leading to: biodiversity loss, soil erosion, water over-abstraction and land-use conflicts. Some of the crops on which the current global bioenergy boost is based, have historically proven to be extremely damaging in key WWF ecoregions.

WWF considers that certification, including a wide range of environmental, social issues among other important tasks like land-use planning, careful design of financial incentives, development of best management practices etc. can lead to a sustainable development of the bioenergy sector.

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Nature conservation concerns linked to the development of the bioenergy sector – WWF's perspective

László Máthé
Forest and bioenergy officer

WWF

laszlo.mathe@wwf.hu

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- WWF sees bioenergy as one of the means to cut GHG emissions, along other very important solutions like: decrease of consumption, energy efficiency and other renewables. WWF promotes all of the above mentioned solutions as part of its climate change strategy.

- Modern use of bioenergy, for heat, electricity and transport purposes can greatly contribute to the decrease of GHG emissions. ***Scientists estimate that the global bioenergy potential could be as high as 1/3 to 3 times the current global energy consumption with woody biomass having a significant share.***

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- Bioenergies are not automatically environmentally sustainable just because they are a renewable resource. Depending on what kind of biomass is used to produce bioenergy, how and where it was produced can cause significant environmental and social impacts, such as forest degradation, deforestation, forest conversion leading to: biodiversity loss, soil erosion, water over-abstraction and land-use conflicts.

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	Total Primary Energy Supply (TPES) all sources Mtoe	Of which Renewable Energies (RES) Mtoe	Share of RES in TPES %	Share of Bioenergy in total RES %	Share of Bioenergy in TPES Mtoe / EJ	Share Bioene in TPE %
Africa	539.8	268.7	49.8	97.2	261.2 / 10.9	48.4
Latin America	454.8	129.2	28.4	62.5	80.8 / 3.4	17.8
Asia	1183.9	390.9	33	92.7	362.4 / 15.2	30.6
China	1245.0	242.3	19.5	89.8	217.6 / 9.1	17.5
Non-OECD Europe	99.7	9.1	9.2	55	5.0 / 0.2	5.0
Former USSR	930.5	27.7	3	29.1	8.1 / 0.3	0.9
Middle East	431.3	3.5	0.8	30	1.1 / 0.04	0.2
OECD	5345.7	304.2	5.7	54.6	166.1 / 7.0	3.1
EU-15	1489.43	84.35	5.66	60.58	51.1 / 2.1	3.4
World	10230.7	1375.5	13.4	80.1	1101.8 / 46.1	10.8

Source: IEA Renewable Information 2004

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Global Bioenergy Production Potentials in 2050 (technical)

Assumptions & Variables

- **Medium population growth (to 8.8bn)**
- **Medium increase in per capita food consumption**
- **Establishment of plantations (dedicated crops seen as best potential)**
- **Livestock production shift key variable**

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Feed conversion efficiency	high	high	high	high
Animal production system used (pastoral, mixed, landless)	mixed	mixed	landless	landless
Level of technology for crop production	very high	very high	very high	super high
Water supply for agriculture (rain-fed = r.f., irrigated = irri)	r.f.	r.f./irri.	r.f./irri.	r.f./irri.

Source: Copernicus Institute

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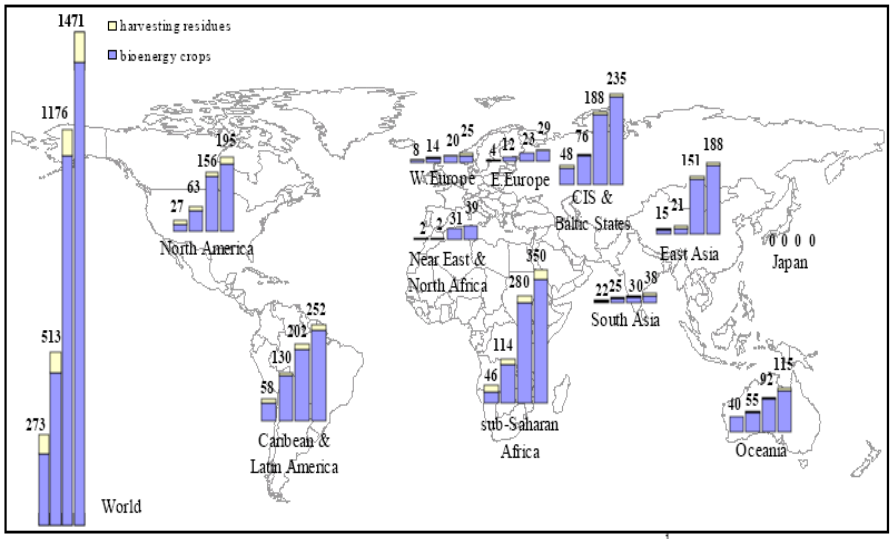

Source: Copernicus Institute

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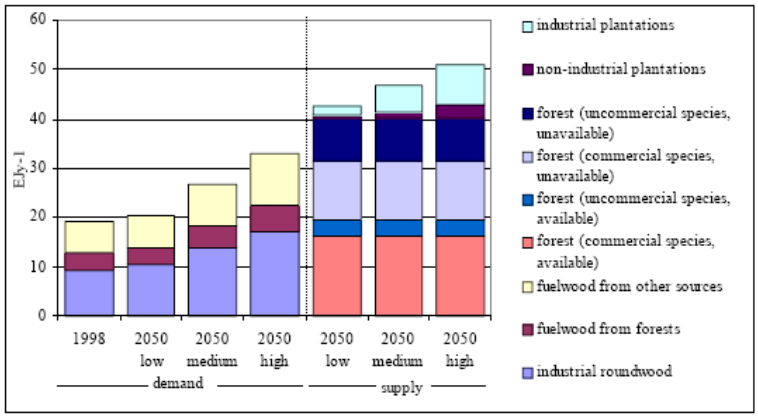

Roundwood demand and supply in 2050 assuming no deforestation (un)c.s. = uncommercial species, (un)av.= unavailable[26].
Sources: (FAO 1998b, 2001, 2002a), own calculations.

- The total (technical) surpluses of annual forest growth is 29 EJy^{-1} (medium demand scenario and medium plantation establishment scenario), with a range of 20 to 38 EJy^{-1} dependent on the combination of demand and supply scenarios.

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However...

- " Roughly half of the global forest areas is old-growth undisturbed forest. For reasons of nature protection these areas may be excluded from supply. ***If undisturbed forest areas are excluded from production, the surplus bioenergy production potential decreases from 33 to 8 Ejy^{-1}.***

- Some two third of the annual forest growth consists of species that are presently commercially harvestable (commercial species). For the remaining production, there is presently no market. ***If the use of wood from natural forest growth is limited to commercial species, the bioenergy potential decreases from 29 to 5 EJy^{-1}.***

- Not all forest areas are available for wood production. ***If the production of roundwood is limited to available areas only, the surplus bioenergy production decreases to 1 EJy^{-1}."***

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How much bioenergy can Europe produce without harming the environment? EEA report 2006

Environmental criteria:

1. No intensification of use on protected forest areas.
2. Foliage and roots are always left on site.
3. The extraction rate for residues from stem and branches is limited according to the suitability of the site.

For complementary fellings, where dedicated harvesting for bioenergy was considered, additional criteria comprise:

4. A reduction of the area available for wood supply in each Member State by 5 % in order to allow for an increase in protected areas.
5. A set-aside of 5 % of wood volume as individual and small groups of retention trees after harvesting in order to increase the amount of large diameter trees and deadwood.

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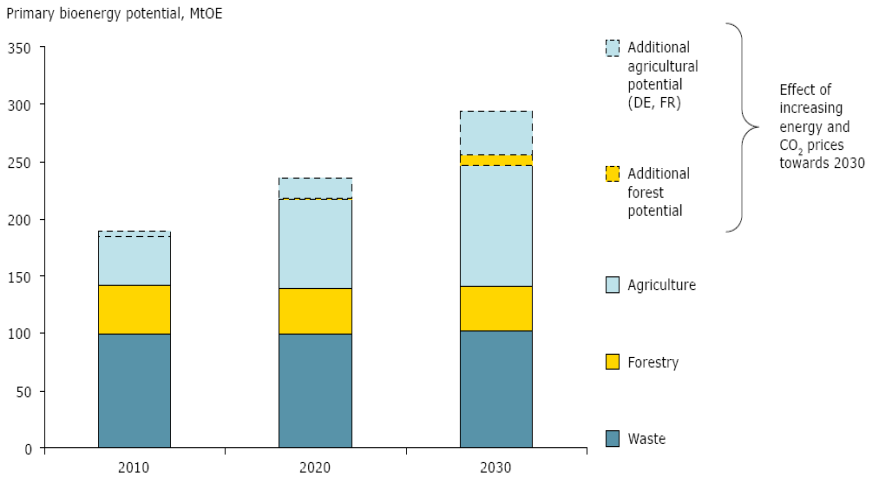

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1. Introduction: The role of bioenergy in WWF's work
2. Current situation
3. Potential development
4. **Potential impacts**
5. What is WWF's approach

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In case of biomass for heat and electricity

- increased utilisation of forest resources in commercial forests

- increased use of annual increment (in forests with high utilisation rate): in most of the large forest holdings the use of annual increment is high (70-80%), while in forest owned by small private owners utilization rate is much lower (45-50%).

- further decreasing quantities of deadwood. A WWF report published in 2004 states that temperate forests need at least 20-30 m^3 /ha of deadwood. 1/3 of the species living in temperate forests depend on deadwood.

In Austria according to recent research there is 6 m^3 /ha deadwood. Taking into account the WWF recommendation 50 million m^3 of wood should be left in the Austrian forests. 13-14 million m^3 is exploited annually.

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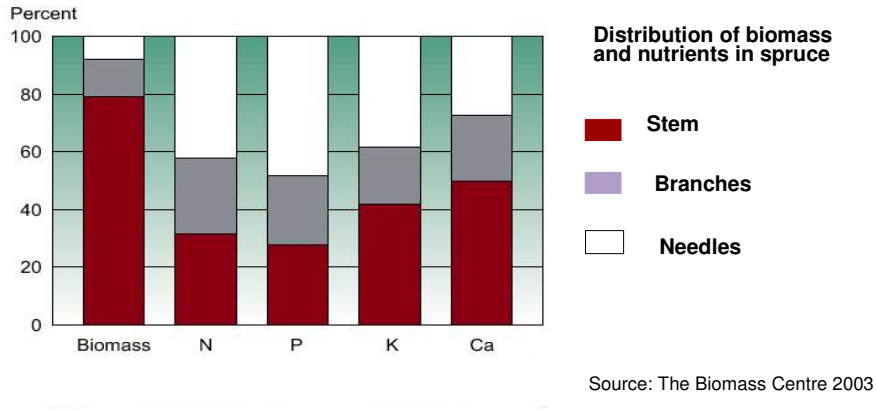
- increased harvest of woody biomass (up to whole tree harvesting) which can lead to nutrient scarcity, disturbance due to increased transport.



Source: The Biomass Centre 2003

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- increased utilisation of forest resources in non-commercial forests

- increased pressure on protected forests

- increased pressure on protective forests which can lead to decreased role in soil protection and watershed protection

In Austria more than half of the potentially available biomass is located on slopes steeper than 40%.

- increased utilisation of forest with non-commercial species.

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In case of biofuels (I. Generation)

- forest conversion, defforestation

Palm Oil: area of oil palm plantation in Indonesia increased by 320% in the last decade. Demand is expected to double by 2020.

Soy: Area planted increased by two thirds in Latin America since 1995. World consumption more than doubled in the last decade. Demand is expected to increase by 40% by 2020.

+ Social issues!

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Research

- Palm-oil for bioenergy: threats & opportunities
- Bioenergies trends & geo-political context
- Mapping “go” and „no-go” areas
- Determining environmentally compatible potential
- Cascade use?

Standards

- Certification for commodities (FSC), non-commodity specific meta-standards. Certification for „green-energy”: EUGENE in Europe. GHG balance.
- German roundtable to develop concept for certification for bioenergy.

Industry partnerships

- Commodity roundtables (soy, palm oil, sugar cane) to improve practices and protecting high conservation value areas.
- Develop best management practices in forestry for example.

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Thank you for your attention!

László Máthé

WWF

laszlo.mathe@wwf.hu