What FAO Thinks and Does about Sustainable Bioenergy

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What is not true !

- **Sweeping statements on bioenergy sustainability** - Food crop feedstock always bad / Energy crops and residues always good - **Not that simple!**
- **Simple solutions to reconcile food and fuels are available** - **You must be joking!**

Food-based feedstocks always bad??

- **Not necessarily the case** (e.g. sugarcane thanol in Brazil, outgrower palm oil in Indonesia)
- **Flex crops (that produce food and fuel) do not compete with food if fuel adds to food** – Possible but challenging through:
  - **Yield increase** (e.g. sugarcane in Brazil)
  - **Substitution of export crops** (e.g.: cassava ethanol study in Tanzania)
  - **Integrated food-energy systems** (IFES)
  - **Outgrower schemes**

By-products/residues – Panacea??

- Agricultural/wood/fisheries by-products/ **residues becoming commodities as increasingly used** (IEA predicts residues 25-30% of biofuel feedstock energy by 2050)

- Use of by-products allows for 10-30% reduction in land needs

BUT

Watch out for:

- **competing use of agricultural residues** (soil management – feed – bioenergy)
  - Cheapest fertiliser and soil protection for small-scale farmers
  - Often more than 40% animal feed in developing countries
- **Handling costs !**

Energy crop'/second generation - The silver bullet?

- **More conversion efficient** (uses all parts of the plant)
- **Less DIRECT competition** with food security

BUT

- **Less edible by -products** as whole plant is used for bioenergy
- **Possible negative environment effects**
- **Possible INDIRECT competition with food security**
  - Regarding land use
  - Regarding the use of agricultural residues (soil, feed, energy)
- **No flexibility between food and energy markets**
- **Not ready on large scale yet and for some more**

Certification is the cure for all ills !????

Source: Dubois, 2008

Only works if many other things are in place

Most address poorly food security
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Challenge for smallholders

5. Other elements

4. Monitoring ,evaluation, verification
Audit, certification or participatory review

3. Tools
Incentives and disincentives for policy implementation

2. Policies
Policies, standards, regulations for sustainable bioenergy

1. Actors' roles
Roles (Rights, Responsibilities,& Benefits) of concerned actors and institutions defined and agreed upon

BASIC CONDITIONS
- Secure and equitable tenure conditions
- Favourable market and investment
- Institutionalised participatory decision-making mechanisms
- Formal recognition of primary actors and institutions (government, private sector and civil society)

What is true

- **Sustainable bioenergy is complex** and
- **One should embrace this complexity** rather than oversimplifying things
- **Assessment of bioenergy sustainability must be:**
  - **evidence-based,**
  - **contextualized, and**
  - **integrated**

Enough Land? Most people think Yes

- **Not so much about How much land**
  - Biofuels currently use only 2-3% of all arable land
  - Percentage could rise to 5-8% in the next decades.
  - It depends on many factors (intensification, use of by –products)

- Often more about **Whose and What Land**

WHOSE land

Source: Dubois, 2008

Land belongs to	Size of bionergy production unit	
	Large	Small/community type
Company (private or public)	A	C
Small producer or community	B	D

Outgrower schemes

And WHAT land

- **"No go areas"** (high carbon, high biodiversity) – **Relatively easy to define; more difficult to enforce**

- **"Best bet areas"** Often so-called degraded/marginal/ abandoned land: But controversial/dynamic concepts that **need to be *locally* defined**

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What is more Interesting for investors !?

The ILUC issue

- There can be an **ILUC risk**
- **Models** to assess the ILUC risks **oversimplify the reality**
- There are **ways to reduce the ILUC risk, so more constructive to focus on these**

Key messages on land

Often more about "Whose" and "What" Land

A lot to do with land and natural resources governance

Voluntary guidelines on sustainable tenure governance of land, forests and fisheries

ILUC can be an issue but there are ways to minimize ILUC risks

Biofuels and food prices

- Based on global studies biofuels cause 3 to 75% increase on international food prices - **Jury out for ever!**

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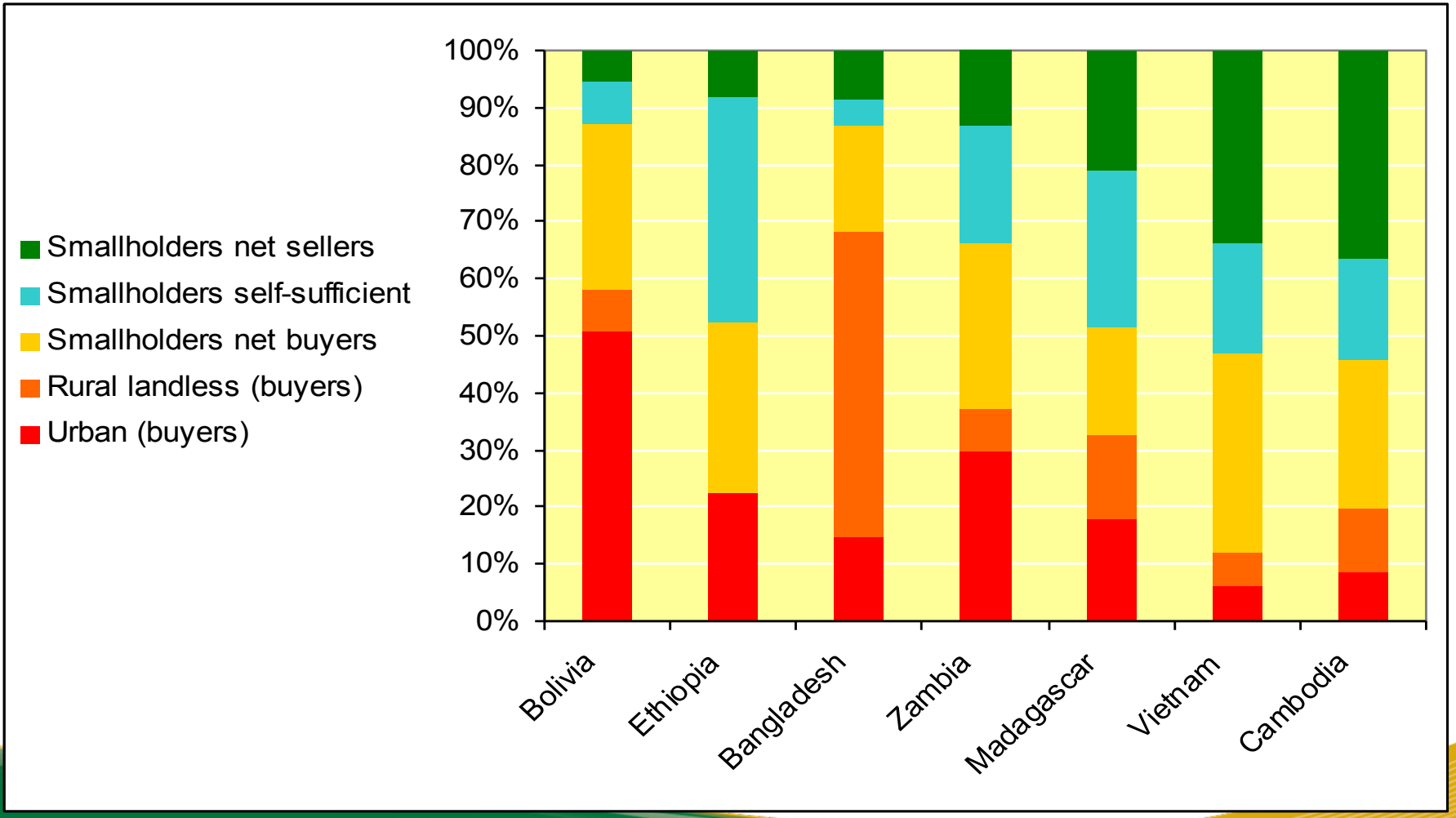
- Need to assess **price transmission** from commodity to food and from international to national and local levels

- Price changes **impact different people in different ways**

Impacts will vary for net sellers and net buyers of food



Source: World Bank 2007

Key message on food prices

There is a link

BUT

Bioenergy is one amongst many other factors that influence food prices

Need to look at it at country and household levels where it matters!

Sustainable Bioenergy: What is needed

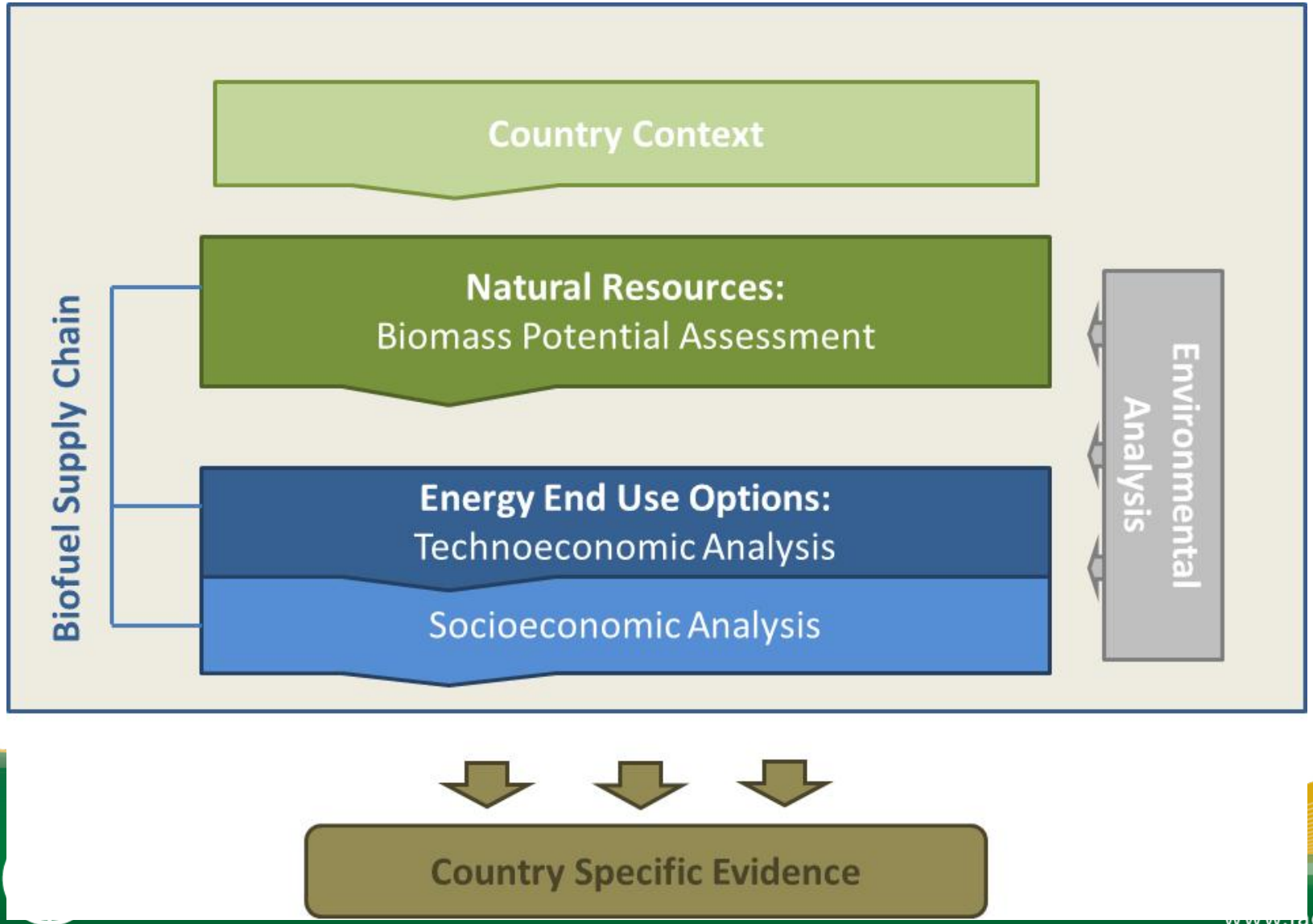
- **An in-depth understanding** of the situation and related opportunities and risks as well as synergies and trade-offs;
- **Implementation of good practices** by investors/producers in order to reduce risks and increase opportunities;
- **An enabling policy and institutional environment** to promote the implementation of good practices;
- **Appropriate monitoring and evaluation** of impacts and performance of good practices and policy responses
- **Political will, capacities** and **good governance** to implement the above

FAO's Sustainable Bioenergy Support Package

Typology of FAO Tools for Sustainable Bioenergy

	Before project implementation: Screening and risk prevention	**After project implementation: Assessment and monitoring**
Local Impact	BEFS Operator Level Tool	IFES analytical framework
Regional/ National impact	BEFS Rapid Appraisal	GBEP indicators

BEFS Sustainable Bioenergy Assessment



BEFS Operator Level Tool (OLT) for Investments

Key environmental and socioeconomic issues to consider in assessing operator level impacts on food security:

1. **Change in the supply of food** (crops and livestock) to the domestic market

2. **Resource availability and efficiency of use** (land, water and fertilizers)

3. **Land** and **income displacement** and related **compensation**

FAO BEFSCI OPERATOR LEVEL FOOD SECURITY ASSESSMENT

Operation Overview	
Name (Company/Sponsor/Organization)	ABC Tanzania Ltd.
Bioenergy Feedstock	Sunflower
Total hectares	15000
Latitude	-6.328125
Longitude	34.1455078125

Country: United Republic of Tanzania

Key	
	Potential Benefit for Food Security
	No Significant Influence on Food Security
	Potential Risk to Food Security

1. CHANGE IN THE SUPPLY OF FOOD TO THE DOMESTIC MARKET

1.1

Former/Current land-use (prior to operation)	hectares
Subsistence agriculture	2000
Commercial agriculture	7000
Livestock grazing	5000
Fallow land	3000

1.4 Change in the supply of food basket items to the domestic food market — **tons**

CROPS

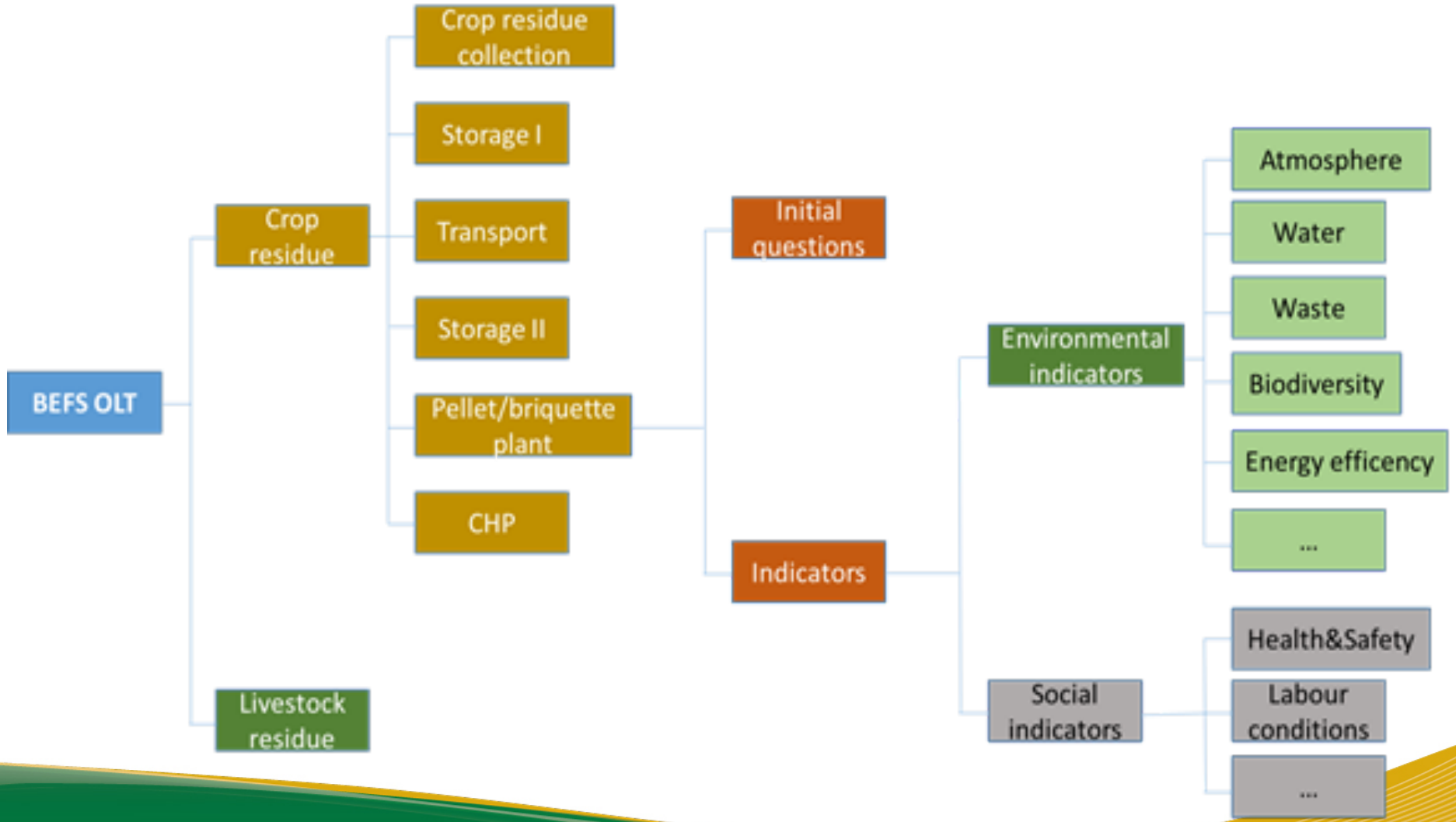
Cereals and tubers	2000
Sugar crops	-4200

2. RESOURCE AVAILABILITY AND EFFICIENCY OF USE

2.1	Land and/or water scarcity	No land and water scarcity
2.2	Land Use Management	Up to two practices

Crop	Land use efficiency	Fertilizer application efficiency
Sunflower	More efficient than national average	
Maize	More efficient than national average	

Complementary OLT on crop and livestock residues



Addressing competing use of residues

- **At territorial level** – The BEFS-RA module on residues

- **At Farm level**: The OLT + Energy module of the FarmDesign optimization algorithm to assess tradeoffs in use of resources in farming systems (with Wageningen)

Examples of good practices

- Agro-ecological zoning
- Outgrower schemes
- Integrated food energy systems
  - Optimizing land use efficiency by mixing energy and food crops (e.g. rotations, agroforestry systems)
  - Optimizing biomass use through cascading uses (e.g. biogas from livestock manure)

How to do it? GBEP Sustainability Indicators

PILLARS		
Environmental	**Social**	**Economic**
INDICATORS		
1. Life-cycle GHG emissions	9. Allocation and tenure of land for new bioenergy production	17. Productivity
2. Soil quality	10. Price and supply of a national food basket	18. Net energy balance
3. Harvest levels of wood resources	11. Change in income	19. Gross value added
4. Emissions of non-GHG air pollutants, including air toxics	12. Jobs in the bioenergy sector	20. Change in consumption of fossil fuels and traditional use of biomass
5. Water use and efficiency	13. Change in unpaid time spent by women and children collecting biomass	21. Training and re-qualification of the workforce
6. Water quality	14. Bioenergy used to expand access to modern energy services	22. Energy diversity
7. Biological diversity in the landscape	15. Change in mortality and burden of disease attributable to indoor smoke	23. Infrastructure and logistics for distribution of bioenergy
8. Land use and land-use change related to bioenergy feedstock production	16. Incidence of occupational injury, illness and fatalities	24. Capacity and flexibility of use of bioenergy

Agreed by 23 countries & 13 international organizations involving a total of 46 countries and 24 int. organizations

FAO's key messages on bioenergy

- **Sustainability of bioenergy is context specific.** Therefore its assessment must be based on reality not models and global studies
- **Tools and knowledge are now available** to help governments and operators reduce risks and enhance opportunities of bioenergy development
- *Per se* **biofuels are neither good nor bad.** What matters is the way they are managed
- **Bioenergy** should be viewed as another **opportunity for responsible investment in sustainable agriculture and rural development**.

Thank you for your attention!

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