

UNEP's approach to bioenergy:

Bioenergy is neither good nor bad per se; to avoid unintended consequences in the short and long-term, bioenergy development requires solid planning both on the national policy and strategy and the project levels.

UNEP's key activities:

working with UNEP collaborating centers WCMC, URC, GRID and other centers of excellence, UN sister agencies, NGOs, the private sector and governments

scientific assessments

International Panel for Sustainable Resource Management: Assessing Biofuels report (2009)

The Bioenergy and Water Nexus, UNEP, IEA Bioenergy Task 43, Oeko Institut (2011)

Expert workshops on emerging issues:

- high conservation value areas/degraded land;
- indirect land-use change;
- water and bioenergy nexus

Issue Paper series on emerging issues:

- Land use and land use change
- Bioenergy and Water
- Invasive species
- Stakeholder consultation
- Group Certification

Assessments & Guidelines for Sustainable Liquid Biofuel Production in Developing Countries, funded by the GEF, jointly lead with FAO and UNIDO, providing guidance on environmental, social and economic performance of biofuel projects, using a settings approach.

tools

Global Bioenergy Partnership (GBEP):

- Methodological framework for GHG calculations
- Sustainability criteria & indicators (adopted)
- UNEP – co-leader of environmental sub-group

Roundtable on Sustainable Biofuels (RSB):

- solid multi-stakeholder process
- all major issues are covered
- pilot tested Sustainability Standard released
- Certification scheme developed and rolled out
- UNEP – active in working groups, chamber discussions and Steering Board

UN Energy Decision Support Tool for Sustainable Bioenergy (DST), developed by UNEP and FAO to provide stepwise guidance to decision makers in governments to develop sustainable bioenergy policies and strategies, and to assess investment proposals.

Mapping of land suitable and available for bioenergy development:

- Methodology refined (GIS and groundtruthing)
- completed in Kenya, Uganda, Senegal

finance

CASCADE: enhancing African expertise to generate carbon credits in the forestry and bioenergy sectors by providing technical assistance, institutional support and training workshops. The programme includes bioenergy projects based on jatropha oil, wood waste and green charcoal.

Jatropha-based PoA: assessing the feasibility of a CDM Programme of Activities for rural energy generation from Jatropha oil in Mali.

African Rural Energy Enterprise Development promoting rural energy enterprises, includes a bioenergy component that allows to demonstrate additional environmental and social benefits resulting from 'local production for local use' projects.

regional and national support

Bioenergy Policy Support Facility, providing advisory services to governments developing and implementing bioenergy policies, strategies and measures, mobilizing local and international experts: targeted consultations; science-based information for decision making; advice on legal frameworks, planning and management tools; and guidance on processes to facilitate integrated decision-making.

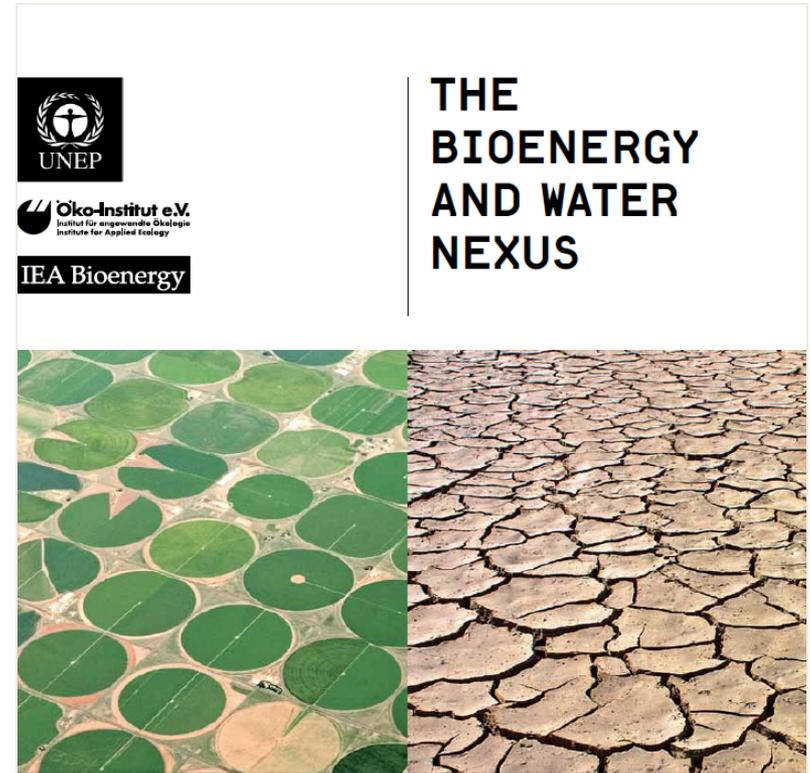
Bioenergy and water are inextricably linked

For the first time, this report examines in depth these interlinkages, highlights the risks and opportunities, and offers an outlook on ways to address them.

It provides policymakers with scientific information to support informed strategies and policies.

The report also points to the need for further research, filling data gaps, and the development of regionalized tools.

45 international experts contributed to this report through a process facilitated by UNEP, Oeko-Institut and IEA Bioenergy Task 43.



Recommendations



Take a holistic approach and a long-term perspective, and cooperate on a watershed level

- integrated water planning and management
- regional, national and local conditions to identify the 'best use of a drop of water'
- life-cycle perspective, possible beneficial effects and synergies, e.g. food and fuel combined systems, interrelations with other resource needs, e.g. land / water
- global trends such as climate change adaptation needs

Base decisions on impact assessments to ensure sustainable water management

Design and implement effective water-related policy instruments

Establish/support appropriate institutions and processes, for example inter-ministerial task forces to coordinate different policy objectives; stakeholder engagement from the planning through implementation phases; and ground-truthing on the watershed level, to verify information gathered through remote sensing

Disseminate best practices (upgrading extension services; and promotion of special training through certification schemes)

Promote technology development

Intensify dialogue on the topic and on capacity building

Conduct further research, fill data gaps, and develop regionalized tools

Assessments & Guidelines for Sustainable Liquid Biofuel Production in Developing Countries, a GEF Targeted Research Project

Goal: Identify and assess sustainable systems in developing countries worldwide for the production of liquid biofuels for both transport and stationary applications.

- Life cycle energy and greenhouse gas (GHG) assessment
- Economic viability of the production of liquid biofuels
- Global non-GHG environmental impacts
- Social impacts of liquid biofuel production
- Next generation liquid biofuel production
- Fuel and vehicle compatibility
- Stationary applications
- Scale up and integration

Key issue	Green	Yellow	Red
BIODIVERSITY			
Conservation of areas of significant biodiverse value	Mapping of SBV areas has been sufficiently carried out at the project location AND Cultivation area is located outside of SBV-areas and the required buffer zone (depending on local conditions, up to 5km)	Mapping of SBV-areas is missing OR Cultivation area is located in an SBV-area or it buffer zone; cultivation practices must be adopted to protection goals	Located in an SBV-areas that clear dose not allow any human activity (e.g. primary forests, highly biodiverse natural grassland, core zone of national parks etc.)

mapping and zoning

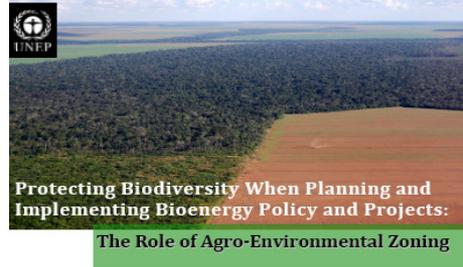
- **Building blocks for a solid mapping methodology**

The level of detail (i.e. scale and accuracy) for each variable matters; and the optimal data is a decision between availability and cost.

- **Data collection may present a particular challenge for developing countries.**

- **Data gaps** have been identified, particularly regarding biodiversity. Information on PAs designated under the CBD and Wetlands under the Ramsar Convention is easily accessible.

A database or an assessment tool, such as IBAT, adapted to bioenergy planning would be useful.



The Challenge.

Evidence has shown that bioenergy development can present a threat to biodiversity. As the threat for bioenergy (in particular, biofuels for transport) increases, so does the potential that natural lands, including primary forests, will be converted into plantations for these so-called "green fuels". Not only does this direct land-use change affect biodiversity, but indirect land-use change, where bioenergy feedstock production displaces other land uses that then encroach into natural lands, does as well, and in some cases to a greater extent. Land is a limited resource, and a number of global trends put further pressure on its population growth, changing diets, yield developments and soil loss. Bioenergy-related land requirements impose additional pressure along with these trends, and it is recognized that other sectors that depend on biomass as input have similar risk potential.

Although the complexity of trends and assumptions that are pointed to in the direct and indirect land-use change discussion is still being understood, it is recognized that that impacts affecting the integrity of ecosystems need to be prevented all over the world, as ecosystems are the basis for life and human activities.

Beyond deforestation and land conversion from direct and indirect land-use change, there are a number of additional threats to biodiversity, including marginalization of biodiversity of potentially invasive species used for bioenergy production. GHG production, increased competition for local water resources externally directing water away from maintaining biodiversity, and increases in agro-chemicals and nitrogen use leading to run off externally impacting water quality.

The bioenergy sector itself is dependent on ecosystem services provided by biodiversity; losses may come with economic supersessions for the short-term and future biofuel production. Recognizing that these challenges and losses are often more complex, the United Nations Environment Programme (UNEP) has been developing a series of initiatives that seek to answer the question - how do we ensure sustainable use that does not exceed the carrying capacity of ecosystems and thereby protect biodiversity from bioenergy production?

Navigating a Path to Sustainable Bioenergy: Mapping as a Tool.

To avoid resulting negative consequences from bioenergy development on biodiversity, solid planning and implementation are needed. A range of methods, processes, and tools exist to safeguard biodiversity, both on a national policy level and on a project level. Mapping and zoning of areas suitable and available for bioenergy development are part of them, and should form the basis for decision-making processes.

As spelled out in the Bioenergy Decision Support Tool, prepared by FAO and UNEP under the framework of UN Energy, assessments should be carried out by using a combination of top-down and bottom-up approaches, i.e. mapping and zoning and ground truthing. ICAH has broken down this approach into a four-step process. Mapping would be part of step 1, and Box A gives a more detailed view on what is required.

Land Suitability

- Agro-climatic: Water Balance Temperature
- Edaphic: Topography (altitude and slope) Soils
- Climate change outlook/ adaptation

Land availability

- Environmental screening/ sensitivity areas
- PA
- Ecosystem services
- Wildlife
- HCV
- LCV/degraded land
- Land cover

Social

- Cultural / medicinal use areas
- Current land use / Food/Fodder
- Urban
- Conflict
- Archeological
- Land tenure

Infrastructure / logistics

Bioenergy Decision Support Tool:
Planning Strategically and Assessing Risks in Investment Choices

UNEP FAO

About Enter the Tool Access the E-book Tools/Resources Contact

Enter the Bioenergy Decision Support Tool

Solid planning is critical to drive sustainable bioenergy development

Governments are presented with – at times difficult – choices and trade offs when considering bioenergy development.

This online tool discusses issues of relevance, puts them into the broader resource efficiency and development contexts, and offers links to process and tools that have been used in the area of bioenergy or in other related sectors.

Entry points to access the information are on two levels: policy making and project assessment and you can also access the tools directly for quick reference or [download the overview](#)

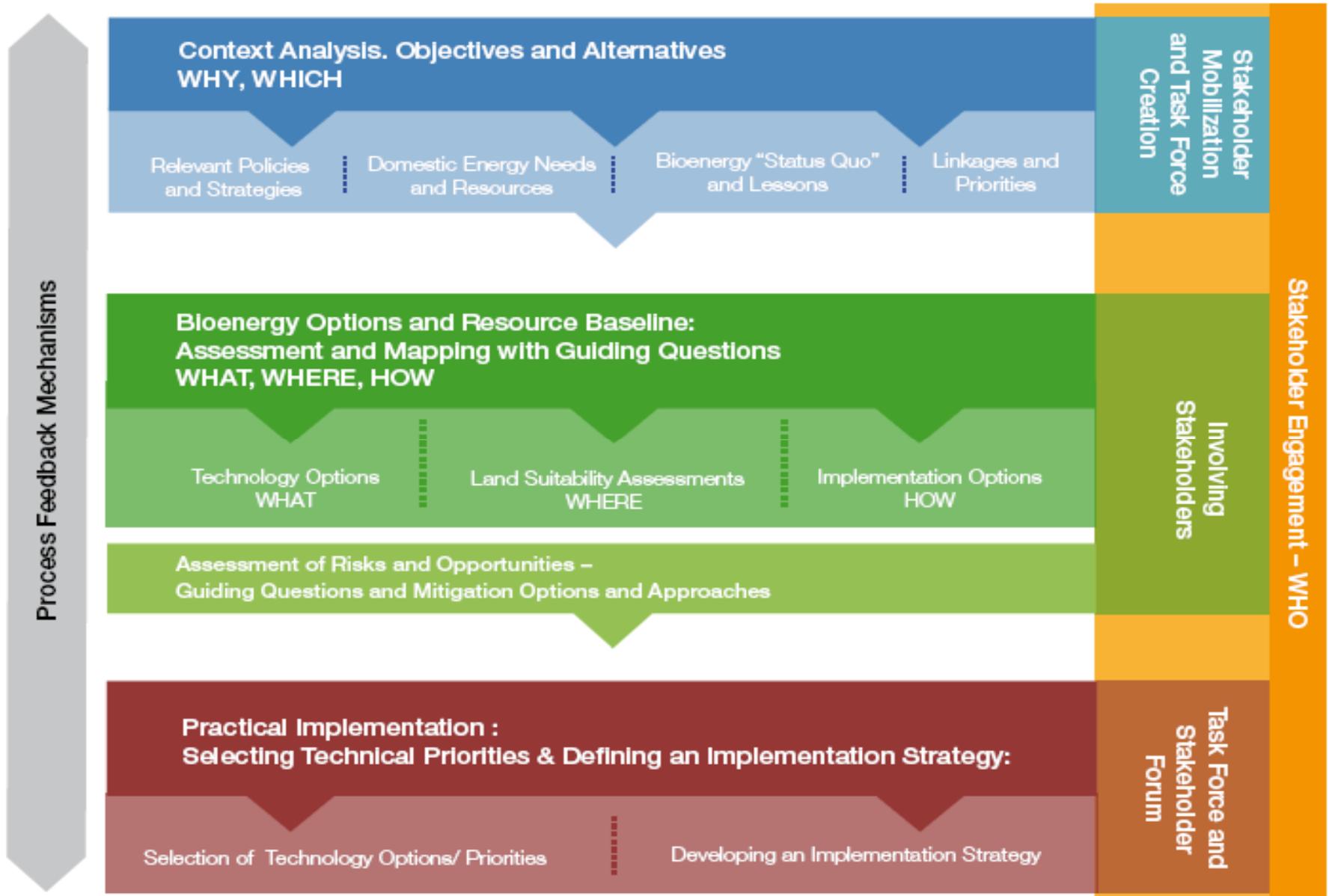
UN-Energy

**National Strategy
and Planning**

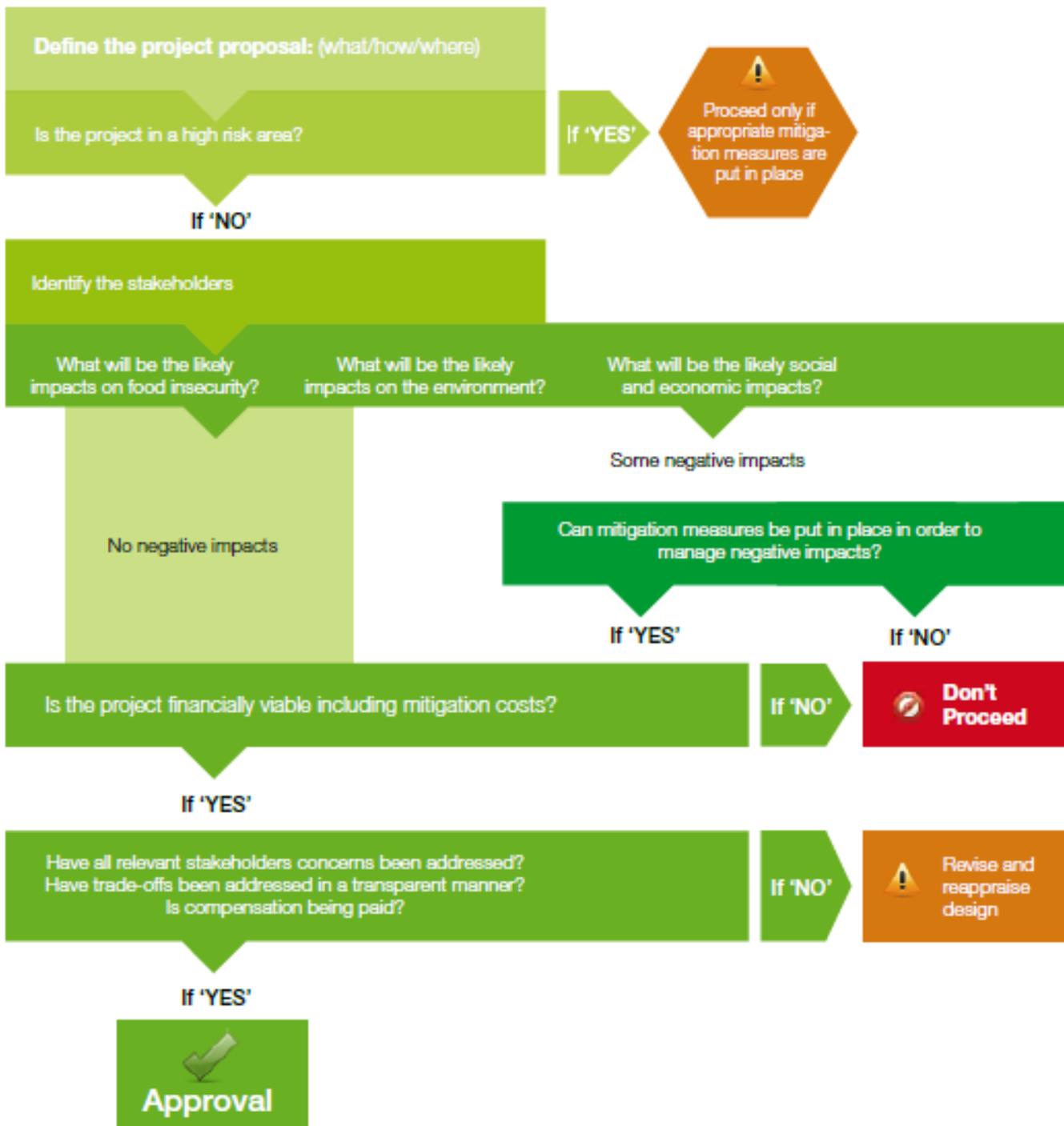
**Project
Screening**

www.bioenergydecisionsupport.org

A National Strategy Decision Tree



Investment Level Decision Tree



Bioenergy Decision Support Tool:

Planning Strategically and Assessing Risks in Investment Choices



About Enter the Tool Access the E-book Tools/Resources Contact

Techno-economic Background

Introduction
Definitions and Terms
Biomass Resources
Bioenergy Production Chain
Sectors and Applications
Bioenergy Conversion Processes
Bioenergy Systems: Efficiency, Scale and Cost
Liquid (and Gaseous) Biofuels

Designing a Strategy

Implementation and Operation

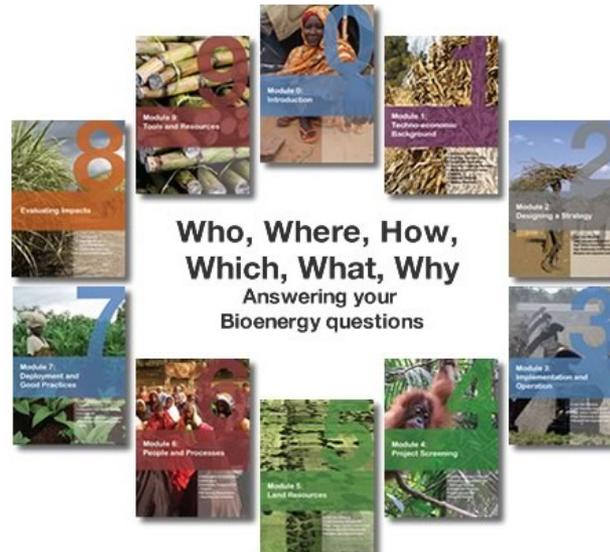
Project Screening

Land Resources

People and Processes

Deployment and Good Practices

Evaluating Impacts



Techno-economic background

Designing a strategy

Implementation and operation

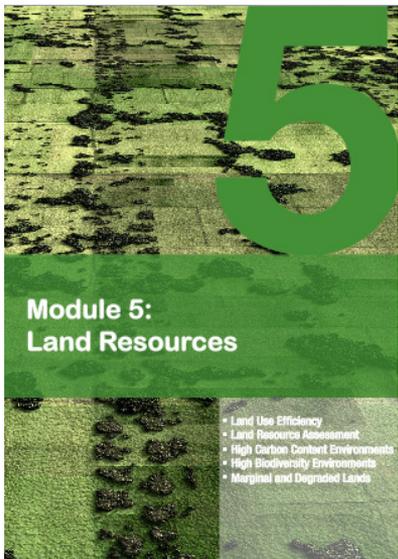
Project screening

Land resources

People and processes

Deployment and good practices

Evaluating impacts



Module 5: Land Resources

- Land Use Efficiency
- Land Resource Assessment
- High Carbon Content Environments
- High Biodiversity Environments
- Marginal and Degraded Lands

Bioenergy Decision Support Tool:
Planning Strategically and Assessing Risks in Investment Choices

UNEP

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Techno-economic Background

Designing a Strategy
Implementation and Operation
Project Financing

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Deployment and Good Practices
Calculating Impacts

Introduction

Global trends suggest that increasing land pressures will require considerable care in managing before expansion, in order to prevent loss of biodiversity, ecosystem services and release of carbon from sensitive areas. However, as bioenergy options it is pertinent to address first potential conflict resources. In this section, key drivers and analytical approaches to the allocation of land resources for bioenergy production, a review of land use for bioenergy systems is first provided, followed by principles and assessment methods for determining the appropriate production.

UN-Energy

1 Use of publicly available global map datasets to identify strictly protected areas, and broad zones of high and low risk for development.

SCREENING

2 An explicit requirement for national or regional level consultation to identify important features that are not apparent from global level mapping processes, and facilitate site selection.

LANDSCAPE LEVEL ASSESSMENT

3 Detailed site level management planning, where definitive "no-go areas" are mapped and protected, and appropriate areas for potential development are identified

SITE LEVEL MAPPING

4 Application of best agricultural management practices in areas where development is agreed.

RESPONSIBLE MANAGEMENT

Review of publicly available maps

- Global data on carbon, biodiversity and other values
- Identification of protected areas and broad zones of high and low risk.

National/Regional consultation

- Consultation with relevant institutions and experts
- Identification of important features not identified in global maps
- Site selection

Detailed site-level assessment and planning

- Consultation with local people and field-based data collection
- Delineation, and management plan for no-go areas
- Identification of appropriate areas for potential development

Implementation of responsible land management

- Development of appropriate areas, involving stakeholders in decision making
- On-going monitoring of impacts, and adaptive management
- Compliance with international best practice

Central government authorities, including those responsible for

- Energy
- Science and research
- Agriculture
- Rural development
- Poverty and food insecurity
- Environment
- Forests
- Water
- Finance
- Planning
- Trade
- Donor liaison

Representatives of regions/local government, agricultural extension providers/organizations, energy related parastatals, for example:

- Energy utilities
- Regulatory bodies

Non-governmental organizations, for example:

- NGOs for environment and development
- Labour organizations
- Trade organizations
- Farmers organizations
- Community-based Organizations

Private sector, for example:

- Producers, distributors and users of biomass
- Providers of bioenergy facilities
- Producers of bioenergy technologies
- Research agencies
- Providers of advisory services
- Private utilities

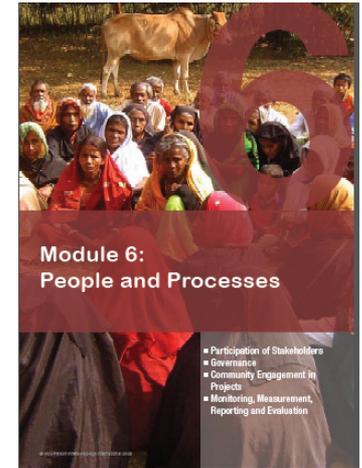
Financing institutions

- Banks and finance institutions
- Small-scale finance providers

Bilateral and multilateral organizations in development cooperation

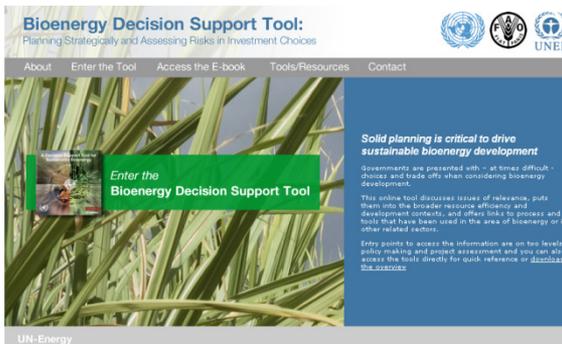
(ESMAP, 2006)

National level stakeholders:
primary stakeholder-based institutions that drive the strategy process



Local stakeholders: an example of community engagement approaches

	PROCESS	OUTCOME
Negotiate	Two Way: Joint decision making on issues that impact a community.	Negotiate agreement and/or free, prior and informed consent.
Consult	Two Way: Proponent seeks input before a decision is taken.	Proponent records input and demonstrates to community how input is incorporated into decision.
Inform	One Way: Proponent informs community after decision is taken.	Improved community understanding of the project.



Future Capacity Building Activities with the Decision Support Tool (DST)

ECOWAS Regional Centre for Renewable Energy and Energy Efficiency – ECREEE Regional Bioenergy Forum (Feb 2012)

Expert Group Meeting to Validate Reports on Bioenergy Policy and Technology Options in Africa in Addis Ababa, 21-23 November 2011, EUC and UNECA

FIRM – Facilitating Implementation and Readiness for Mitigation -

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