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Bioenergy and Food Security Projects

Bioenergy: Risks and Opportunities

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Outline

- Food security definition and dimensions
- Bioenergy and food security linkages: risks and opportunities
- Sustainable bioenergy development
- Risk prevention and management

Food Security

- The concept of food security has evolved significantly over time. The definition of food security which has been formally endorsed at the global level, is the one adopted at the 1996 World Food Summit held in Rome:

  Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

Food Security

- This definition introduces four main dimensions of food security:
  - Physical **AVAILABILITY** of food
  - Economic and physical **ACCESS** to food
  - Food **UTILIZATION**
  - **STABILITY** of the other three dimensions over time

The four dimensions of food security

1. **AVAILABILITY**: Physical AVAILABILITY of food

   Food availability addresses the **"supply side" of food** security and is determined by the level of food production, stock levels and net trade

However, it became obvious that an adequate supply of food at the national or international level does not in itself guarantee household level food security

2. **ACCESS:** Economic and physical ACCESS to food

   Access to food is influenced by market factors and the **price** of food as well as an **individual's purchasing power**, which is related to **employment** and **livelihood** opportunities.

The four dimensions of food security (contd.)

3. **UTILIZATION:** Food UTILIZATION

   Utilization is commonly understood **as the way the body makes the most of various nutrients** in the food. This food security dimension is determined primarily by people's **health status**. General **hygiene** and **sanitation**, **water** quality, health care practices and **food safety** and quality are determinants of good food utilization by the body.

The four dimensions of food security (contd.)

4. **STABILITY:** STABILITY of the dimensions

   Stability refers to stability of the other three dimensions over time. The phrase **"at all times"** refers to the stability dimension of food security. It emphasizes the importance of having to **reduce the risk of adverse effects** on the other three dimensions: food **availability**, **access** to food or food **utilization**.

For food security objectives to be realized, all four dimensions must be fulfilled simultaneously.

Source: Food Security Concepts and Frameworks www.foodsec.org and Food Security, FAO Policy Brief, Issue 2, June 2006

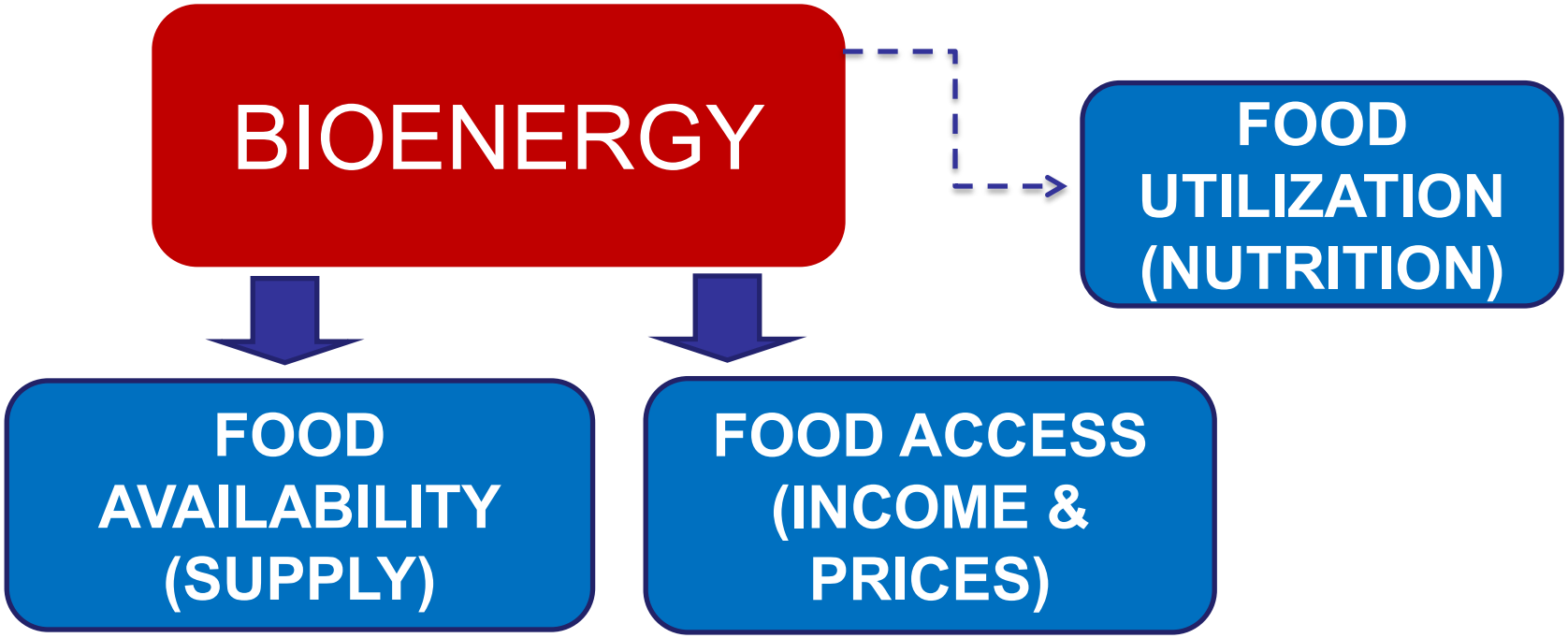
Food Security and Bioenergy Linkages

Food Security Dimension	Bioenergy Link	Risk	Opportunity
Food Availability			

Food Security and Bioenergy Linkages

Food Security Dimension	Bioenergy Link	Risk	Opportunity
Food Utilization			

Linkages: Bioenergy and Food Security



WHICH SOLUTIONS ARE VIABLE?

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Broader opportunities, tradeoffs

- **Energy security** (diversification) and access
- **Rural development**
- **Climate change mitigation**
- **Infrastructure development etc.**

All this depends on:

- how the sector is **developed** at **all levels** (feedstock production, processing and distribution)
- how the development of the sector is **planned** and how production is **managed**
- on **opportunity costs** and comparison with **other *development* alternatives**

Need to assess the **tradeoffs**, might need some **safeguards**

Key variables of the sector

The viability of sustainable bioenergy development will depend on a number of factors:

- the types of **feedstock**, **processing technologies** and **biofuels**
- local **environmental conditions**, eg agroecological conditions, sustainable production of biomass
- local **socioeconomic conditions**, eg land tenure, farm size
- the types of **business models** and **management practices** along the bioenergy supply chain, eg. smallholder inclusion, good environmental and socioeconomic practices
- the regional, national and local **policy environment**, especially in the areas of energy, agriculture, food security and environmental protection

A qualifier: Prices and impacts
Rising food prices: multiple drivers

- Declining investments in agriculture
- Declining cereal stocks
- Demographic growth
- Economic growth and dietary changes
- Exchange rates and export restrictions
- **Growth in biofuel demand**
- Rising energy costs
- Speculation
- Weather-related production shortfalls

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A qualifier: Prices and impacts
Who gains and who loses

Factors including international and domestic bioenergy policies

Food price changes

Country level impacts
Household level impacts

Countries: net importers vs net exporters
Households: net buyers vs net sellers
Vulnerability

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An Example: Tanzania

Which specific food crops do I need to be concerned of?

- **Food security** staples: **Maize** and **Cassava**

Ranking	Commodity	Calorie Share (%)
1	Maize	33.4
2	Cassava	15.2
3	Rice (Milled Equivalent)	7.9
4	Wheat	4.0
5	Sorghum	4.0
6	Sweet Potatoes	3.3
7	Sugar (Raw Equivalent)	3.3
8	Palm Oil	3.0
9	Beans	2.9
10	Beverages, Fermented	2.7
11	Milk – Excluding Butter	2.2
12	Bovine Meat	1.8
13	Pulses, Other	1.7
14	Plantains	1.5
15	Millet	1.4
Subtotal share for selected items		88.5
Total Calories per capita		1959

Data source: FAOSTAT

An Example: Cambodia

Which specific food crops do I need to be concerned of?

- **Food security** staples: **Rice**

Ranking	Commodity	Calorie Share (%)
1	Rice (milled equivalent)	65
2	Cassava	7
3	Prigmeat	4
4	Sugar	4.0
5	Sorghum	4.0
6	Sweet Potatoes	3.3
7	Sugar (Raw Equivalent)	3.3
8	Palm Oil	3.0
9	Beans	2.9
10	Beverages, Fermented	2.7
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Subtotal share for selected items		88.5
Total Calories per capita		1959

Data source: FAOSTAT

An Example: Peru

Which specific food crops do I need to be concerned of?

- **Food security** staples:
  Rice, maize, wheat and potatoes

Ranking	Commodity	Calorie Share (%)
1	Rice (milled equivalent)	22
2	Maize	13.2
3	Wheat	11.7
4	Potatoes	9.9
5	Sugar (raw equivalent)	8.5
Subtotal share for selected items		65
Total Calories per capita		2 595

Data source: FAOSTAT

To summarize

- Why do I want to develop bioenergy?
- Who do I want to target, e.g. national versus local level?
- Which are the main food staples in the country and which specific food crops do I need to be concerned of? eg. net trading position, main producing areas etc.
- Which resources are available without causing competition?
- How can I structure the sector to ensure smallholder involvement and minimal negative impact?

Concluding remarks

- Modern bioenergy development can create both risks and opportunities

- In order to ensure that modern bioenergy development is sustainable and that it fosters rural development and food security, it is essential to:

  - ✓ formulate **evidence based policy**
  - ✓ prevent and manage **risks**
  - ✓ implement impact **monitoring** evaluation and response
  - ✓ ensure **capacity building**, **institutional** dialogue, **stakeholder** engagement

Sustainable Bioenergy Development
The FAO Sustainable Bioenergy Toolkit

WHAT TO DO

FAO-UNEP Decision Support Tool (DST)
A Roadmap to Sustainable Bioenergy
(WHY, WHAT, WHERE, HOW)

HOW TO DO IT

Bioenergy and Food Security (BEFS) Approach: Getting Facts Right to make the Right Choices

Bioenergy and Food Security (BEFS) Approach: Risk prevention and management

Impact Monitoring, Evaluation and Response
Global Bioenergy Partnership (GBEP) Sustainability Indicators and BEFS Approach

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Main environmental and socio-economic dimensions that may be affected by bioenergy development

ENVIRONMENTAL:

- Biodiversity
- Agrobiodiversity
- Climate change mitigation
- Water availability and quality
- Soil quality

SOCIO-ECONOMIC:

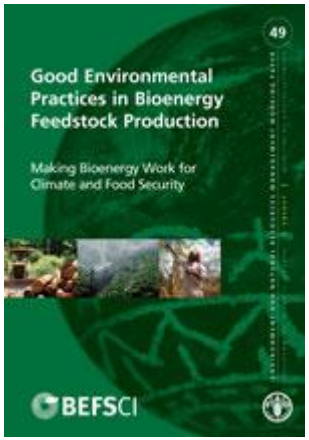
- Access to land
- Employment, wages and labour conditions
- Income generation and inclusion of smallholders
- Local food security
- Community development
- Energy security and local access to energy
- Gender equity

Factors determining the impacts of bioenergy development

- Local environmental and socio-economic conditions and interaction with other sectors/activities
- the regional, national and local policy environment
- the types of feedstocks, processing technologies and biofuels
- the scale and ownership of production
- the types of business models along the bioenergy supply chain
- the way production (especially feedstock production) is managed

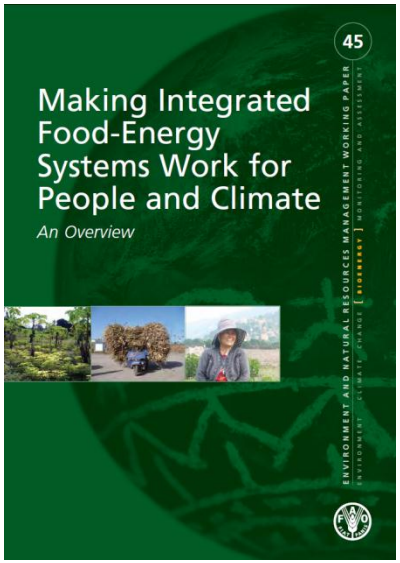
GPs to mitigate env. risks and enhance benefits: Sustainable agricultural management approaches

- Conservation Agriculture
- The Ecosystem Approach and Sustainable Crop Production Intensification
- Organic Agriculture



GPs to mitigate env. risks and enhance benefits: Integrated agricultural and forestry management systems

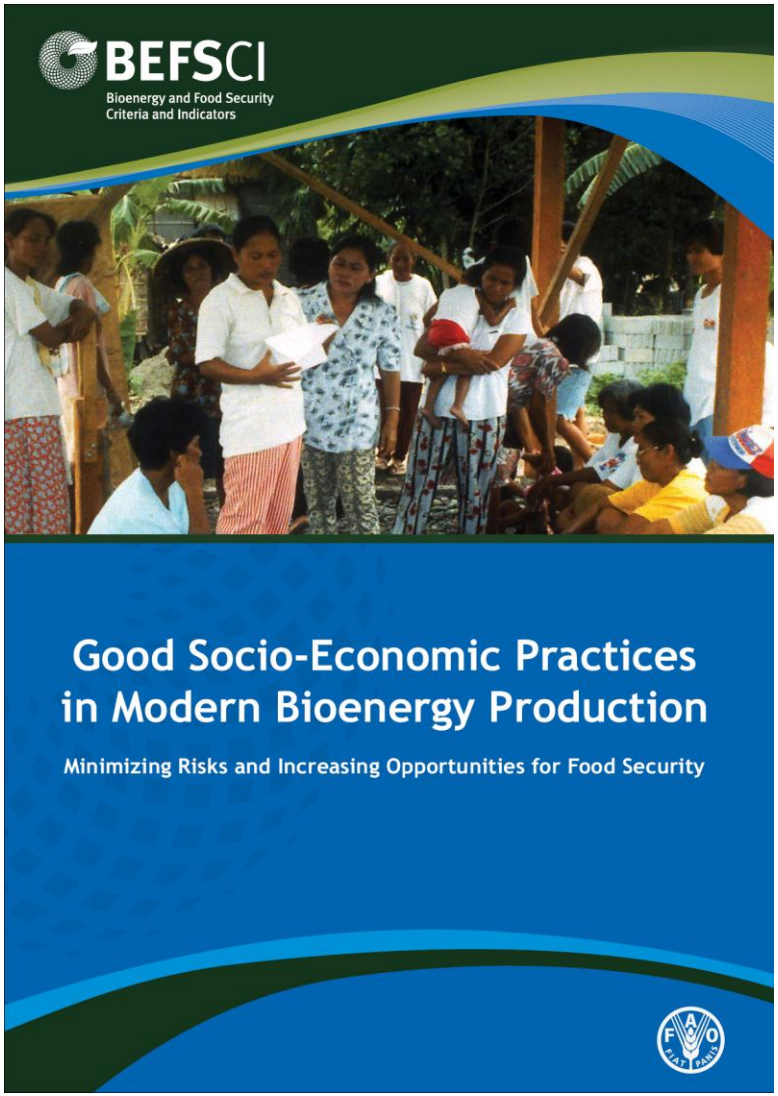
- Multiple Cropping Systems and Crop Rotation
- Agroforestry
- Integrated Food-Energy Systems (IFES)



GPs to mitigate env. risks and enhance benefits: Sustainable field-level agriculture and forestry practices

- Alternatives To Slash-and-Burn
- Community-Based Forest Management (CBFM)
- Conservation And Sustainable Use of Plant Genetic Resources and Seeds
- Forest Buffer Zone
- Integrated Pest Management (IPM)
- Integrated Plant Nutrient Management (IPNM)
- No- or Minimum Tillage
- Pollination Management
- Precision Agriculture
- Rainwater Harvesting and Management
- Rehabilitation of Degraded Lands
- Soil Cover
- Sustainable Forest Harvest
- Sustainable Irrigation
- Wild Biodiversity Management at Farm Level

Based on input from 16 operators in 3 continents:



Web-based compilation:
http://www.fao.org/bioenergy/foodsecurity/befsci/gpenv/se/

Examples of good socio-economic practices implemented by operators

Food Security:

- Integrated food and energy systems (IFES)
- Subsistence plots
- Provision of improved agricultural inputs and/or equipment
- Training on good agricultural practices
- Provision of food
- Improved cookstoves

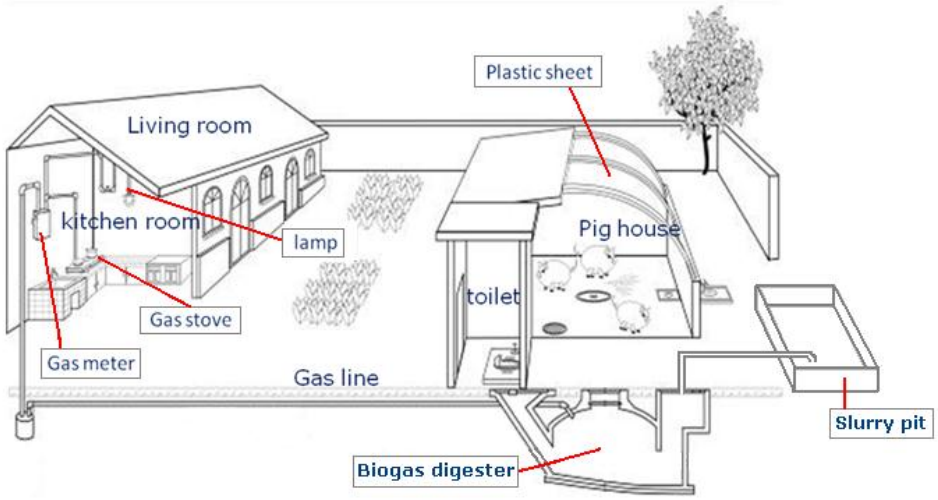
Access to Land:

- Consultation
- Mapping of customary rights
- Fair compensation to landowners/users
- Conflict resolution mechanisms
- Inclusion of smallholders

Examples of IFES

Intercropping food, fuelwood and fertilzer in smallholder systems in Malawi:
Pigeon peas and corn

Closing the loop in smallholder food, feed, biogas and fertilzer systems in Asia:
Livestock, crops, biogas technology



Good practices: success factors

- **Good practices** can play a key role in **mitigating risks** and **enhancing benefits** of bioenergy development

- But no 'silver bullet' solutions:

  - The *relevance* and *viability* of each good practice depend on the characteristics of production system and of the area where production takes place

  - The *effectiveness* of each good practice depends on local biophysical, socio-economic and cultural factors, and on the quality of local governance and institutions

Good practices: implementation challenges

- Implementing good practices can be a ‘win-win’ solution in some cases
- But there are **barriers** (economic + non-economic) to the implementation of certain good practices in certain contexts
- Therefore, adequate **policy instruments** and **incentives** are required for the scale-up of good environmental and socio-economic practices

Policy instruments for good practices in bioenergy

- **Mandates with sustainability requirements**
- **National Standards for Certification**
- **Financial incentives**:
  - Direct payments
  - Tax credits
  - Payments for Environmental Services (PES)
  - Grants
- **Capacity building**

THANK YOU!

http://www.fao.org/bioenergy/foodsecurity/befs

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