**Bioenergy for Africa: An illusion or a sustainable option to reduce the vulnerability to energy and poverty?**

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## Overview

With the volatility of energy prices, poor countries must develop policies to mitigate the impact of high energy bills on their economies. The most effective policy in this regard is the efficiency and the diversification of energy and bioenergy seems to be for some countries especially for sub saharian countries, as a good opportunity in terms of economic growth, eradication of poverty and achieving the Millennium Development Goals. Bioenergy covers a wide spectrum of energy activities, from the direct production of heat through combustion of fuel wood and other biomass residues to the generation of electricity, the production of gaseous and liquid fuels and chemicals. It is widely used throughout the world. In Sub-Saharan countries, biomass in the form of fuel wood, agricultural residues are often the most common fuels for cooking and heating. Biofuels such as ethanol and biodiesel have been predicted as the future of energy. African governments are expected to invest heavily in the development of biofuels and develop national strategies of biofuels as soon as possible. However, many theories argue that the development of bioenergy production would be at the root of the worsening food crisis in recent months and would lead to increased deforestation in some countries.

In the light of these concerns, the question must be asked whether bioenergy has the potential to become an "engine of growth for African countries”? What is economic feasibility of the development of this sector? What cost ? What financing ? What impact on the taxes take for the government (compared to the petroleum gasoline?) What price for the consumer ? What impact on food crops ?

The paper is organised as follows: After the introduction the second section gives an overview about the african energy situation. The third section develops the key challenges facing by Africa energy sector (energy poverty deepened by energy price volatility, population growth, urbanisation, climate change, conflict and so on). The fourth section addresses the opportunity to set up and develop bioenergy sector in africa. In section five we describe the impact and implication of this sector for african countries (economic, social, environmental, trade and development issues of bioenergy in Africa). The final section gives recommendations and proposals for a pro-poor development of the bioenergy sector in Africa (compatible with sustainable development and an asset for poverty alleviation).

## Methods

The work will be conducted by an analytical method based on the empirical literature but also through case studies about possilibility of implementation or development of bioenergy sector in a given country or in a given region (studies about Jatropha development in ECOWAS sugarcane development in Kenya etc.). But also by examining the experience of countries (Brazil, USA etc.) that have already established and developed the bioenergy sector, to draw lessons.

**Results**

Results from the analysis show a potential impact of bioenergy development in Africa. Bioenergy can have positive impact on:

**Poverty reduction** by enhancing energy security trough energy diversification and oil import bill reduction and by job creation (development of biofuel production could have an effect on employment in agricultural sector and the rural exodus).

**Environment,** by reducing Carbon emissions**.** Bioenergy can affect net carbon emissions in two main ways: it provides energy that can displace fossil fuel energy, and it can change the amount of carbon sequestered on land (over their life cycle, biofuels absorb and release carbon from the atmospheric pool without adding to the overall pool, Kartha 2006).

**Export development** Many countries see in biofuels an opportunity to develop a new export market for their agricultural produce and to increase export revenues. This is because the main international consumers (Northern countries) will not have the domestic capacity to supply their entire domestic demand, while tropical and subtropical developing countries have, or may develop, advantages in biofuel production. On average, biomass in tropical and subtropical areas is five times more productive, in terms of photosynthetic efficiency, than biomass produced in temperate regions (Johnson et al 2006).

Unfortunately, the broader picture is not as smooth, it has flaws. Firstly, various barriers entrave the adoption and commercialisation of biofuel technologies in Africa. These constraints are technological and non-technological constraints (policy, legal, financial, institutional, cultural, social etc.). Some of these constraints are developing below:

**Financial constraint.** Without subsidies, most biofuels cannot compete on price with petroleum products in Africa. The high initial cost of production of biofuels and inadequate financing arrangements for biofuel technology has been identified to be an important barrier to biomass energy commercialisation in most African countries.

**Policy, institutional and legal hurdles**. Many developing countries are characterised by a weak legal system: lack of appropriate legislation, little respect for the judicial system, weak legal enforcement etc. Investors may be discouraged by difficulties in upholding and enforcing contracts.

In addition to these barriers to entry that must be overcome to develop the production and use of bioenergy in African poor countries it should be noted the **Inertia and inflexibility to change.** The time of changes are long and the resistances heavy. There are rigidities of structures and behaviors. Furthermore, serious drawbacks associated with the development of this sector are observed

**Threats to food security** are recognised as the primary drawback of large-scale biofuels development. On a global basis, specialists argue that increased biofuel production will lead to higher food prices, benefiting producers and disadvantaging consumers. Biofuel production stands to impact on both of the major dimensions of food security: *availability* (food supply from production and imports) and *access* (entitlements and distribution among society). The surface of cultivable land that they require is significant and has put pressure on food and water prices. A recent OECD/FAO (2007) report expected food prices to rise by between 20% and 50% by 2016.

**Environmental and social impacts, through land and water use,** are concern as well, notably the clearing of natural forests or rangeland for meeting demand for biofuels results in many cases in the increasing of yield, displacement of other crops and expansion of the total agricultural land area. Water consumption during processing is also high, for example, around four litres of water per litre bioethanol for maize biorefineries in the US (Turner et al 2007). This results of competing water uses and reserves in aquifers and rivers.

Impacts of global biofuel development and growth on poor can be both positive and negative. To mitigate potentially adverse impacts of increases in biofuel production, adequate policies must be set up by concerning governments.

## Conclusions

Biofuels: is the cure worse than the disease? In recent years, biofuels have attracted increasing attention. Their selling points are many: they are made from renewable feedstocks that can be grown by farmers, and substituting them for petroleum products reduces greenhouse gases and dependency on foreign oil. Following Brazil’s footsteps, one country after another has launched new programs to encourage their production and use. Projects to demonstrate the possibilities of producing biodiesel from Jatropha have been started or are being planned in several African countries (Burkina Faso, Ghana, Lesotho, Madagascar, etc.). Regional and sub-regional organizations joined with international organizations have initiated some programs, to explore opportunities for bioenergy in the region. Some countries as the South Africa has already increase by 95% in ethanol production from 2001-2005 and the projection that biodiesel could meet up to 25% of the world’s energy needs in the next 20 years.

But, in the light of these concerns, the question must be asked whether the potential “cure” offered by biofuels will be worse than the disease.

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