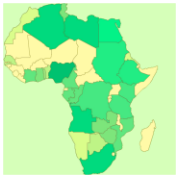

ustainability : Socio-economic indicators: The case of Africa

Presented at The 1st Brazilian BioEnergy Science and Technology (BBEST) Conference
Campos do Jordão, SP, Brazil – August 14th - 18th, 2011

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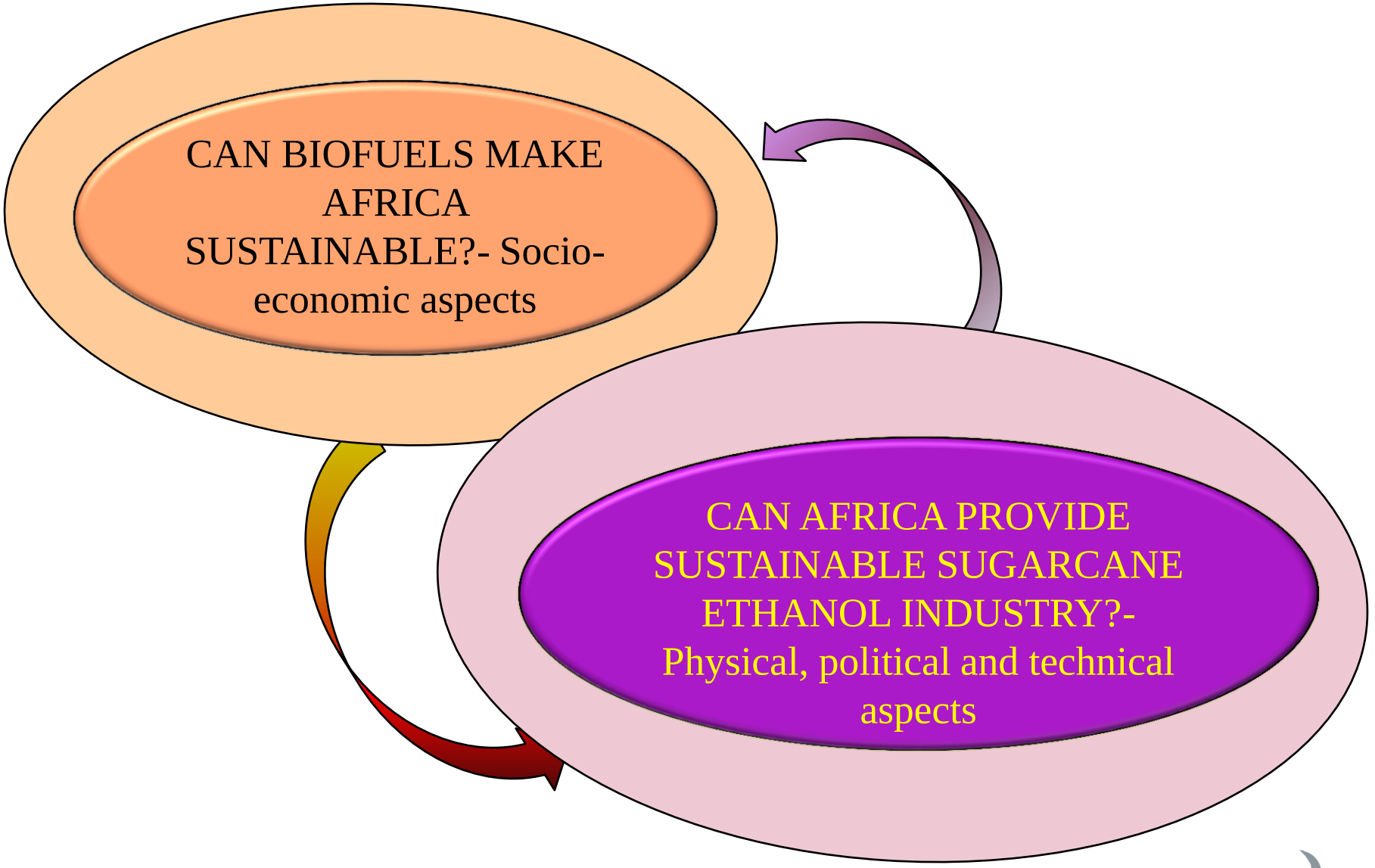
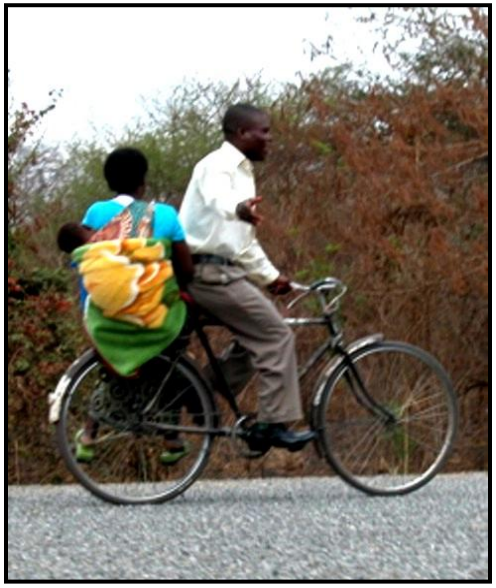
SUSTAINABILITY & BIOFUELS IN AFRICA



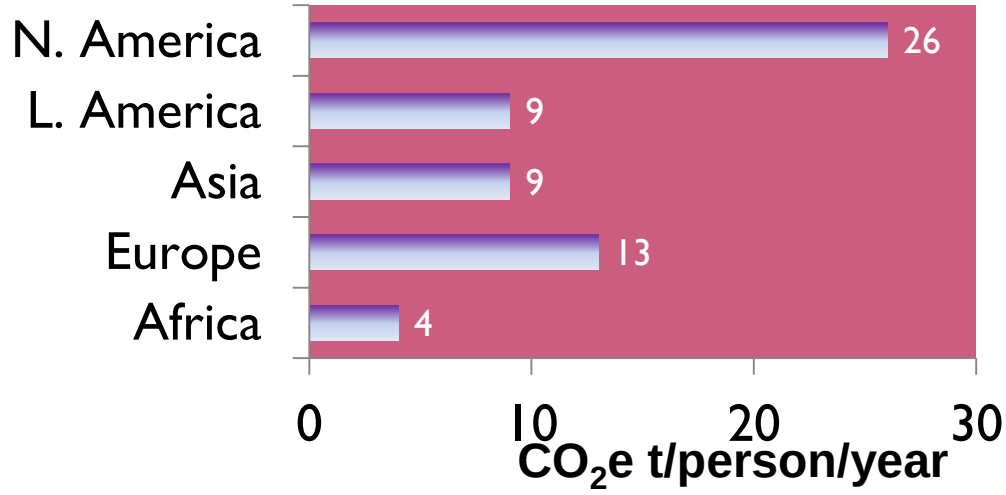
OUTLINE

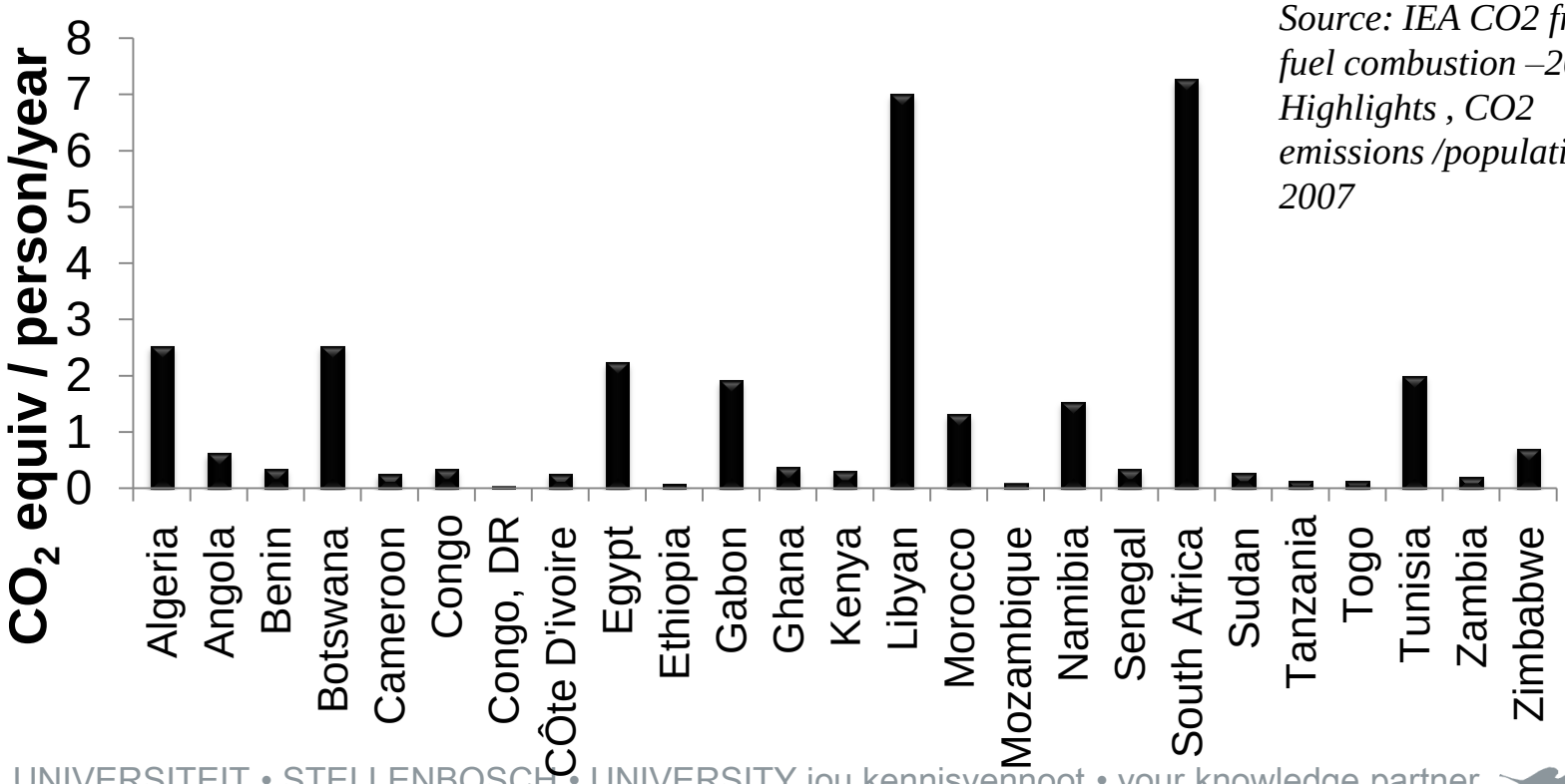
- Socio-economic aspects related to biofuels production and use
- Socio-economic aspects of the impact of expanding sugarcane ethanol program in Africa

SUSTAINABILITY SOCIO-ECONOMIC INDICATORS



SUSTAINABILITY SOCIO-ECONOMIC INDICATORS



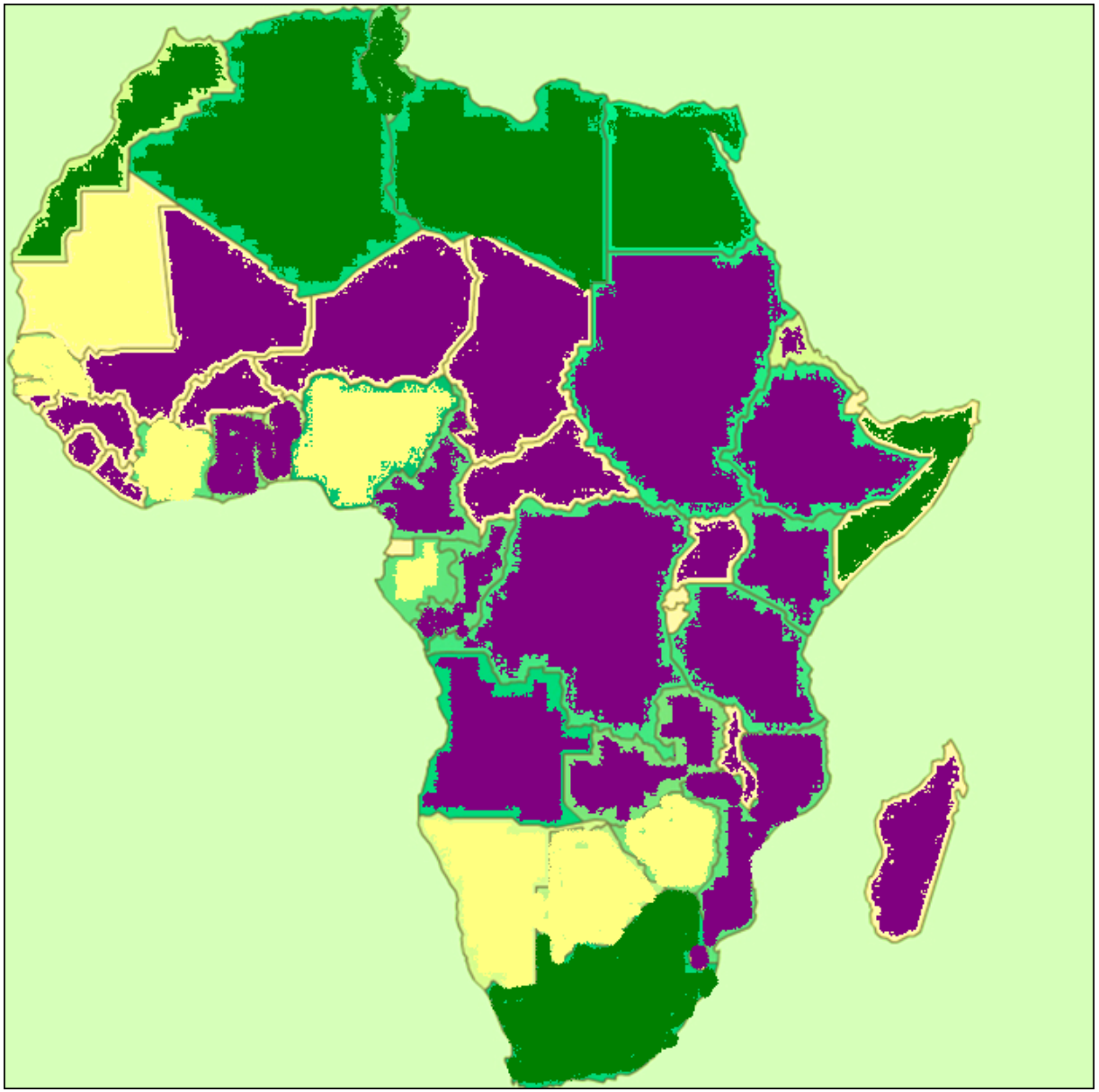


Source: IEA CO2 from fuel combustion –2009 Highlights , CO2 emissions /population 2007

SOCIO-ECONOMIC ASPECTS

Unlike the developed countries, the main thrust for bioenergy and biofuels production in Africa is beyond simple substitution of fossil fuel in the transportation sector.

Instead, it is considered as a strategic response to the chronic socio-economic challenges arising from lack of rural development, high unemployment, food insecurity, and extreme poverty.

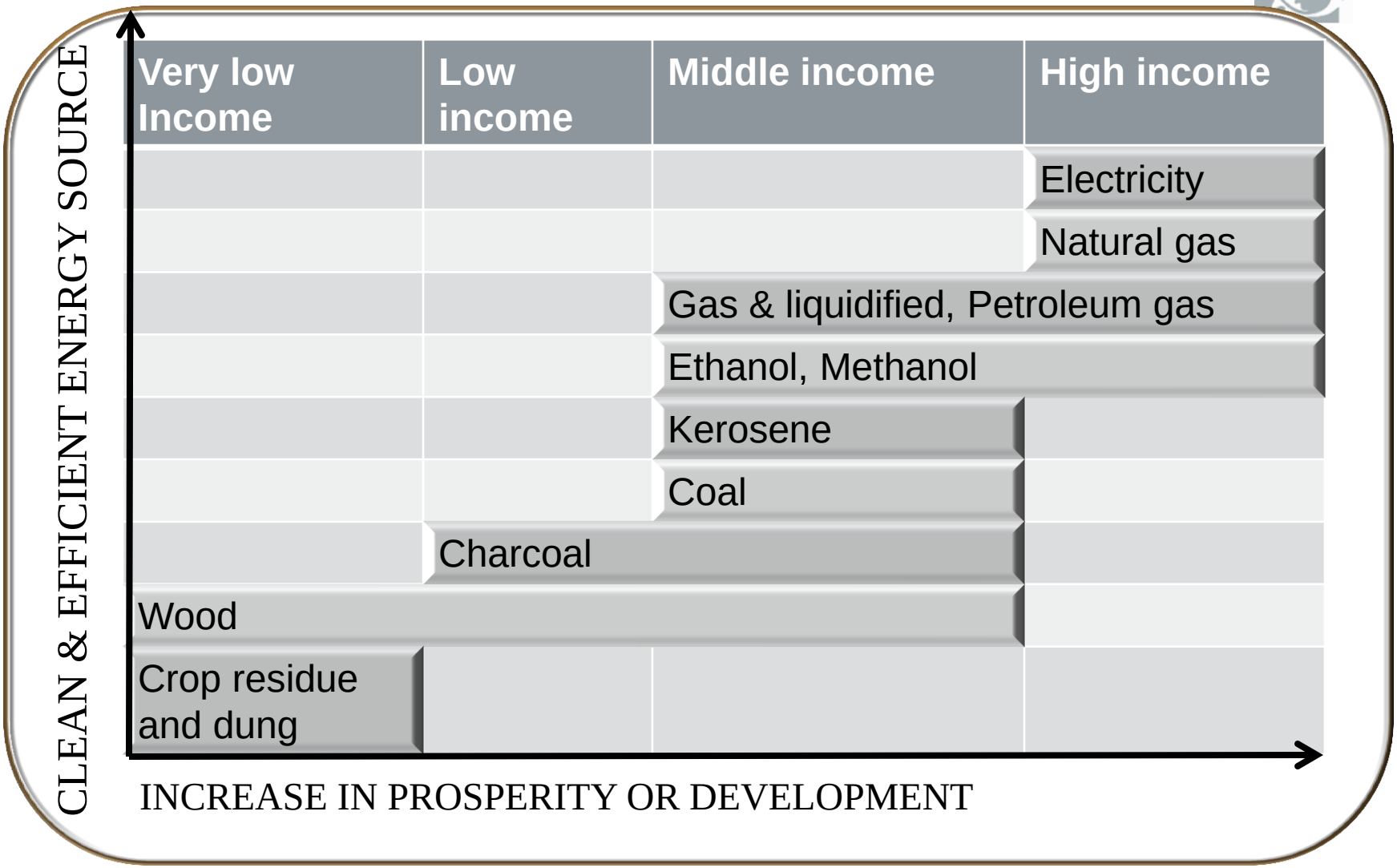


76-100%
51-75%
26-50%
0-25%

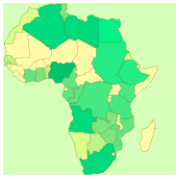
Energy poverty in households

Source: Redrawn from WHO 2006: Fuel for life. Household energy and Health

SOCIO-ECONOMIC INDICATORS

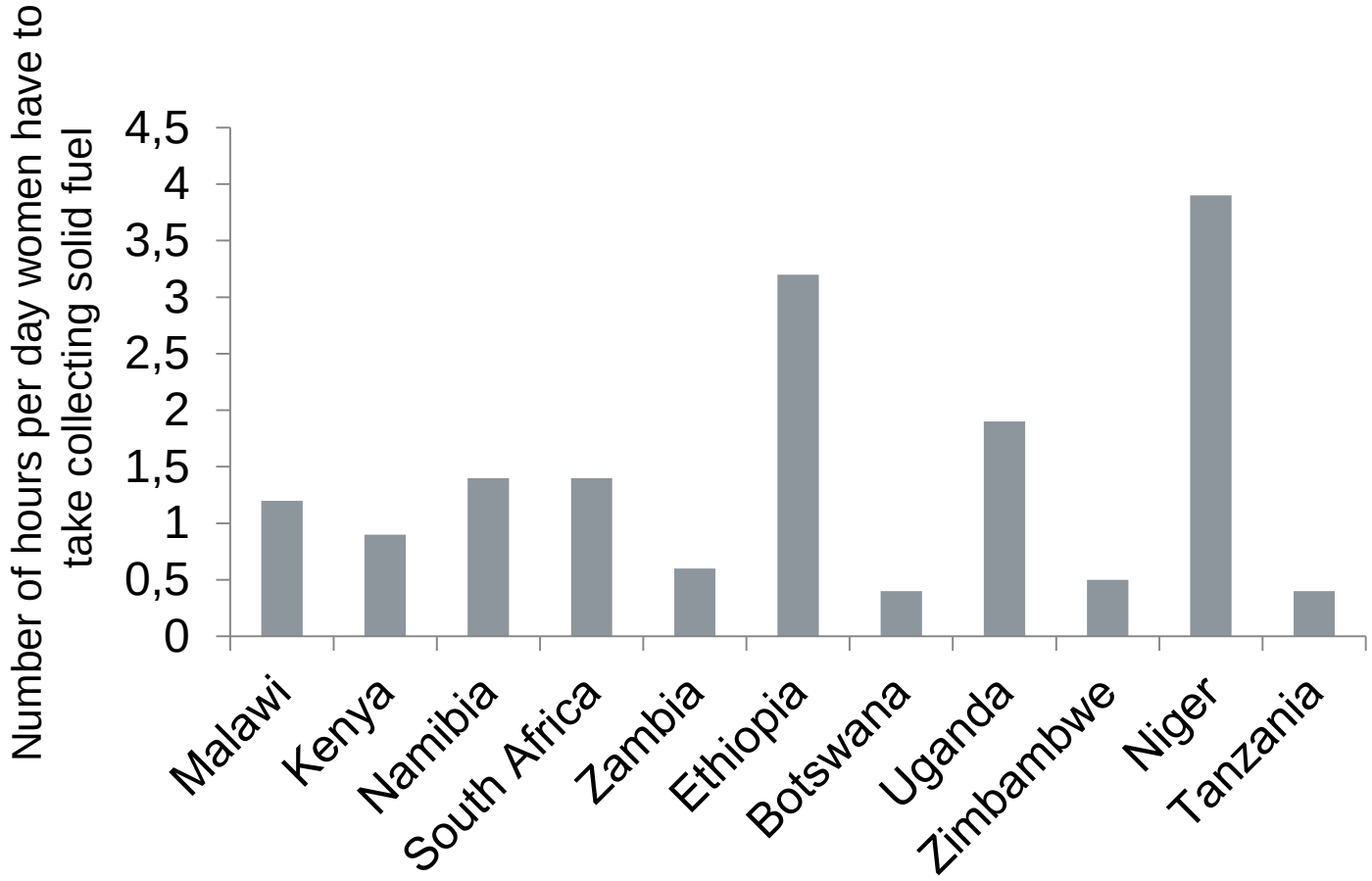


Source: Modified from WHO 2006: Fuel for life. Household energy and Health



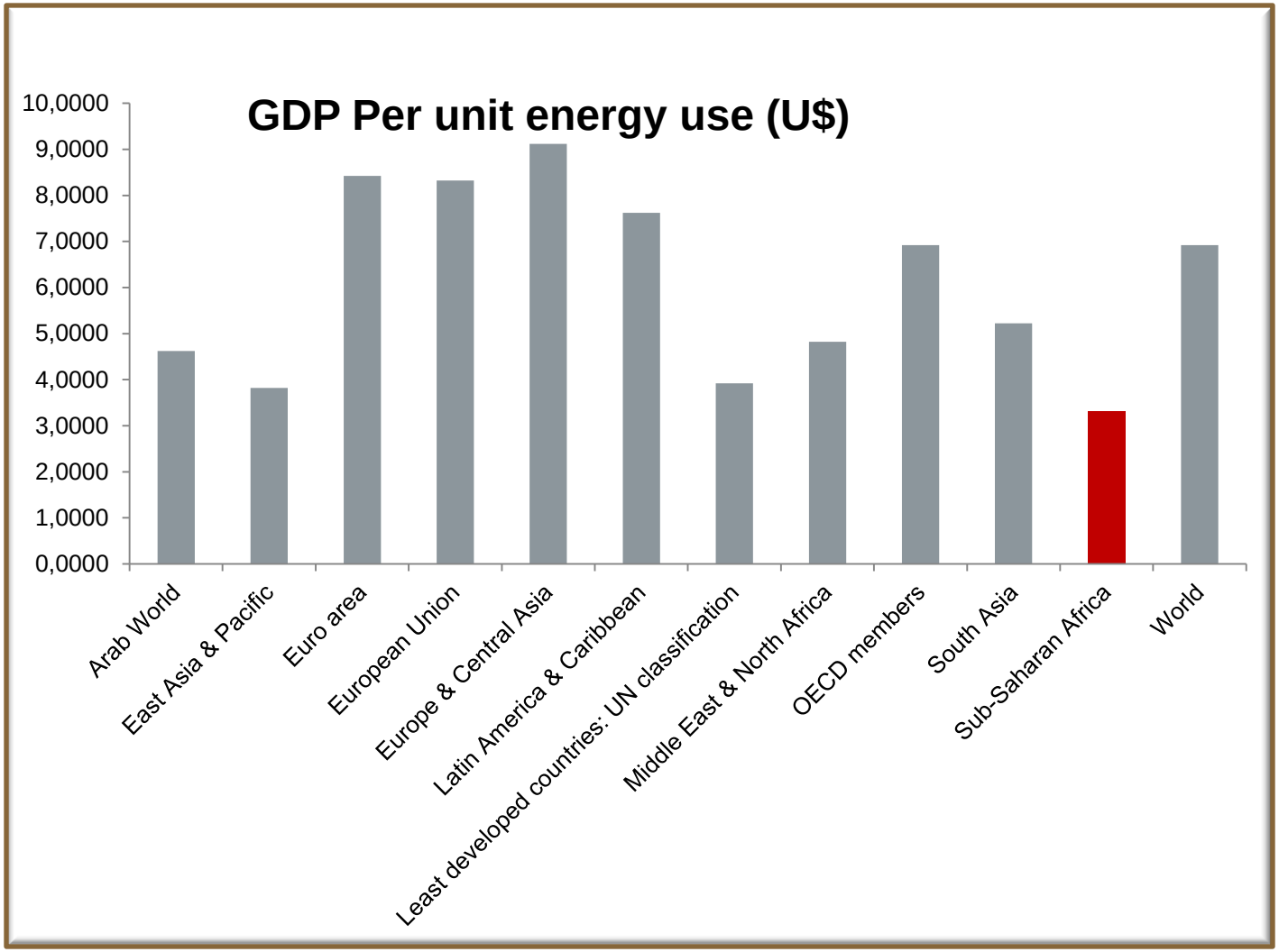
SOCIO-ECONOMIC INDICATORS- REDUCING DRUDGERY

The gathering of biomass is a time consuming exercise that deprives rural women opportunities from participating in high economically rewarding income generating activities.



Source: Modified from WHO 2006: Fuel for life. Household energy and Health

SOCIO-ECONOMIC INDICATORS: Energy access

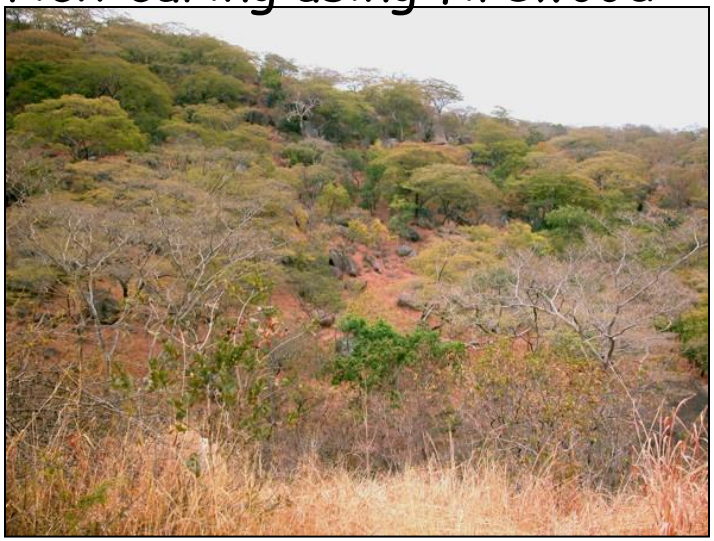


Source: The World Bank 2010Africa Development Indicators,

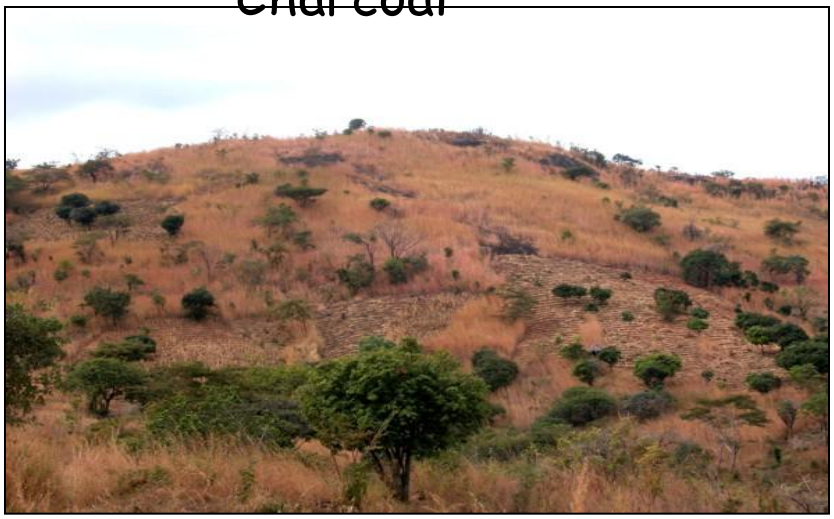
Consequences of unsustainable utilisation of biomass – Case of Malawi

Brick-curing using firewood

Charcoal



Malawi in the past



Malawi today

SOCIO-ECONOMIC INDICATORS- REDUCE INDOOR POLLUTION

- Burning of solid biomass fuel result in high levels of indoor pollution.
- 1.5 million people die globally from diseases caused by indoor pollution.
- In Africa 70-80% of population use solid fuels, translating into 300-400 deaths/100 000 people
- Victims are mostly women and children

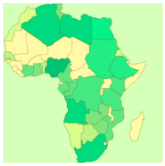
(WHO 2006: Fuel for life. Household energy and Health)

BIOFUELS DRIVING FACTORS

Global: 3 Fs (Fuel, Food & Finance)

(www.future-agricultures.org 2011. Policy Brief 041)

- Increase in oil prices
- The need to reduce green house gas emissions
- Biofuels policies
  - EU 6% liquid biofuels by 2010 and 10% by 2020.
  - USA 25 -25 target supply 25% of United States' energy use from renewable resources by 2025.
- To improve agricultural productivity.



Sustainability indicators in Africa

Satisfaction of basic needs:

- Food security
- Energy security
- Water security

Community empowerment

- Land ownership
- Access to natural resources
- Participation in decision making

Local/Rural development:

- Access to markets/forex
- Access to financial support systems
- Access to technical support systems
- Transport, communication and market infrastructure

Human development

- Access to primary health care, education, skills training and employment

SUGARCANE ETHANOL POTENTIAL

- Availability of low cost production facilities (U$175-240/ton) e.g.
  - Land
  - Labour
  - Irrigation
  - Large scale milling infrastructure (10 000-200,000 tonnes of cane per day).

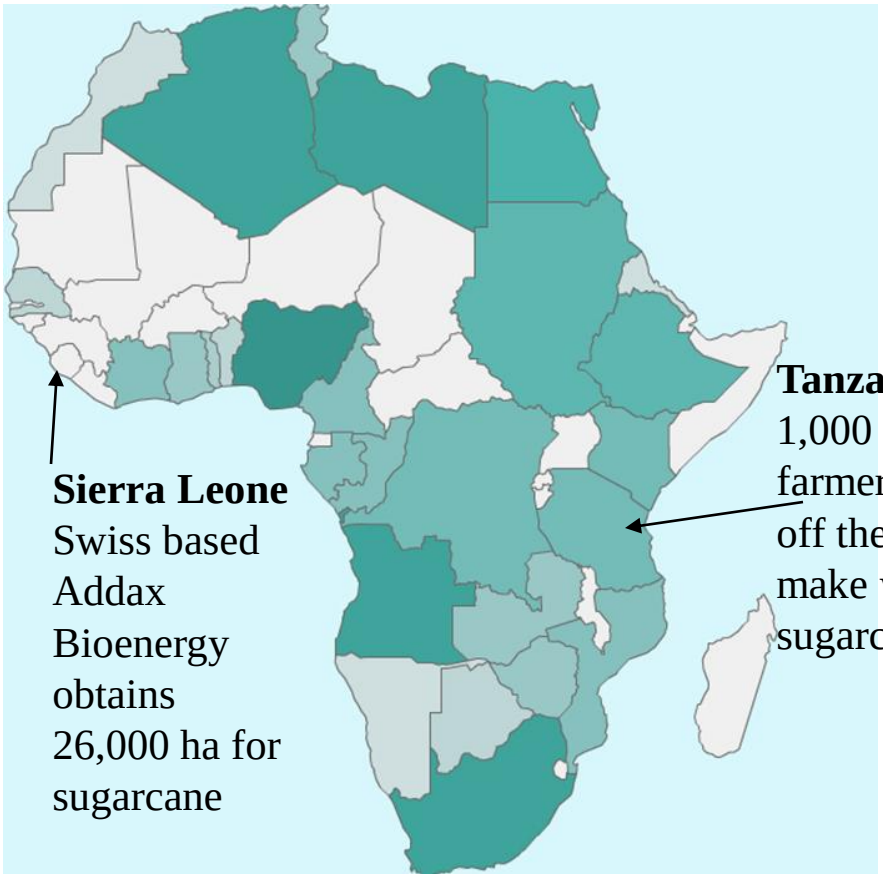
- Well established industry in some parts of Africa- e.g. East and Southern Africa: Malawi, South Africa, Swaziland, Uganda, and Zimbabwe

- Potential players: Ethiopia (190 000 tons/annum capacity) , Sudan, Tanzania and Mozambique, Kenya, ivory coast, Cameron, Nigeria, Uganda

(*Tyler-FAO/World Bank: All-Africa Review of experiences with commercial Agriculture, The African sugar Industry –a frustrated success story. Competitive commercial agriculture in Sub-Saharan Africa study)*

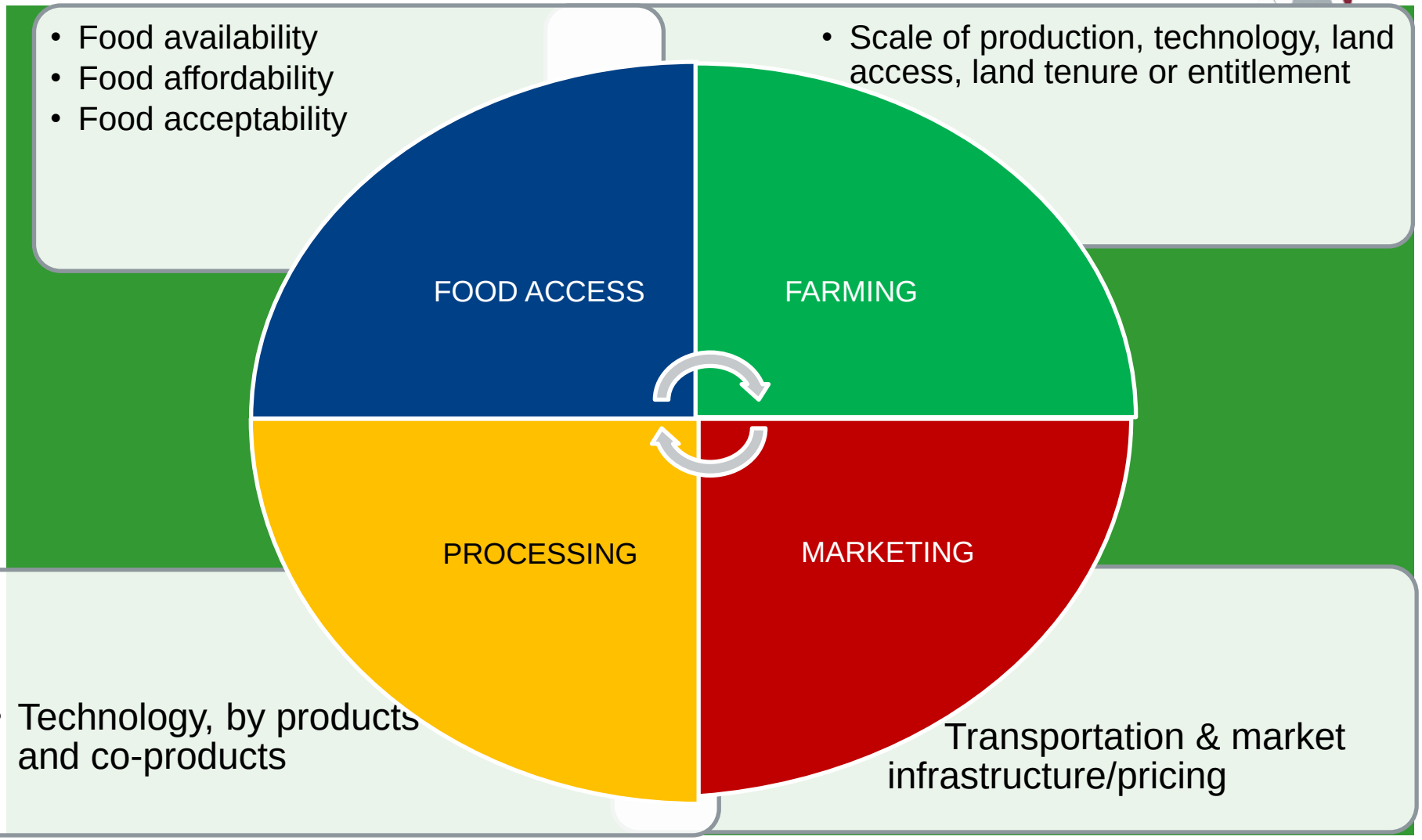
IMPACT OF EXPANSION OF SUGARCANE ETHANOL PRODUCTION IN AFRICA: BIOFUELS- NEW SCRAMBLE FOR AFRICA?

Africa: source of agricultural land and natural resources for the rest of the world. National governments and private companies are obtaining access to land across the continent to grow crops for food and fuel to meet growing demand from mainly overseas countries



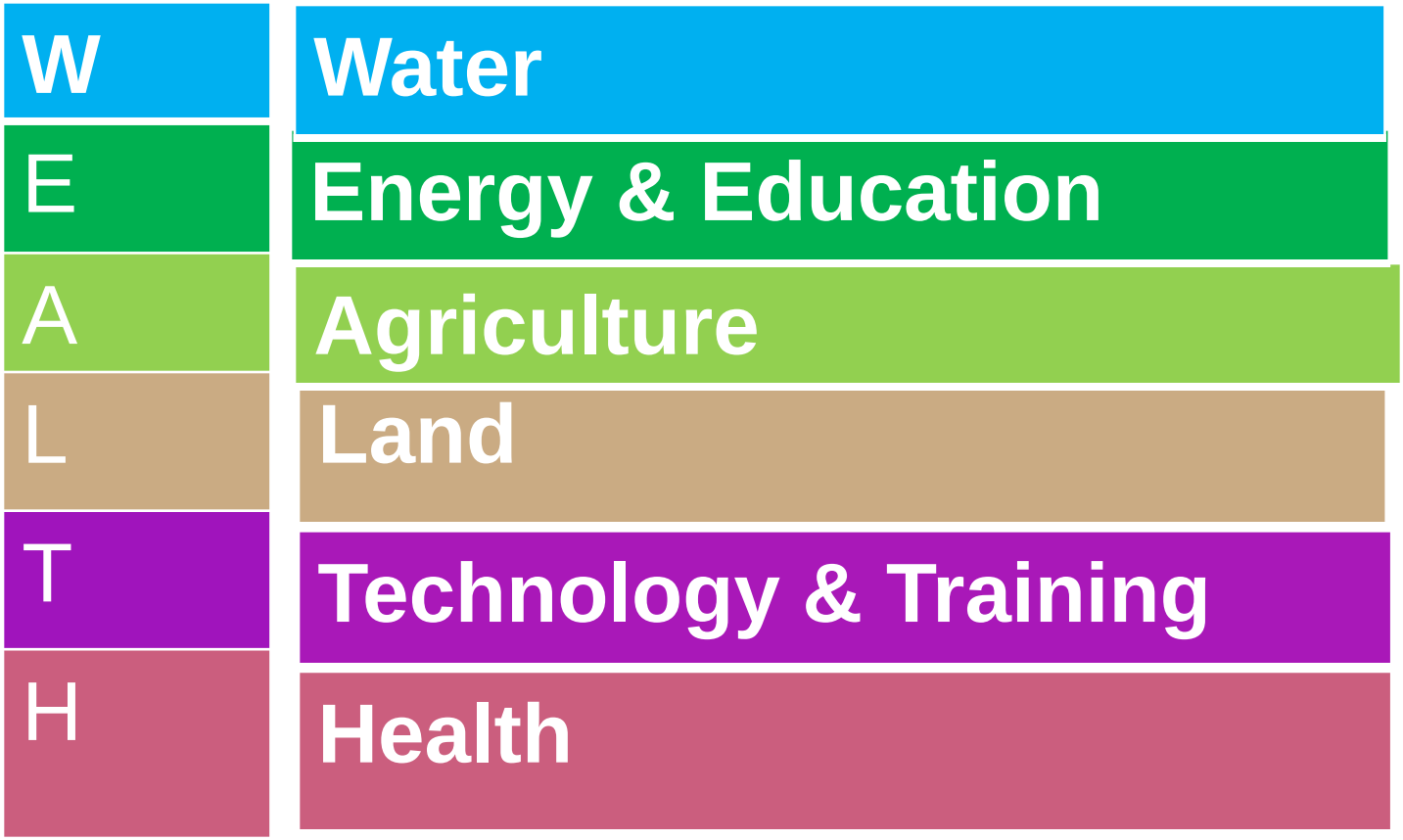
Source: FoE 2010.Africa: up for grabs-The scale and impact of land grabbing for agrofuels

Impact of expanding sugarcane ethanol in Africa



System boundary choices

Fundamental factors for sustainable livelihoods in Africa



Impact of expanding sugarcane ethanol production in Africa

Benefits

- National economic stability
- Stimulation of local markets & infrastructure development
- Income diversification for rural communities along the value chain
- By-products for local use

Fears and concerns

- Unequal distribution of benefits to rural communities
- Distortion of local agricultural systems- monoculture systems
- Deprivation of Land tenure and resource rights
- Market access, trade restrictions, price regulations
- Technical barriers
- Inadequate financial support systems

Socio-economic aspects of impact of expanding sugarcane ethanol production in Africa- Lessons from sugarcane for sugar production

The Case of South Africa

sugarcane for sugar production in rural development in Africa- Case of South Africa

- National level GDP contribution = 0.5-0.7 %
- Employment (primary and secondary employment):
  - Largest employer, 136,671 (direct jobs),110,000 indirect jobs
  - 11% of agricultural employment, 1.3% direct national employment (total = 2.5% national employment)
- Income diversification- stimulation of secondary economy e.g. micro enterprises in rural areas.
- Infrastructure development (transport, communication in rural areas) invested by private investors.
- Corporate social investments in surrounding communities e.g. education, recreation, communication and health.

Source: McCarthy ??: Integrative report: Generic economic and social impact of the sugar industry in the context of milling areas,

Impact of expanding sugarcane ethanol production in Africa

Although the local communities living near sugar plantations and mills have benefited socio-economically through regular direct and indirect employment, improved transport and communication infrastructure, and corporate social activities that provide health, education and recreation facilities, such benefits are not always equitably distributed to local communities at large.

Strategies for ethanol production and use.

The production and conversion technologies of biomass are technically and economically limited in providing local communities with products and energy services that will uplift their socio-economic welfare.

Sugarcane ethanol production as a multiproduct platform

Production of energy products such as ethanol gel, electricity for household and small business use is inevitable to serve rural communities.

Sugarcane producing countries in Africa such as Mozambique, South Africa, Angola,Uganda, Kenya, Egypt, Sudan, Tanzania, Zimbabwe, Zambia, Somalia, Congo, Ethiopia, Malawi and Mauritius have great potentials in the Ethanol gel fuel industry
(Darkwah et al., 2007)

- At 25% increase of sugarcane production from year 2000 production levels, Gel fuel potential in Africa will 1203.1 million Litres

- At 50% increase, the gel fuel potential is 24061 million Litres

Phillips, J. 2002. Agro-economic Assessment of the potential to produce fermentation ethanol alcohol in Africa. RPTE programme 2000.

Sustainable Business models

Participation in the value chain might require smallholder farmers to organise into cooperatives and/or outgrower schemes (IIED, 2009)

- **Hybrid models**:
  - combined large-scale and small-scale (outgrowers)- Smallholder farmers involvement is viable where large concentrated land can not be acquired and also prevents evictions and resettlements
  - Settlement schemes -Formation of small family farms with some of the operations managed by the scheme management (practiced in Malawi, zambia and Swaziland).
  - Separation of cane growing, milling and ethanol processing

Critical questions/check list

- What is the social and economic cost of sugarcane ethanol to the local communities?

- Will it address the issue of food insecurity in Africa?

- Will the expansion enhance economic development at the community level?
  - Will the expansion create wealth and jobs and alleviate poverty?
  - Where will the jobs be created along the value chain biofuels?
  - Who will be qualified to take up these jobs?
  - Will it involve technical and business skills training?

Critical questions/check list

- What is the impact of bioenergy production from sugarcane on local empowerment?
  - Will they participate in negotiation of contracts with investors
  - How will stakeholders participation in the sugarcane biofuel value chain be facilitated?
  - What technical and financial support services are required for sustainable production of biofuels from sugarcane?
  - Will the expansion address gender specific issues?

- What business model would promote sustainable social–economic rural development ?

- How will the macro and micro economic barriers be addressed?

CONCLUSION

- Sugarcane Ethanol production systems should create decent inclusive jobs and new revenue streams to rural communities, i.e. allowing small scale rural farmers to form the integral part of the entire bioenergy and biofuels value chain rather than just being providers of seasonal labour.

- Ideally, the expansion of sugarcane ethanol production should be a stimulant to improving rural transport, communication and market infrastructure and further, enhance reforms in agriculture, market access, land tenure systems and establishment of institutions for community empowerment and gender upliftment.

- Furthermore, improvements in biomass production and conversion technologies should also accommodate multi-product or process value chains both at national and rural levels.

Thank you