



Module 4b

Competing use of biomass

Outline

- > Various uses of biomass
- > Putting energy and biofuels into perspective
- > Biomass in developing countries
- > Biomass and food security



Challenges of bioenergy today

- > GHG balances not OK
- > Endless subsidies needed at current oil prices
- > Land and water use constrain bioenergy to marginal levels
- > Lead to higher food prices
- > Lead to problems for small rural farmers

slide 3/22

Training course on Renewable Energy



Various end-uses of biomass

- > Pulp and paper industry
- > Chemical industry (ethanol)
- > Animal fodder (straw)
- > Human consumption (palm oil, ethanol)
- > But also for energy
- > Problems: land availability & climate change, increasing competition will increase the price

slide 4/22

Training course on Renewable Energy



Basic human needs (F's)

- > Food
- > Feed
- > Fuel
- > Feedstock
- > Fibre
- > Fertiliser
- > Finance



slide 5/22

Training course on Renewable Energy



Uncertainties and key issues

- > Water resources
- > Management of biodiversity
- > Interaction with conventional markets (food, forestry)
- > Proper GHG accounting and land-use management
 - GHG emission reduction of ethanol from wheat or sugar beet or biodiesel from rapeseed is lower than ethanol from sugarcane
- > Balanced economic development (macro & micro scale)
- > Climate change

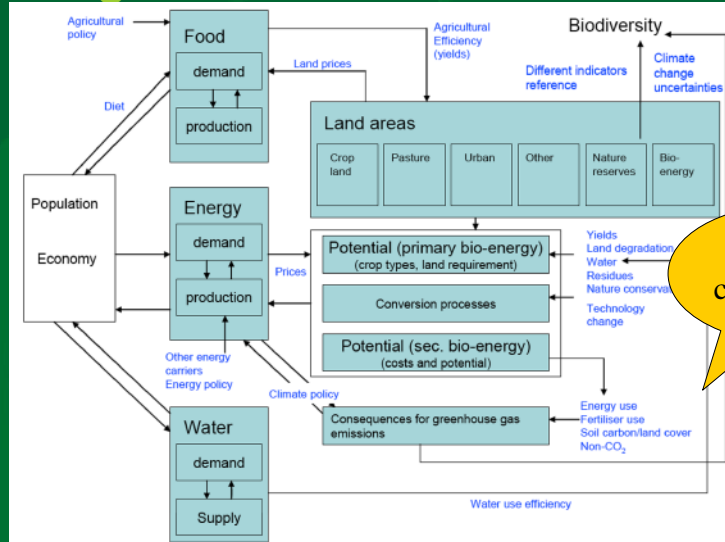


slide 6/22

Training course on Renewable Energy



Integration...



Training course on Renewable Energy

slide 7/22



Agricultural land use!

- > We need a lot more food (especially protein)
- > We don't have (a lot) more (agricultural) land
- > Agriculture and livestock main threat for biodiversity (today...) main consumer of water, main emitter of GHG's
- > Agriculture and poverty interlinked: 70% of the world's poor in rural setting
- > Agricultural productivity is low on large parts of the globe
- > Such agricultural practices often unsustainable as such
- > Poverty (and lack of investment) key driver for unsustainable land use (erosion, forest loss)

Training course on Renewable Energy

slide 8/22



Agriculture to climate links

- > Agriculture in its broad sense accounts for about 1/3 of all GHG emissions
- > Therefore agriculture is part of the problem AND of the solution



slide 9/22

Training course on Renewable Energy



Putting bioenergy into perspective – 2050

- > In most demanding scenario (50% less CO₂ vs 2005)
 - Four-fold increase in biomass use** (20% world energy needs) – again most important renewable
 - Around half the feedstock would come from crop and forest residues (around 100 EJ/yr)**
- > This will require
 - Significant yield improvement
 - **Only 25% from “degraded” and “marginal” land**
 - Hence need to push non-edible feedstock & better food energy integration (by-products, mixed systems, agroforestry)



slide 10/22

Training course on Renewable Energy



Putting bioenergy into perspective

- > If current trends continue, biofuels will use a lot of natural resources
- > Bioenergy and biofuels alone won't solve the world's energy problems
 - First reduce energy consumption
 - Then technology improvement (fuel efficiency)
 - Then renewable energy including bioenergy

slide 11/22

Training course on Renewable Energy



Developing countries - risks

- > Increased bioenergy demand may trigger higher food prices:
 - Most developing countries are net importers of food, in particular cereals
 - Poor already spend between 40-80 % of income on food thus changes in food basket may affect nutritional status
 - Access to land case for majority of poor farmers thus net food consumers - negatively affected by rising food prices
 - Often poor infrastructure and market development

slide 12/22

Training course on Renewable Energy



Developing countries - risks

- > Competition for inputs (land, labour, water and fertilizer) between biomass production for fuel and food
 - Increased pressure on local natural resources base
 - Definition of marginal land may be political and arbitrary
 - Effects on biodiversity conservation, forestry, climate change

slide 13/22

Training course on Renewable Energy



Developing countries - opportunities

- > Increased productivity - investment and progress
- > Establishment of higher value-chain activities in rural areas
 - Diversification of agricultural output
 - Employment and income generation
 - Reduce rural migration to urban centres
- > Extended energy access to rural areas:
 - For producers farming biomass for self-energy use, on-farm use, local communities or commercial markets
 - Reduce the household energy burdens of rural women
 - Supply energy to rural small and medium enterprises (SMEs)
- > Increased energy security

slide 14/22

Training course on Renewable Energy



What is food security?

- > **FAO definition**
 - food security exists when all people, at all times, have physical, social and economic access to sufficient amounts of safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life
- > **Four dimensions of food security:**
 - Availability, Access, Stability and Utilization

slide 15/22

Training course on Renewable Energy



Food security challenge

- > Significant increase in meat consumption, with more needs for energy, land and water because

Re: Grains

- > It takes 3-4 kg of grain to produce 1kg of pork meat
- > It takes 7-8 kg of grain to produce 1kg of beef meat

Re: water

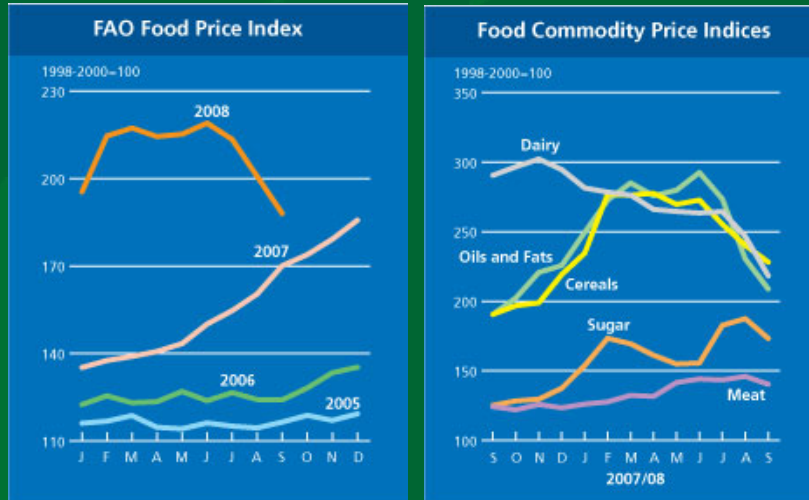
- > 1 kg of wheat requires 1 000 litres of water
- > 1 kg of meat (beef): 15 000 litres of water

slide 16/22

Training course on Renewable Energy



Food security challenge



Training course on Renewable Energy



slide 17/22

Food security challenge

- > 854 million people are suffering from chronic hunger
- > 2 billion people suffer from micronutrient deficiencies



Training course on Renewable Energy



slide 18/22

Political Economy of Food Security and Bioenergy

- > Food Security concerns marginalized and weakest segments of population / market
- > Lack of voice, representation
- > Numerous players: smallholders, limited market access, subsistence farmers
- > Short-term "hand to mouth" survival
- > Energy sector often most powerful segment of market /population
- > Energy top on agenda
- > Often monopolies or oligopolies
- > Large-scale and long-term investments



slide 19/22

Training course on Renewable Energy



On food security.....

- > the availability of adequate food supplies could be threatened by biofuel production
- > food access could be compromised by higher basic food prices
- > increased bioenergy feedstock demand....(could) drive the poor and food insecure into even greater poverty.



slide 20/22

Training course on Renewable Energy



On food security.....

- > BUT the biofuel market offers a new and fast-growing opportunity for agricultural producers and could contribute significantly to higher farm incomes.
- > AND could support productivity growth in agriculture or other sectors with positive implications for food availability and access.



slide 21/22

Training course on Renewable Energy

