

The state of bioenergy and agriculture : today and tomorrow

Sustainable Biofuels Regulations Standards and
Certification Workshop
18-19 September 2012, Brussels

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**Biofuels in the future of agriculture:
competitive or transformative?**

Transformative !

We have no other choice.

Did you know?

The 20th century saw resource use grow **eight-fold**

7 billion tonnes per year

1900

2005



60 billion tonnes per year

2050

140 billion tonnes per year

The next 40 years could continue to a **tripling** resource use if the same resource intensive development paths are followed.



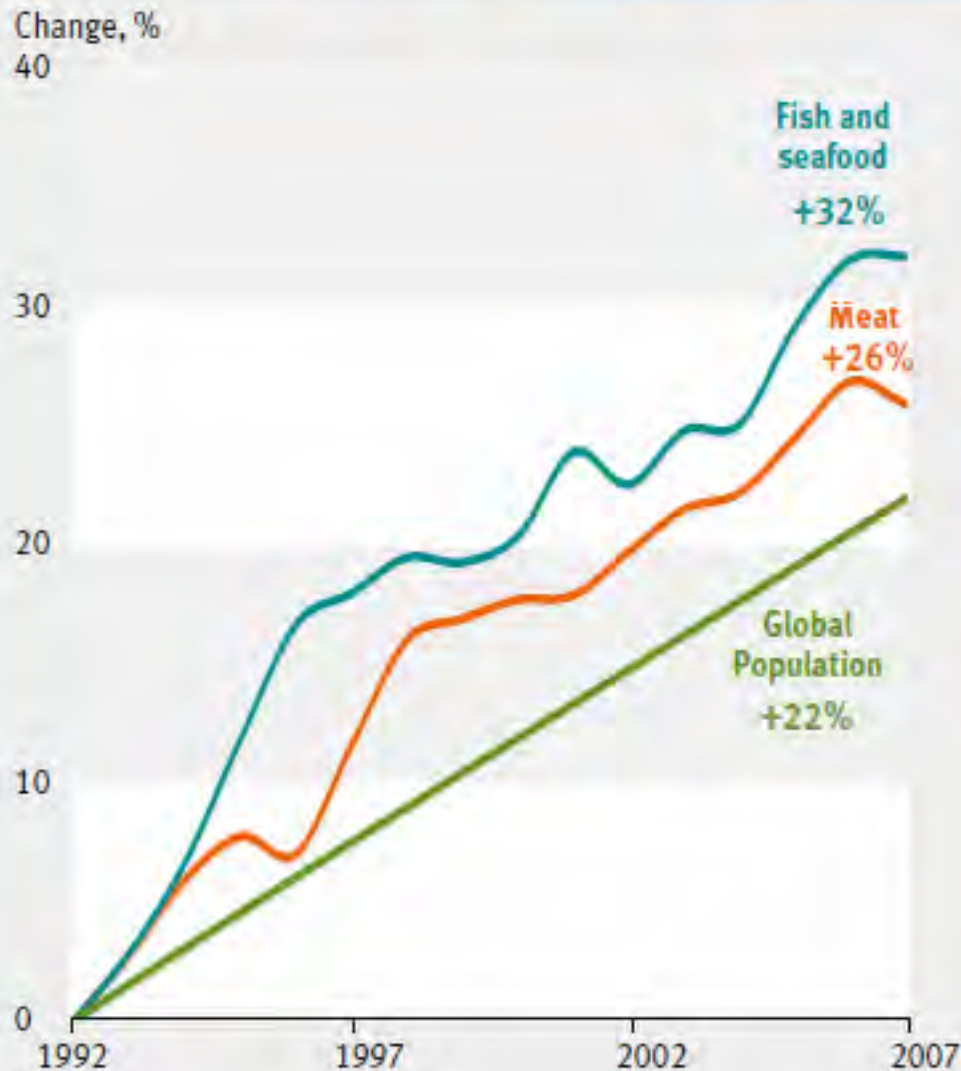
UNEP



International
Resource
Panel

www.unep.org/resourcepanel

Figure 3: Change in global population and in meat, fish and seafood supplies, 1992–2007



Source: UNEP/FAO

Land

The pressure on land resources had increased; economic growth has come at the expense of natural resources and ecosystems.

Water

The limit of sustainability of water resources, both surface- and ground-water, has already been reached or surpassed in many regions.

Demand of water continues to increase and water-related stress on both people and biodiversity is escalating rapidly.

Figure 4: Global irrigation efficiencies, c. 2000

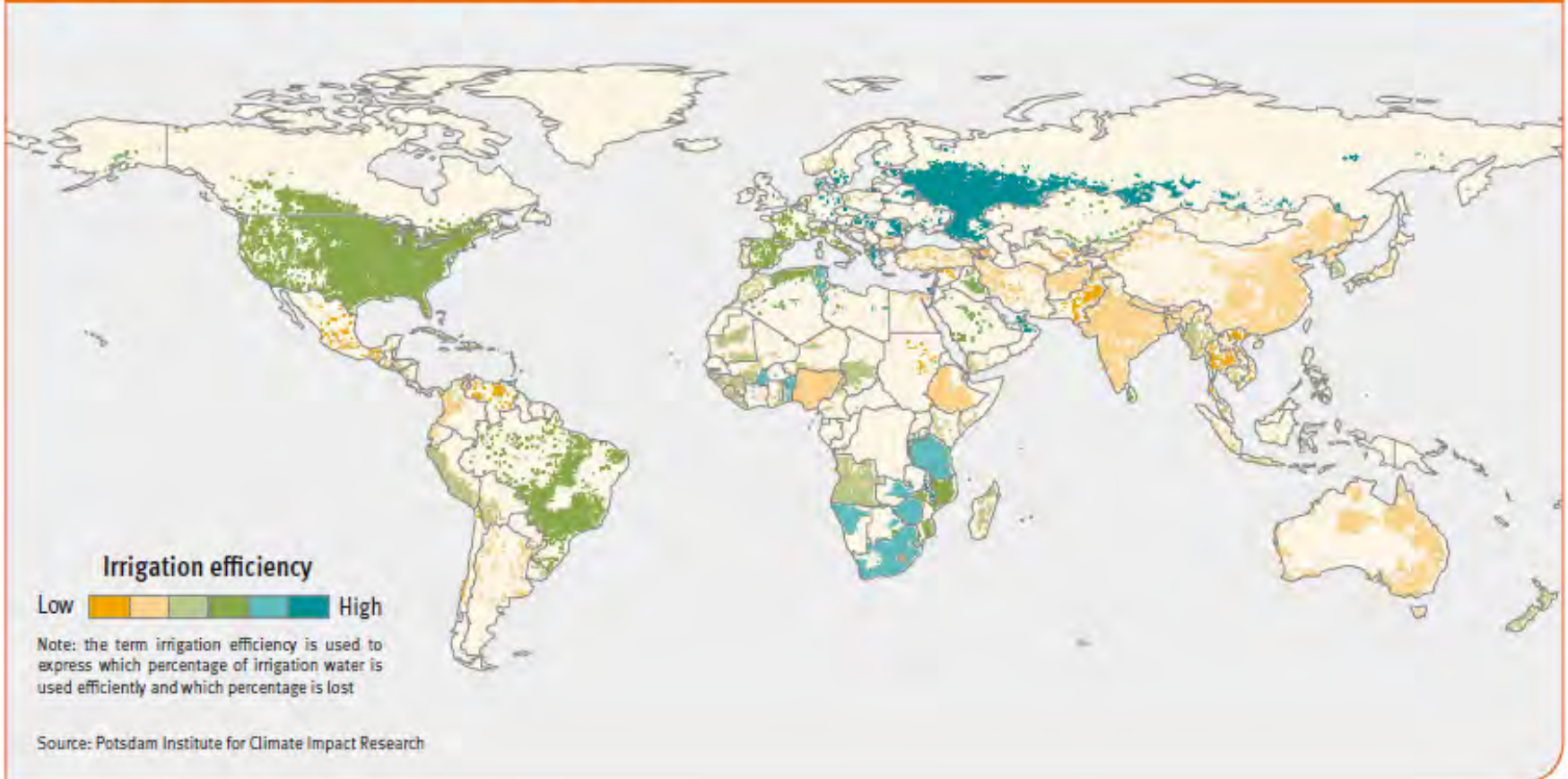
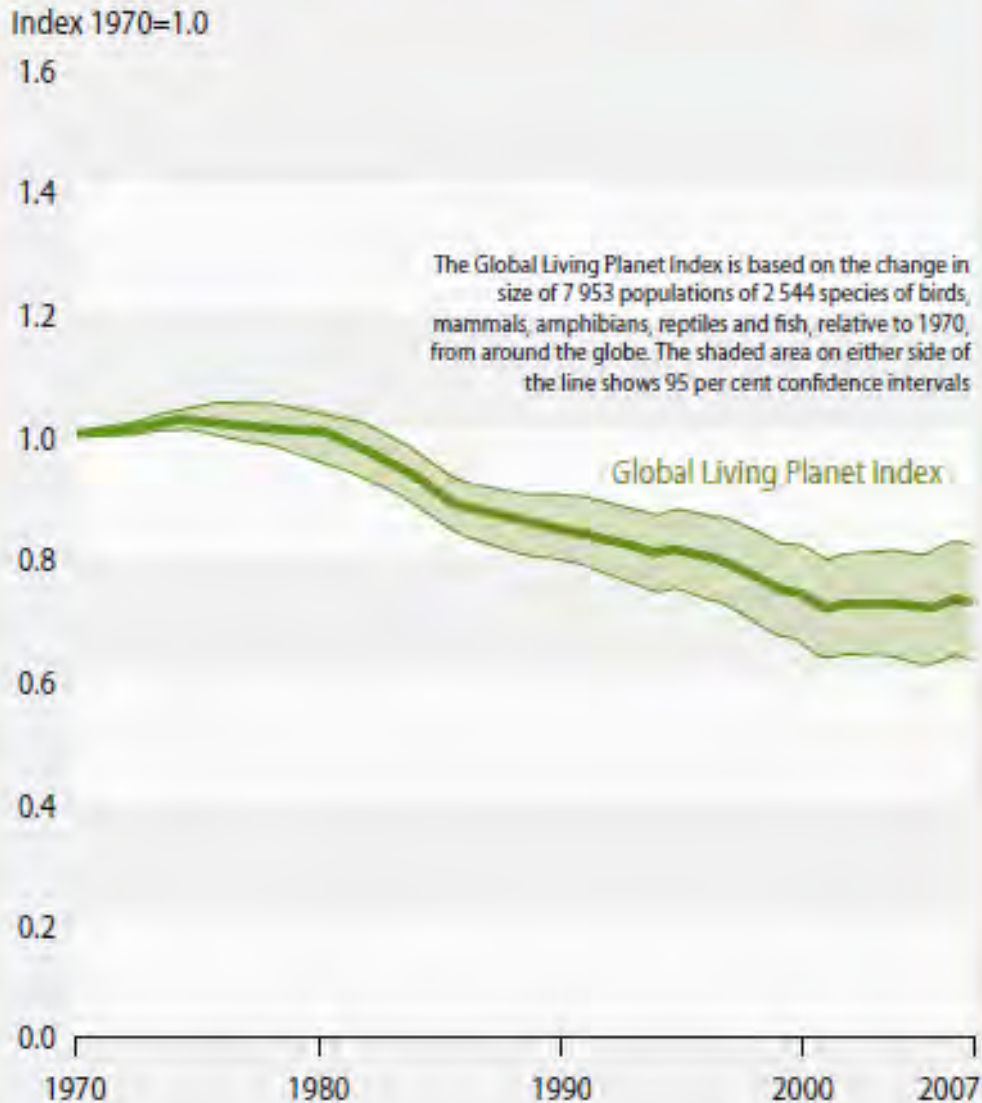


Figure 5: Global Living Planet Index, 1970–2007



Source: WWF

Biodiversity

Up to two thirds of species in some taxa are threatened with extinction;

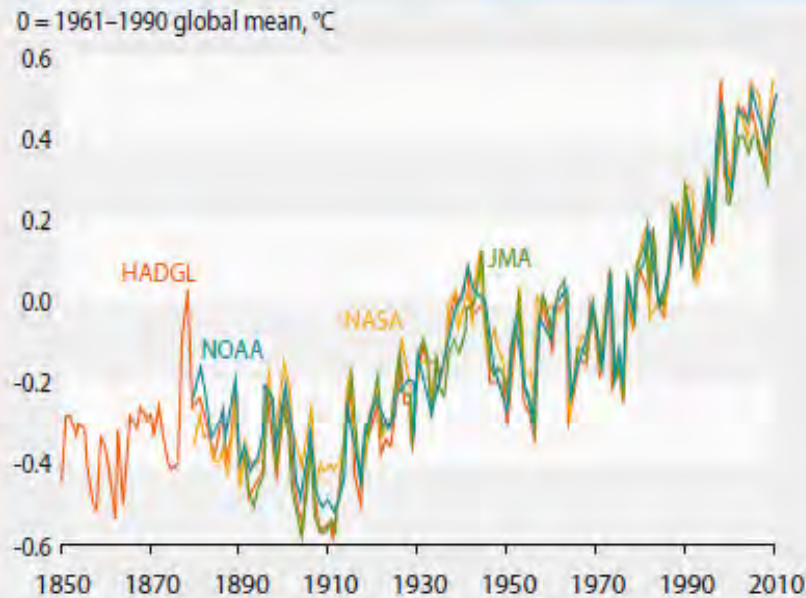
species populations are declining, since 1970, vertebrate populations have fallen by 30 per cent; and since 1970 conversion and degradation has resulted in declines of 20 per cent of some natural habitats.

Climate change will have profound impacts on biodiversity.

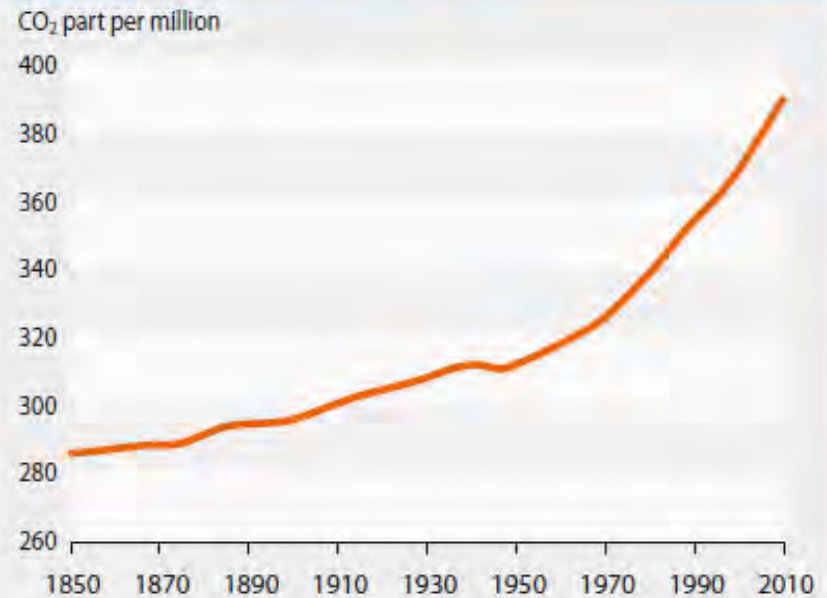
Atmosphere

Reaching the climate goal under the UNFCCC of reducing global GHG emissions so as to hold the increase in global average temperature below 2° C above pre-industrial levels will require not only the fulfilment of current pledges but also transformative change towards a lowcarbon global economy.

Figure 2: Trends in temperature change and atmospheric CO₂ concentrations, 1850–2010



Sources: Climate Research Unit at the University of East Anglia (HADGL), NOAA NCDC, NASA GISS, Japan Meteorological Agency



Sources: Scripps Institute of Oceanography, NOAA

Energy

FIGURE 1. RENEWABLE ENERGY SHARE OF GLOBAL FINAL ENERGY CONSUMPTION, 2010

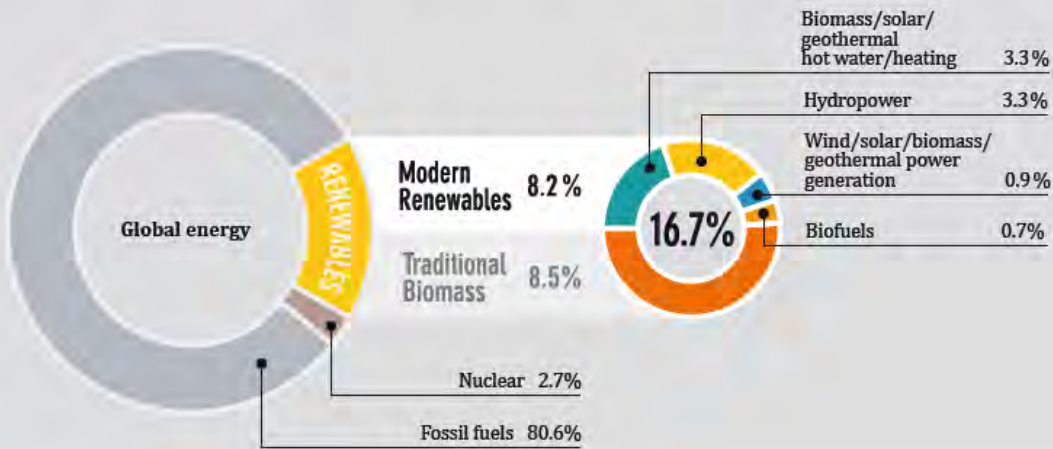


FIGURE 20. GLOBAL NEW INVESTMENTS IN RENEWABLE ENERGY, 2004–2011

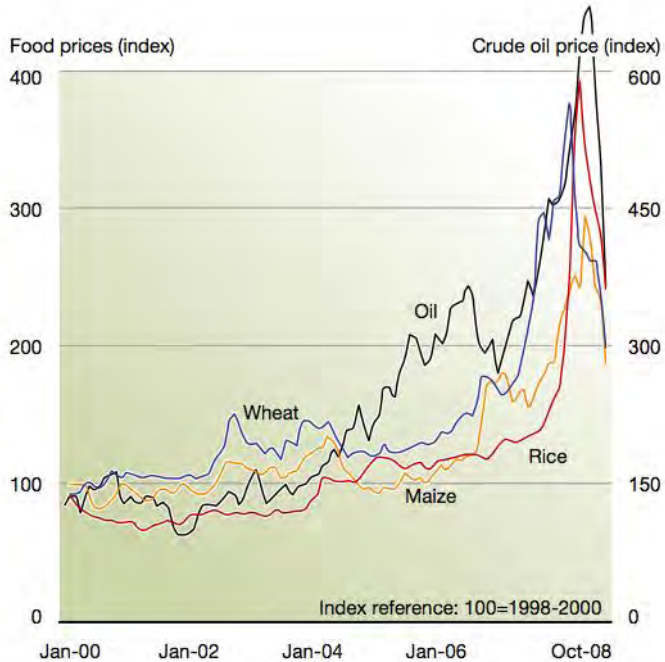


Biofuels provide currently about 3% of global road transport fuels. Ren21 GSR 2012

Thanks to new technologies by 2050, 32 exajoules of biofuels will be used globally, providing 27% of world transport fuel. IEA Biofuel Roadmap

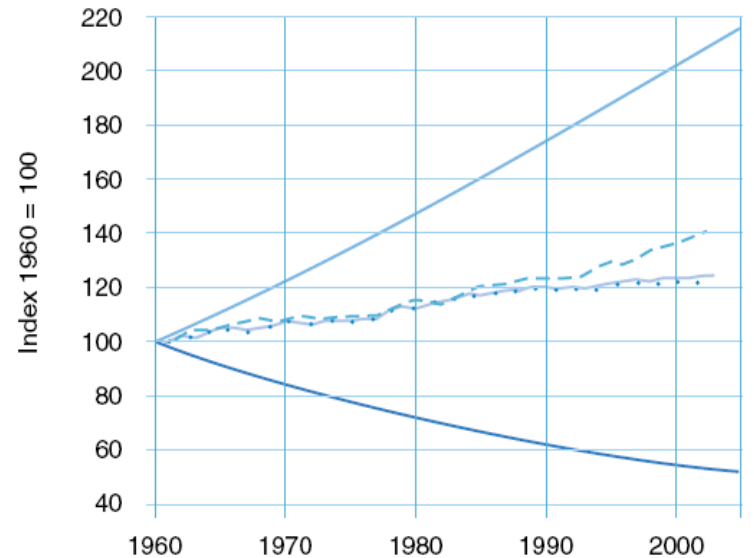
By 2050, 60 per cent of industrial fuels and heat will come from biomass. 13 per cent of building heat will come from biomass and some biomass will still be needed in the electricity mix (about 13 per cent), for balancing purposes with other RE technologies. WWF – The Energy Report. 100% RE by 2050

FOOD AND AGRICULTURE



Price volatility

Yield developments



Demand increases and changing diets

Climate change

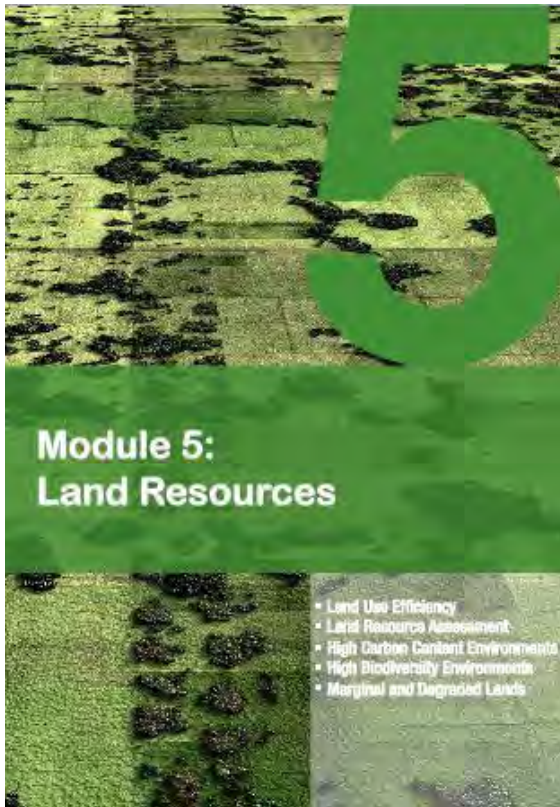
Access to markets

Food Waste

Sources: UN population statistics online; FAOSTAT online

Development of global population, agriculture land and consumption, per person (1960-2005)

- Population, million
- - - Animal products, kcal/person/day
- Total food consumption, kcal/person/day
- Vegetal products, kcal/person/day
- Agricultural area, ha/person



Where?

Land use. Land use change.

Land use planning.

conduct a land suitability assessment ←

identify and map areas of special sensitivity, i.e. 'high risk areas' in terms of potential damage to vital ecosystem functions ←

identify and map existing agricultural production areas ←

overlay infrastructure information to evaluate market accessibility and the economic feasibility of feedstock production ←

conduct 'ground-truthing' in areas with potential for feedstock production, involving local communities and other relevant stakeholders ←

HOW

- Scales
- Business Models
- Good Practices

Module 7: Deployment and Good Practices

- Deployment of Bioenergy Systems
- Integrated Food Energy Systems
- Co-products
- Sustainable Agricultural Practices
- Sustainable Forest Management (SFM)

Integrated Food Energy Systems: integrate, intensify, and thus increase the simultaneous production of food and energy ←

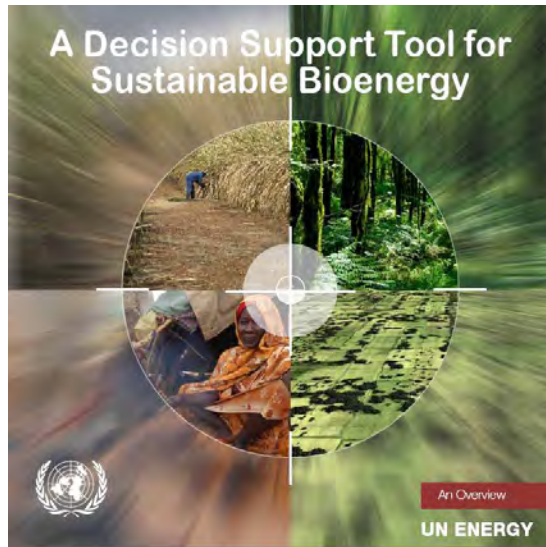
Co-products: ←
improve energy balance and economic viability;
energy cascading, e.g. CHP
non-energy: chemicals and materials

Sustainable Agriculture Practices: ←
Agro-Forestry; Conservation Agriculture; Eco-Agriculture; Good Agricultural Practices; Integrated Pest Management; Invasive Species

Sustainable Forest Management: ←
ensure long-term availability of resources while maintaining ecosystem services such as soil and watershed protection

www.bioenergydecisiontool.org

a web-based tool and living document developed by FAO and UNEP under the framework of UN Energy to assist countries to manage risks and challenges, in a process anchored in each country's specific context:



step-wise guidance for strategy formulation and investment decision-making processes



repository of technical resources and links to existing tools, guidelines and resources



guidance on identification and inclusion of stakeholders in the bioenergy decision-making process and on adopting transparent processes for good governance