

SIXTH FRAMEWORK PROGRAMME

FP6-2004-INCO-DEV-3

PRIORITY A.2.3.: Managing Arid and Semi-arid Ecosystems



National Policies and Strategies on Bioenergy in Africa

Case Study: Botswana

January 2008

COMPETE

**Competence Platform on Energy Crop and Agroforestry
Systems for Arid and Semi-arid Ecosystems - Africa**

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COMPETE is co-funded by the European Commission in the 6th Framework Programme –
Specific Measures in Support of International Cooperation (INCO-CT-2006-032448).

This work has been conducted in the framework of the project COMPETE (Competence Platform on Energy Crop and Agroforestry Systems for Arid and Semi-arid Ecosystems - Africa), co-funded by the European Commission in the 6th Framework Programme – Specific Measures in Support of International Cooperation (Contract No. INCO-CT-2006-032448).

The Competence Platform on Energy Crop and Agroforestry Systems for Arid and Semi-arid Ecosystems – Africa (COMPETE) will establish a **platform for policy dialogue and capacity building** and identify **pathways for the sustainable provision of bioenergy**

- to improve the quality of life and create alternative means of income for the rural population in Africa
- to aid the preservation of intact ecosystems in arid and semi-arid regions in Africa
- to enhance the equitable exchange of knowledge between EU and developing countries

The current document has been elaborated within Work Package 6 on Policy Development of the COMPETE project by the consortium partner University of Botswana.

The objective of COMPETE Work Package 6 is to coordinate policy research activities in African countries aimed at facilitating the efficient implementation of improved energy crop and agroforestry systems in order to enhance economic productivity and sustain rural and peri-urban livelihoods. It is also aimed at avoiding adverse environmental and social degradation that could arise from faulty policy development and implementation.

Within the context of the COMPETE Work Package 6 current national and international policies and strategies (including national legal and institutional frameworks) are identified addressing the implementation of improved energy crop and agroforestry systems.

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National Policies and Strategies on Bioenergy in Botswana

1.0 Introduction

Bioenergy is a leading form of renewable energy that is well ahead of other renewables such as hydropower, geothermal, wind, solar and marine energy (Karthi et al., 2005). As in other countries, the interest in the development of bioenergy and other renewable energy sources in Botswana has been driven by local and international developments. These include increasing energy prices, possible depletion of fossil energy sources, concerns about the environment (especially climate change), and reduction in rural poverty. The structure of the energy sector in Botswana reflects the economic and social structure of the dependent and dualistic economy. As in other parts of Africa, the main source of household energy in rural areas is fuelwood, while the urban population depends mainly on commercial sources of energy such as electricity and petroleum-based products. The 2005 energy balance of Botswana shows that renewable energy (mainly in the form of solar energy) contributes only 0.014% to final energy consumption. Other sources of primary energy are coal (10.3%), petroleum products (67.9%) and electricity (21.8%). The energy balance does not capture the use of biogel (a liquid biofuel imported from South Africa), which is mainly used by households (83%) for cooking of food and by caterers (17%) for food warming (EECG, 2007). This paper examines the development of bioenergy policies and strategies in Botswana. After a review of the draft energy policy for Botswana, policy objectives for traditional biomass energy are briefly reviewed, before examining progress which has been made in establishing policies and strategies for modernised biomass energy.

2.0 Botswana's Energy Policy

The objectives of Botswana's energy policy aim at achieving the aspirations of national development plans and the Long Term Vision for Botswana (Vision 2016). The draft energy policy of Botswana gives the overall objectives of the policy as follows:

- 1) To facilitate economic efficiency
- 2) To improve access and affordability of energy services
- 3) To ensure environmental sustainability,
- 4) To ensure security of supply and diversified supply sources
- 5) To facilitate gender equity and to improve governance within the energy sector (Government of Botswana, 2006).

The promotion of solar energy and sustainable methods of traditional biomass energy are given greater emphasis in the policy; whereas other fuels such as biogas from waste and landfill gas are not given attention. Liquid biofuels are not at all mentioned. Although the policy objectives do not pay much attention to bioenergy, a few remarks are made below about how these fuels link with the draft energy policy.

The objective of economic efficiency implies that bioenergy sources should be supplied at a least cost to the economy. An efficient use of bioenergy will promote its conservation. It is critical that bioenergy should be accessible to households as it is a basic need. It can play a major role in achieving the goal of environmental sustainability since it is climate friendly and can also advance other environmental goals such as soil restoration, watershed protection and habit preservation (Kartha et al., 2005). The policy objective for ensuring “security of supply and diversified supply sources” of energy can be achieved partly by developing indigenous sources of energy supply; and bioenergy can play a major role in meeting this objective. Any policy that addresses the bioenergy problem actually empowers women and therefore facilitates gender equity since women are the main collectors of fuelwood in Botswana.

3.0 Traditional Biomass

As already stated, the most important source of bioenergy in Botswana is fuelwood. Other sources of bioenergy such as crop residues and dung are only used to a limited extent, particularly in areas of fuelwood scarcity. Wood is also not processed into charcoal, like in other African countries, due to cultural reasons. In order to develop and use traditional biomass in a sustainable way, the government has the following policy goals:

- 1) To promote sustainable use and harvesting of biomass energy
- 2) To promote a switch from fuelwood to alternative sources of energy in public institutions
- 3) To collaborate with other stakeholders on policies and legislation supporting community-based fuelwood management (MMEWR, 2006).

The draft energy policy states that there is localised shortage of fuelwood in the eastern part of the country. The policy further states that there is no fuelwood pricing and tax mechanism to address the unsustainable harvesting of fuelwood. The preferred fuelwood species are therefore being increasingly depleted in south-eastern part of the country, particularly around major settlements where fuelwood traders cut live trees (MMEWR, 2006). There is evidence that the proportion of households using fuelwood has reduced over time due to a switch to commercial energy sources such as liquified petroleum gas (LPG) and kerosene. This was mainly due to an increase in incomes and increased scarcity of fuelwood, and not necessarily because of the promotion by government policy. In order to promote a switch from fuelwood to LPG in government institutions, the Government installed modern kitchens fitted with modern liquid petroleum stoves in 707 primary schools during the period 2001 and 2007 (MMEWR, 2007). However, a survey of 60 primary schools in the Central District revealed that the construction of these kitchens did not lead to a switch to LPG. Most of the schools (76%) did not use LPG because of the following reasons:

- 1) The stoves were perceived to be inefficient
- 2) There was poor maintenance of the kitchen equipment and
- 3) The unreliability of LPG supply (MMEWR, 2007).

4.0 Liquid biofuels

A feasibility study has been undertaken to assess the potential for the production and use of energy crops; and in particular to compare the potential of the following energy crops: *Jatropha curcas*, palm oil, sunflower, soybeans, sugarcane, maize, and sweet sorghum. The results of the study will be utilised to formulate a strategy for liquid biofuel policy in Botswana. The study revealed that there is a potential for the production of bioethanol and biodiesel in Botswana from sweet sorghum and *Jatropha curcas*, respectively. The production of these biofuels would contribute to employment generation (5000 jobs), import substitution (5%) and gross national product (10%) (EECG, 2007).

For bioethanol, the study recommended that sweet sorghum and sugarcane were suitable feedstocks as a result of their low cost of production. Maize was not recommended as a suitable feedstock as a result of high production costs and competition with food. The production costs for manual and mechanised production of sweet sorghum were estimated to range from P50/tonne to P60/tonne, respectively. The study recommended that biodiesel should be produced in Chobe District, where there will be a 20 million litres plant for processing the biodiesel (EECG, 2007). The study revealed that bioethanol will be competitive with fossil fuel if there is a 50% reduction in levies (EECG, 2007). The study recommended *Jatropha curcas* should be the feedstock for biodiesel. The feedstock can either be produced by both small and large scale farmers in Central District, where land is available for growing this crop. However, this fuel can only be competitive if there is a reduction in levies (which is currently applied) by 75% (EECG, 2007).

The results of this study will be used to guide policy formulation on liquid biofuels in National Development Plan 10. Currently, the Department of energy is making an arrangement for the drafting of the energy policy strategy. An international conference on the role of liquid biofuels in development is being planned by the Department of Energy in 2008, and the draft strategy on liquid biofuels in Botswana will be presented in this conference for discussion. It is expected that the strategy for biofuels will outline the vision of the government on these fuels and also address future targets for the share of liquid biofuels. In addition, it is also expected that the strategy will determine blending ratios, prices, standards, financial incentives, and funding mechanisms of these fuels (EECG, 2007).

Conclusion

Botswana has not as yet established bioenergy policies and strategies. However, it is expected that a strategy for liquid biofuels will be drafted in the near future. A feasibility study for the production and use of liquid biofuels has already been drafted. However, the draft energy policy has policy statements for the production and use and solid biomass. The policy mainly promotes the sustainable use and harvesting of biomass energy and a switch from fuelwood to alternative sources of energy.

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COMPETE is co-funded by the European Commission in the 6th Framework Programme – Specific Measures in Support of International Cooperation (INCO-CT-2006-032448).