Bioenergy in FAO
Focus on:
Development and Environment

LAMNET Workshop

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Bioenergy resources

Wood

Charcoal

Black Liquor

Forest residues

Energy crops (sugar, sorghum, rapeseed, vegetable oils, etc.)

Agro-residues

Animal residues and by-products (manure, slaughterhouse residues)

Fast growing grasses

Bioenergy forms

Liquids

Ethanol
Methanol
Biodiesel
Vegetable oils

Solids

Charcoal
Briquettes

Gaseous

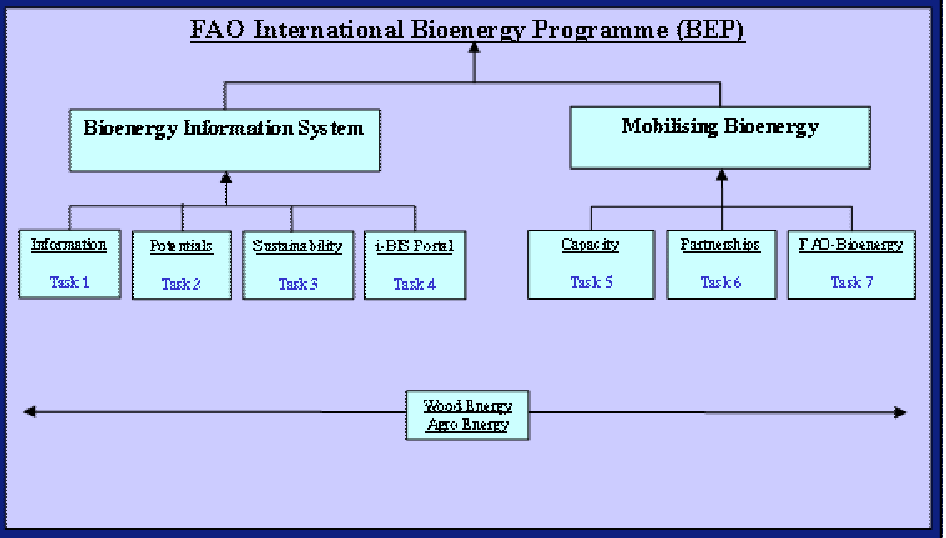
Hydrogen
Methane

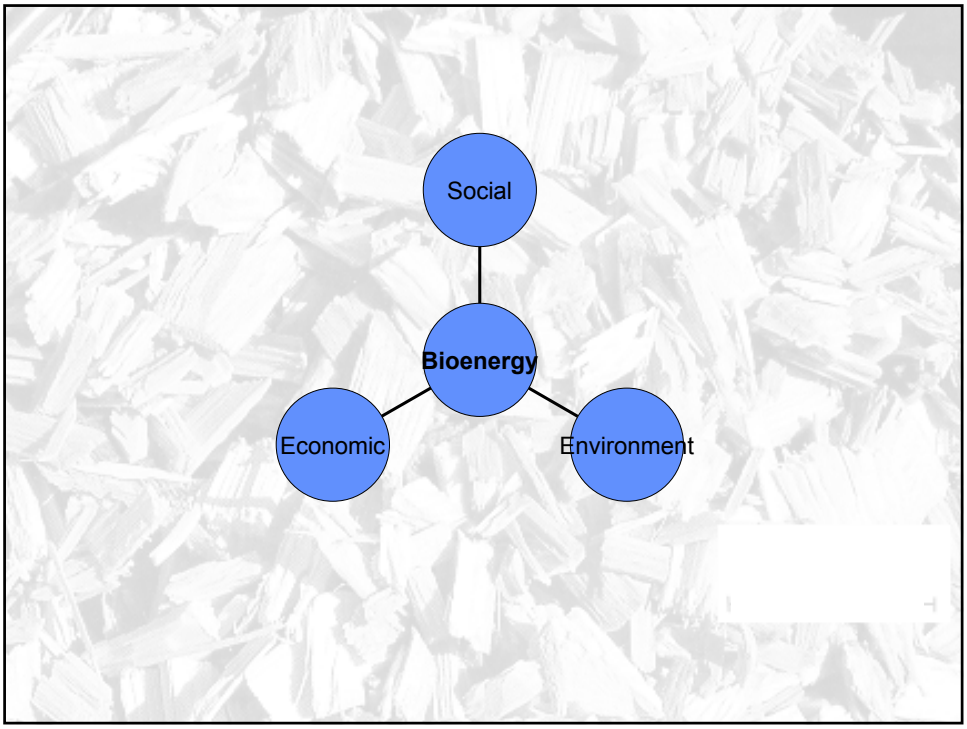
Bioenergy use: 50 EJ/a of 406 EJ/a total energy consumption (1997)

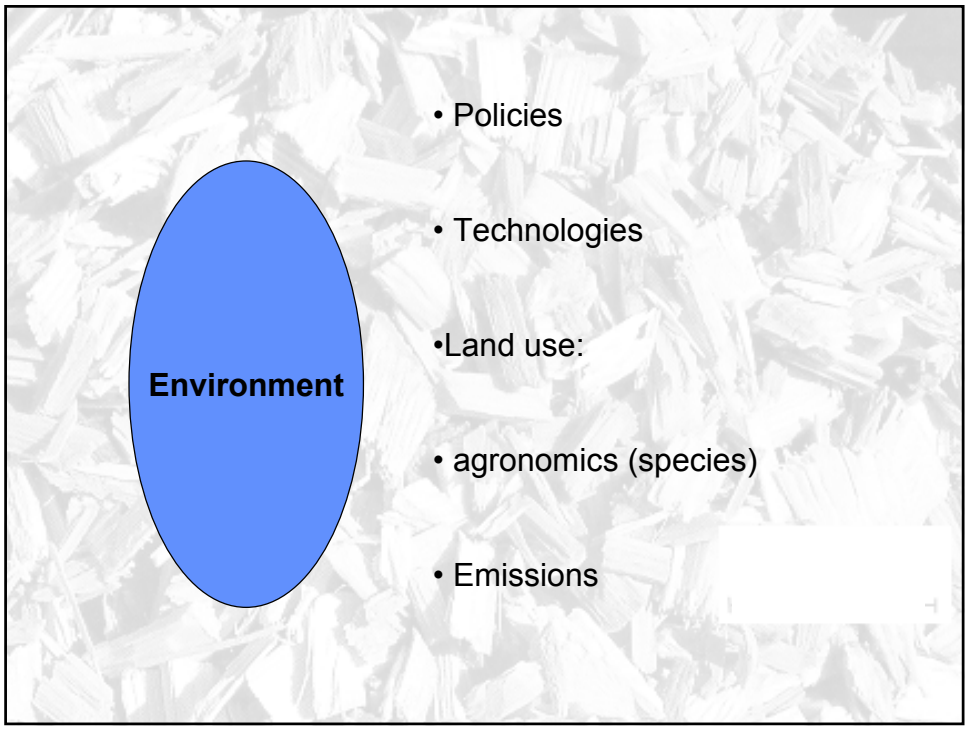
- Use of biomass fuels in 13 countries of different economic, climatic, and demographic conditions

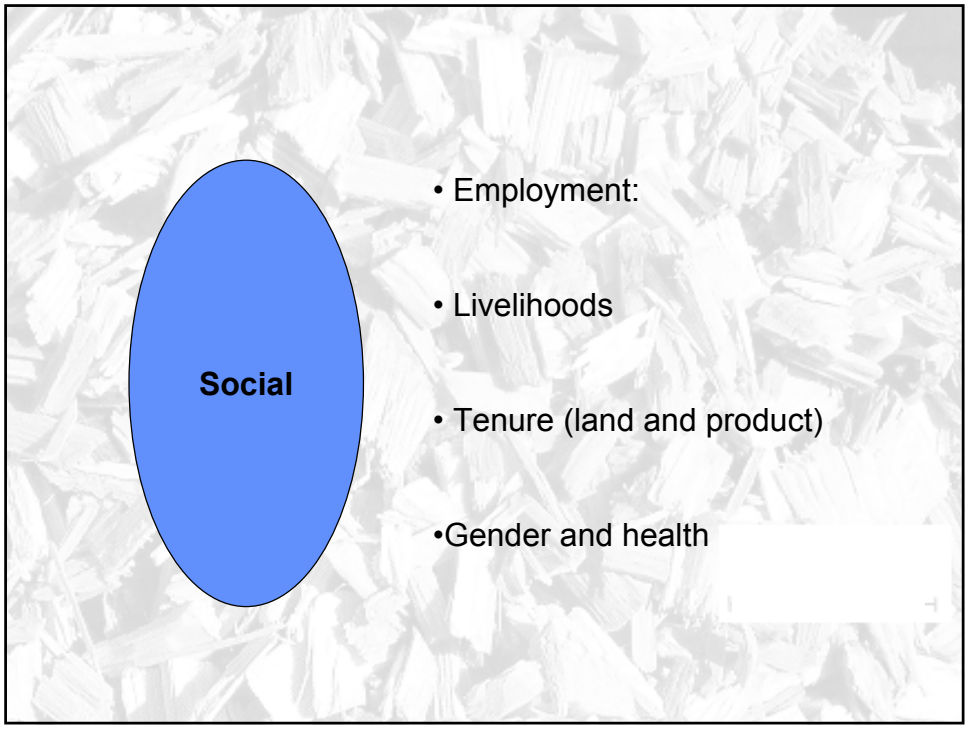
Country	Total energy consump. [PJ]	Bio-energy consump. [PJ]	Share of bio-energy [%]	Popu-lation density [cap/km^2]	Total energy per cap. [GJ/cap]	Bioenergy per capita [GJ/cap]
Austria	1,053	100	9.5	94.3	137	13.0
Germany	15,012	84	0.6	230.8	189	1.1
Japan	17,390	6	0.0	331.9	141	0.0
Poland	3,595	40	1.1	126.5	94	1.0
Sweden	1,971	230	11.7	21.1	230	26.8
USA	84,321	3,482	4.1	28.1	337	13.9
Brazil	5,155	1,604	31.1	18.5	35	10.8
China	36,632	9,287	25.4	129.2	32	8.1
Egypt	1,502	380	25.3	56.3	29	7.2
India	16,554	8,543	51.6	301.6	20	10.1
Malaysia	1,488	663	44.6	58.6	83	37.1
Tanzania	954	925	97.0	32.5	37	35.6
Zaire	435	362	83.2	18.2	12	9.7

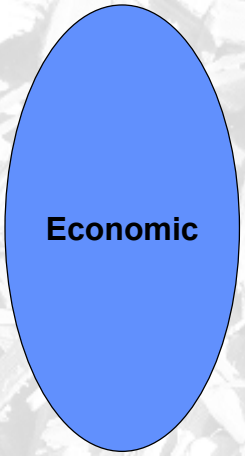
FAO Biomass Energy Programme Schematic






Environment
• Policies
• Technologies
•Land use:
• agronomics (species)
• Emissions


Social
• Employment:
• Livelihoods
• Tenure (land and product)
•Gender and health



- Synergies with food production
- Agroindustry diversification
- Rural infrastructure

OBJECTIVES

- Enhance rural development and food security
- Integration of bioenergy into the forestry and agricultural sectors
- Promotion of the potential of bioenergy in the energy market
- Promotion of bioenergy in climate change mitigation
- Promotion of sustainable management of bioenergy resources, conversion and use
- Promote benefits of energy trade to rural producers

INTEGRATION OF AGRO-ENERGY INTO THE AGRICULTURAL SECTOR

- Developing tools and methodologies for the rapid field assessment of agro-energy potential

- Integration of energy issues into agricultural policies, plans and programmes

- Undertaking capacity building, training and dissemination of information

- Involving the farmer in the decision-making process

PROMOTE THE POTENTIAL OF AGRO ENERGY FOR THE ENERGY MARKET

- Integration of agro energy into the national energy policies and balances

- More equal market for conventional and renewable energies

- Regulation of the energy market

- Stimulate r&d investments on new technologies

FOOD SECURITY AND RURAL DEVELOPMENT

-Stimulating the double role of agriculture as an energy user and an energy producer

- Promoting the generation of employment and rural infrastructure through the implementation of agro energy projects

CLIMATE CHANGE MITIGATION

- Promoting the substitution of fossil fuels

- Assessing the potential of different agro energy systems for GHG reduction

- Mobilizing available mechanisms (CDM, GEF) for agro energy technological development and application

- Providing assistance for the implementation of the Kyoto Protocol

Carbon reduction, substitution and conservation in Agriculture

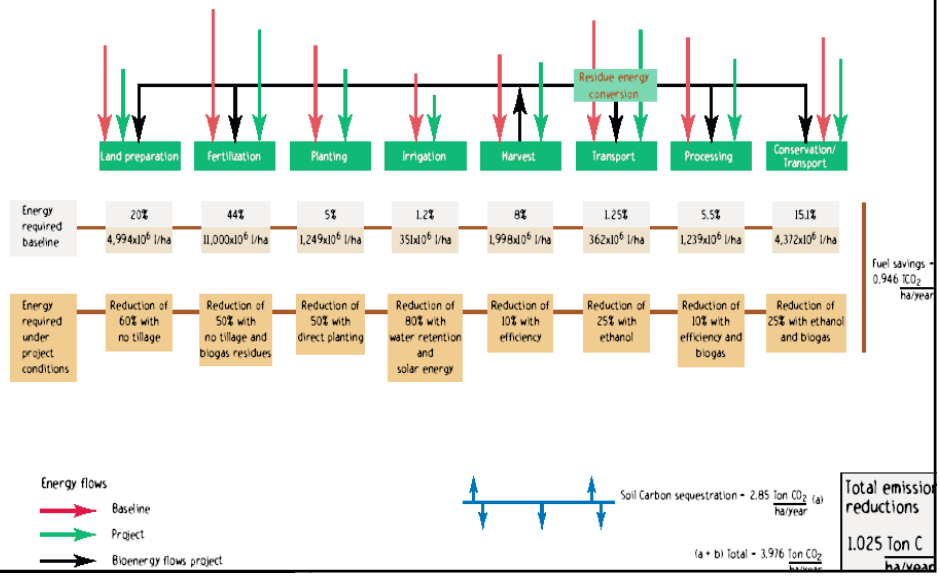
Agricultural practices

Carbon reduction
Water management
Chemical inputs reduction
Agronomic research – new species
Carbon sequestration
Carbon conservation

Bioenergy

Carbon substitution
Biofuels
Electricity
Residue management
Biogas

Energy and biomass flows: renewable energy and conservation agriculture An overall perspective



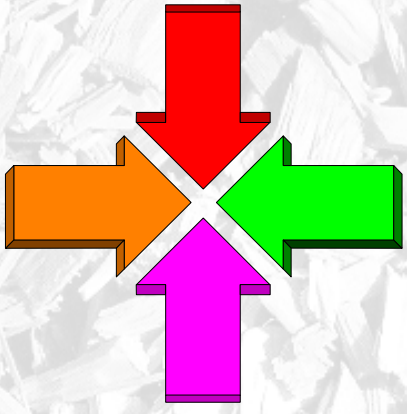
Bioenergy main Benefits

Promotes employment and rural infrastructure

Stimulates the double role of agriculture and forestry:
energy users and energy producers

Reduces Carbon emissions

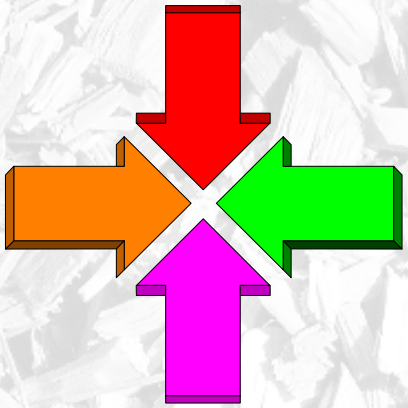
Bioenergy and agriculture- points of convergence



The Society

- **new employment opportunities;**
- **rural emigration halted;**
- **higher quality of life;**
- **enhanced education and health;**

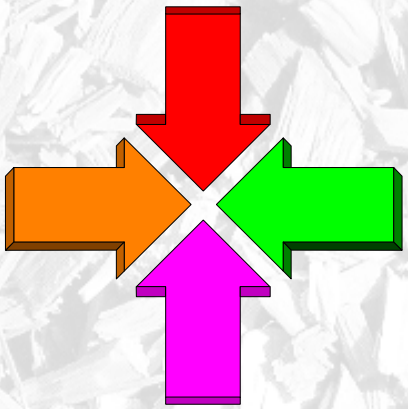
Bioenergy and agriculture points of convergence



The Environment

- **contribute to global environment and carbon substitution: Kyoto Protocol;**
- **cleaner and more sustainable transport;**
- **cleaner and more sustainable industry;**

Bioenergy and agriculture points of convergence



The Economy

- **new markets;**
- **rural economy mobilized;**
- **industrial evolution;**
- **enhanced infrastructure**

CONSTRAINTS

Land use conflicts (food production, landscape)

Environmental impacts of large monocultural plantations

Low energy conversion efficiency

High costs due to market distorsion

What are the main barriers?

- No policies integrating agriculture, forestry, and energy sectors
- Weak local, national and international capacities
- Lack of access to financial resources

Selected FAO activities – 2002/4

- Studies and data
  - Wood energy in all regions
  - Bioenergy potential assessment
  - Bioenergy information system (decision making)
  - Databases
  - Links with climate change (mitigation and adaptation)
  - CDM Methodologies for Agriculture

Selected FAO activities – 2002/4

- Projects
  - Energy strategies – Niger, Mali
  - Wood energy - Mexico, Cuba, Slovenia
  - GEF GHG/emission redtion. - Asia, Brazil, Ethiopia
  - Ethanol – Nigeria; Biodiesel – Ukraine
  - Special Programme for Food Security

Selected activities – 2002/4

- Partnerships
  - → UN Energy
  - → IEA
  - → GEF
  - → UNFCCC and IPCC
  - → LAMNET, GNESD.....
  - → Universities – SAU, IC, UU, UNAM
  - → Associations – ISES, ANES, ITEBE

What are FAO's Comparative Advantages?

- Direct contacts with counterparts
  farmers, public, private, NGOs, academia
- Policy development and decision making tools
- Wood energy information system
- Multidisciplinary expertise
  AG, ES, FI, FO GI, SD, TC
- Besides the classical energy, agriculture and forestry knowledge:
  - → land use, land and product tenure, agronomy, synergies with food production, marginal lands, rural organizations

Main focus of FAO's Bioenergy Programme

International Bioenergy Information System

Support to National Bioenergy Programmes

FAO

is looking for partnerships

for

Bioenergy development

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