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

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Report on International and Regional Policies and Biofuels Sector Development in Sub-Saharan Africa

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

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List of Acronyms

AfDB	African Development Bank
AoA	Agreement on Agriculture
AU	African Union
CO ₂	Carbon dioxide
CAP	Common Agricultural Policy
CDM	Clean Development Mechanism
CENBIO-USP	National Centre of Reference in the Biomass Universidade de São Paulo
CER	Certified emission reductions
CNG	Concentrated natural gas
COMESA	Common Market for Eastern and Southern Africa
COMPETE	Competence Platform on Energy Crop and Agroforestry Systems for Arid and Semi- arid Ecosystems- Africa.
DOE	Department of Energy (USA)
DRC	Democratic Republic of Congo
EAC	East African Community
EC	European Commission
ECOWAS	Economic Community of West African States
EIA	Energy Information Agency (USA)
ETBE	Ethyl-tertio-butyl-ether
EU	European Union
FAME	Fatty acid methyl esters
FANRPAN	Food, Agriculture and Natural Resources Policy Analysis Network
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
GATT	General Agreement of Tariffs and Trade
GEF	Global environmental facility
GM	Genetically Modified
GMO	Genetically modified organisms
GTL	Gas to liquid
HS	Harmonized system
IIED	International Institute for Environment and Development
IISD	International Institute for Sustainable Development
ISO	International Standards Organization
LCD	Least Developed Country
NEPAD	New Partnership for Africa's Development
NGO	Non-governmental Organization

OECD	Organisation for Economic Co-operation and Development
RECs	Regional Economic Communities
SADC	Southern Africa Development Community
SASOL	Suid Afrikaanse Steenkool en Olie (South African Coal and Oil)
SCM	Subsidies and Countervailing Measures
SCM	Subsidies and Countervailing Measures
SMEs	Small and Medium scale enterprises
SNG	Saturated natural gas
SPS	Sanitary and phytosanitary
SSA	Sub-Saharan Africa
SVO	Straight vegetable oil
SWOT	Strengths, Weaknesses, Opportunities and Threats
TBT	Technical Barriers to Trade
UEMOA	Economique et Monétaire Ouest Africaine (West African Economic and Monetary Union)
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNF	United Nations Foundation
UNIDO	United Nations Industrial Development Organization
USA	United States of America
WTO	World Trade Organization

Preface

This report has been prepared by a team led by the Centre for Agricultural and Rural Development (CARD), Bunda College, Malawi; Dr. Charles Jumbe is the team leader. CARD is a member of the FANRPAN network, providing research inputs on a number of policy areas of importance to the southern Africa region.

FANRPAN is a partner in the COMPETE project, responsible for leading the implementation of the Work Package on policy development. This is the second of two papers to be produced in the first year (2007) of implementation. The first report is on national policy frameworks in sub-Saharan Africa, also led by Dr. Jumbe.

Other contractual contributors to this report include UEMOA-PRBE (West Africa), Eco, UCT-ERC (South Africa), MU, ISUSI, EUBIA, UEMOA, FAO, WIP, and EKMD. We thank those who provided inputs, but we remain responsible for the contents of this report.

Summary

This study analyses different regional and international biofuels policies and strategies with a view to assessing the extent to which biofuels policies and strategies of selected advanced countries, international agencies, and African Regional Economic Communities (RECs) promote or undermine sustainable development of a biofuels industry in African countries. Regional and international strategies reviewed include the EU, COMESA, East African Community, SADC, AU, US, ECOWAS, and three international strategies by UN agencies (UNIDO and UNCTAD focusing on trade and investment potential in biofuels, and the Kyoto Protocol which provides legally binding greenhouse gas emission reductions). The process involved evaluating the content of different policies and strategies, assessing the measures (incentives) put in place to develop the biofuels sector, and identifying key factors driving the success of the various biofuels initiatives.

The main findings from this review are that, unlike in the developed countries, regional economic groupings in Africa such as SADC, COMESA, ECOWAS and the AU do not have a coherent regional policy agenda for developing the biofuels sector with specific targets. This has contributed to differences in terms of commitment to biofuels industry development by individual countries in the developing world, with some countries making technological advances in biofuels (e.g., South Africa) and others lagging behind.

The study has shown that member states of the EU and the USA commit huge financial resources for research and development and provide tax-incentives for promoting use of biofuels. Unlike in developed countries, there is little African government support to facilitate the development of the sector, resulting in small-scale production of energy crops without accompanying investment in infrastructure for processing, storage, distribution and marketing of biofuels products.

The absence of coherent regional and international policy frameworks largely emanates from the inadequate awareness and sensitization of the political and administrative leadership of the SSA region regarding the potential benefits as well as dangers of biofuels if not properly managed.

Many countries in Africa, including Angola, DRC, Mozambique, Ghana, Tanzania, Zambia and Zimbabwe, have abundant land for growing energy crops for biofuels production without disturbing the traditional farming systems and the ecosystem. This potential can only be harnessed to benefit the rural masses and facilitate rural economic development if the regional economic communities in Africa develop a comprehensive regional strategy, and provide resources and incentives for the development of a vibrant biofuels industry.

1.0. Introduction

1.1. Setting the stage: The era of biofuels

Although energy continues to be the pivot of economic and social development of all countries around the world, increased consumption of fossil fuels has been the subject of ongoing debate centred especially around the destructive effects on climate change of increased use, leading to greenhouse gas emissions and their devastating effect on global warming and climate change (UN-Energy, 2007). In addition, the growing interest in biofuels emanates from the increased concerns about the political instability in many oil exporting countries which threatens the steady supply of fossil fuel to importing countries, the need to ensure national energy security, and the quest for job creation, promotion of rural development and poverty alleviation. These factors, along with rising oil prices, have stimulated great interest in re-examining the role that energy crops should play in diversifying energy sources and addressing these concerns. Among the factors responsible for inducing increases in prices of fossil fuels include the increased demand for fossil fuels of emerging developing economies (especially China and India) to support the rapid pace of industrialization.

Owing to their relatively favourable environmental qualities, there is a growing enthusiasm for biofuels as an alternative to fossil fuels. In fact, biofuels development has risen to the top of the international policy agenda and currently dominates policy debate around the world. Many countries, especially in the developed world and Asia, are advocating greater use of biofuels as an environmentally friendly source of energy. In some countries, the biofuels industry is becoming an important economic sector contributing to employment creation via the biofuels value chain. The United States, for instance, has passed legislation to increase the share of ethanol in the U.S. liquid fuels mix and has committed funding for research on cellulosic biofuels (DOE/EIA, 2007). In Europe and Asia, there has been a major push to increase the use of biofuels for transportation. A number of biofuel programs have been initiated in a few land-locked oil importing countries in Africa as a substitute for petroleum fuels and as a catalyst for facilitating rural development (Takavarasha et al., 2005). For example, Malawi initiated the first major biofuels program in

Africa in the 1980s where ethanol produced from sugarcane molasses is blended with imported petrol, presently at 10 percent, in order to reduce the volume of imported petrol for transportation (between 80 and 90 million litres of petrol is imported every year). In October 2007, Malawi imported an ethanol-propelled car from Brazil and has launched a pilot program to modify the engines of some vehicles to run on ethanol or a mixture of ethanol and petrol.

Owing to their vast natural endowment – climate, arable land and water resources – investors have already started purchasing land in Africa for growing biofuels feedstocks, and some are putting up infrastructure for the processing of biofuels in Africa (e.g., SASOL¹ in South Africa). In this study, we examine the implications of different policies of advanced countries for the biofuels industry in Africa, as well as those of African RECs and selected international agencies.

1.2. Objective and scope of the policy review

This study analyses selected regional and international biofuels policies and strategies with a view to assessing the extent to which biofuels policies and strategies of advanced countries promote or undermine sustainable development of biofuels industry of SSA countries. This review provides a framework for comparing the similarities and differences across the different policies. It also helps to isolate issues which may require review of national policies in order to harness the potential of biofuels development in Africa.

The study involved review of regional and international policies documents for the US, EU, ECOWAS, COMESA and the UN-System downloaded from the internet as well as those provided by our COMPETE partners. We evaluated the content of different policies and strategies, assessing the measures (incentives) put in place to develop the biofuels sector and identifying key factors driving the success (or otherwise) of the various biofuels initiatives.

¹ SASOL, Suid Afrikaanse Steenkool en Olie or South African Coal and Oil is a South African company involved in mining, energy, chemicals and producing synthetic fuels especially petrol and diesel from coal and natural gas.

1.3 Organization of the report

This report is organized in 5 sections as follows. The following section (2) presents an overview of the international and regional biofuel policy frameworks. Section 3 assesses the impact of western and international biofuels development policies on Sub-Saharan Africa. This includes analysis of trade policy incentives for the development of the biofuels industry. The opportunities and challenges for biofuels development in Africa including the role of science and technology, is discussed in section 4. The report concludes with a summary of main findings and the way forward in section 5.

2.0 International Biofuels Policy Initiatives

2.1 History, trends and incentives for US and EU biofuels development

The development of renewable energy programs in the United States is mainly driven by need to secure energy independence from unstable, unreliable supply sources. The terrorist attack in 2001 and the Iraq war have led to heightened concern about energy security, energy infrastructure vulnerability, and the need for alternative fuels (Sissine, 2006). As a result, the US government has embarked on an aggressive scheme to replace 15 percent of the petrol-powered cars with “green-fuel” vehicles in order to reduce petrol consumption by 20 percent. This scheme is backed by heavy tax incentives designed to stimulate biodiesel and bioethanol production. Under the provision of the Renewable Energy and Energy Conservation Tax Act of 2007, oil companies claim a one dollar-per-gallon tax credit for renewable diesel made solely from renewable sources irrespective of the production process used. The tax incentives have stimulated the growth of the domestic biodiesel industry. Currently, there are 105 small biodiesel plants capable of producing 864 million gallons or 4000 million litres of fuel. Substantial amounts of soyabean oil are converted into biodiesel in the US while maize is used for ethanol production.

In Europe, the policy for increased promotion of liquid biofuels for transport at the European level was initiated in the 1990s, mainly from the viewpoint of addressing the climate change caused by increased use of fossil fuels which causes global warming. In 1997, the European Commission proposed an

increase in market-share from 0.3 percent to 2 percent for liquid biofuels for transport by 2005 in the forms of alcohols and ETBE, vegetable oils and esters (European Commission, 1997). Given the fact that the production cost of liquid biofuels was three times that of conventional fuels, the EU policy then focused on exploring ways of reducing production costs of biofuels, providing subsidies on raw materials for biofuels production, and removal of tax levy (detaxation) on liquid biofuels on a limited scale (European Commission, 1997).

Recently in 2003, the EU member states have set a target of incorporating 5.75 percent biofuels in the total of fuels used for transportation by 2010 (Hodson, 2006). In fact, several European countries had already introduced mandatory policies for increased use of bioenergy in their final energy consumption well before the EU biofuels directive was issued. For example, in 1995, Finland adopted an energy policy which included increased use of bioenergy of 25 percent by 2005. The EU's production of biofuels was 2.4 million tons in 2004, which accounted for approximately 0.8 percent of EU petrol and diesel consumption. In terms of bioethanol production intended for vehicle use, 500,000 tons were produced in 2004, an increase of 15.6 percent on 2003 production, with Spain as the leading bioethanol producer due to its tax-fee policy on bioethanol (European Union, 2006). Today, Germany, France, Sweden, Spain and Italy have successfully introduced biofuels into their markets (van Thuijl and Deurwaarder, 2006).

2.2 Policy incentives for biofuels development: A comparative assessment of EU and US biofuels policies

This section discusses different policy incentives that have been put in place to develop the biofuels sector in developed and developing countries. Table 1 presents a summary of major regional policy incentives for the development of biofuels sector.

From the table, the EU and USA provide subsidies to producers of energy crops and provide tax-credit for blending of biofuels with petrol and diesel. The developed countries have committed to providing financial resources for biofuel research as well as for the expansion of biofuel projects and capital investment for biofuel infrastructural development. Tax

incentives and detaxation of biofuels are being widely adopted in all developed countries to spur growth of biofuels and to reduce vehicular pollution and green house gases.

Unlike in developed countries, most developing country governments do not have the economic resources to provide tax incentives and other measures for the promotion and development of the biofuels sector. Ideally, tax concessions can be successfully used to promote biofuels in the short to medium term. Generous tax incentives have certainly facilitated the growth of a domestic biofuels industry to partially meet the national energy demand in developed countries. Nonetheless, these incentives are costly and do not help much towards creating a level playing field for competitive biofuels markets.

Currently, developed countries are already interested in exploiting the biomass potential of developing countries for biofuels production. Given that domestic investment capital in biofuels is insufficient in many developing countries, it is possible that foreign direct investment (FDI) will help to develop the industry in Africa which has a favourable environment for the production of first generation biofuels. In theory, this will create employment possibilities in the new industry, and market opportunities for energy crops. However, there is need for legislation to regulate the sector to ensure that the region is able to meet its own energy needs in stead of supporting the foreign-owned firms interested in exploiting land, water and labour to produce biofuels for exports.

Table 1: A comparative assessment of some regional biofuels policies

Incentive	US National Energy Policy Act (2005)	EU Strategy for Biofuels (2006)
Subsidy/ Tax incentive	<p>Tax credit of 51 cents per gallon of ethanol for blending ethanol with petrol</p> <p>The credit or payment of \$1.00 per gallon for agri-biodiesel.²</p>	<p>Total tax exemption permitted for biofuels whether they are pure or mixed with fossil fuels.</p> <p>CO₂-neutral fuels are exempt from both CO₂ tax and energy tax in Sweden³.</p> <p>Farmers awarded a €45 premium for each hectare of land used for bio-fuels production, with a maximum guaranteed area of 1.5 million hectares as the budgetary ceiling⁴.</p>
Research & Develop- ment	<p>Grants provided for research into and development and implementation of, renewable fuel production technologies in States with low rates of ethanol production, including low rates of production of cellulosic biomass ethanol.</p>	<p>Financial assistance for the processing industry and the establishment of a compulsory rate of biofuels for oil companies.</p>
Budget support	<p>Grants, loans and loan guarantees towards, among others, expansion of ethanol and biodiesel production; development of renewable energy projects and energy efficiency improvements; biorefinery projects; feasibility studies; the development of a business plan, or to acquire working capital; ethanol and biodiesel demonstration plants.⁵</p>	<p>Give a high priority to research into the “bio-refinery” concept, finding valuable uses for all parts of the plant, and into second-generation biofuels⁶.</p> <p>Through the EU Energy Initiative, the EU Energy Facility (budget €220 million) to support concrete investments in energy services for those living under the poverty line.</p>

² Joint Committee on Taxation (2005); Sissine, Fred (2006); Koplow, (2006),

³ “Sweden has introduced other policies such as free parking, exemption from congestion charging, and tax breaks for both drivers and companies, which has stimulated demand for flexi fuel cars and the E85 fuel (European Union, 2006).

⁴ European Commission, (2006a); Schlegel and Kaphengst (2005)

⁵ Yacobucci, Brent D., (2006).

⁶ European Commission, (2006a)

Since biofuels are at its initial stage of development, a number of studies have been commissioned to assess their potential, which will provide information useful for developing a regional policy and strategy. At the African level, the implementation of a regional policy can contribute to the achievement of the NEPAD objectives namely, to increase access to financing and increase the reliability of infrastructure, both for companies and households, in order to increase the access rate to energy services (Takavarasha et al., 2005).

2.3 The role of African regional economic communities to the promotion of biofuels

The persistent petroleum price increases, which have put pressure on foreign exchange resources and slowed down economic development, have in turn stimulated SSA countries to diversify their energy sources to achieve energy independence. Recently (August 2007), the African Union Commission organized the First High-Level Seminar on Biofuels in Africa at its headquarters in Addis Ababa to discuss the potential and challenges of biofuels in Africa. A political declaration was developed that will, among other things, facilitate: a) the development of an enabling policy and regulatory frameworks for biofuels development in Africa, b) formulation of guiding principles on biofuels to enhance Africa's competitiveness while minimizing the risks of biofuels development for small-scale producers, and c) encouragement of the engagement of development partners to enable North-South and South-South cooperation in biofuels development. The meeting also called for the engagement of public financing institutions to support biofuels projects, and proposed the establishment of a forum to promote access to biofuels information and knowledge (IISD/UNIDO, 2007). Unlike the European Union, the Africa Union does not have a coherent policy on biofuels.

In 2005, the 15-member Economic Commission for West African States (ECOWAS, 2005) adopted a White Paper whose main goal is to increase by four times during a 10-year period, access to modern energy services for the rural and peri-urban populations. However, due to low technological advancement and the lack of equipment and technical capacity, the policy recognizes the difficulty to follow the Brazilian example of producing ethanol from sugarcane. Rather, it focuses on exploiting some cereals or non-edible plants grown on

degraded soils to produce biodiesel such as *Jatropha curcas*. The policy paper does not contain specific strategies for the development of biofuels in the ECOWAS region except to conduct studies to investigate the market potential for biofuels and the conditions for developing industrial crops.

The Southern Africa Development Community (SADC) with 14 member states has recognized the need to reduce reliance on imported fossil fuels by promoting the use of energy crops for biofuels production. Among the SADC member states, Malawi was among the first in Africa to start a major biofuels program in the 1980s, even before Europe began its biodiesel program in the 1990s (Takavarasha, 2005). Malawi started a program of producing ethanol from sugarcane molasses producing 18 million litres of ethanol a year which is blended with petrol. Tanzania and Mali are growing *Jatropha* for producing biodiesel using the Multifunctional Platform⁷.

However, there are a number of isolated biofuel programs in Africa mainly aimed at reducing pressure on foreign exchange resources that slow down economic development due to persistent petroleum price increases. For example, within SADC, South Africa through SASOL has developed the first synthetic fuel production plant in Africa for the production of liquid fuels such as petrol and diesel from coal and natural gas using Fischer-Tropsch technology. SASOL has a soya biodiesel plant that converts 400 000 tons of soyabeans into 91 million litres of diesel per year. However, biodiesel production is not economically viable without fuel tax-exemption, feedstock subsidies and capital investment support.

Recently, Takavarasha et. al., 2005 conducted a SADC study on the potential of biofuels in the SADC region. The report outlined three main policy objectives for the biofuels sector. The first objective is to meet at least 20 percent of the total liquid fuel needs of the region from biofuels to ensure national as well as regional energy security. The second objective is to open up new markets through value addition opportunities arising from processing of biofuel crops; and the third objective is to maximize the benefits of the region's comparative

⁷ The multifunctional platform is a small diesel engine, mounted on a steel chassis and powers a variety of end-use equipment such as grinding mills, de-huskers, battery chargers and water pumps. It can also generate electricity for lighting, refrigeration and water pumping.

advantage for growing tropical energy crops. Despite these policy objectives offering opportunities for countries in sub-Saharan Africa to develop the biofuel sub-sector and take advantage of supplying the required fuels to the region, so far, SADC has not done much to implement the recommendations from the report. At present, there are no regional biofuels programs to harness the potential of the SADC, COMESA, EAC and ECOWAS regions. This lack of programs means missing out on the potential of biofuels for rural development through employment creation for smallholder farmers as suppliers of raw materials for biofuel production plants, saving foreign exchange on fuel imports of many countries.

For 8 countries in West Africa the Union Economique et Monétaire Ouest Africaine (UEMOA) through its 'Programme Régional Biomasse Energie' (PRBE) has developed a biomass vision and regional strategy which is presented in the Appendix to this report.

2.4 Do international policies have spill-over effects on the African biofuels sector?

As already argued, the continued increase in the cost of fossil fuels coupled with the quest for securing fuel independence have forced many countries in the EU, USA and Asia to seek innovative ways of using energy crops to produce biofuels as a means to diversify and meet their energy needs. However, many countries in the EU (e.g., the Netherlands, and Belgium) and Asia (Japan and China) do not have adequate arable land to spare for the production of biofuels feedstocks. As such, meeting targets for the share of biofuel in transport fuels will require large-scale production of energy crops. Sub-Saharan Africa and South East Asia will be the focus of biofuel investments in the coming years. Thus, SSA and Asian countries are likely to play an important role in the development of the biofuels sector given their vast natural endowments – climate, arable land and water resources. However, there is need for developing a regional policy framework to ensure that biofuel benefits will not only go to importers but also to the producer countries in the developing world. This should be coupled with national governments making commitments to increase the productivity of the agricultural sector, develop partnerships for information and technology exchange, develop biofuels markets within the

region, and provide the resources for research and infrastructural development at the national level.

Despite the clear potential of biofuels to stimulating economic development in Africa, there are a number of uncertainties in relation to its promotion as an alternative to fossil fuels and their effect on agricultural commodity markets. These uncertainties include the nature of agricultural and biofuels policies and strategies that will be implemented to nurture biofuels production from domestic agricultural crops, the pace of technological progress in developing viable “second generation” biofuels production plants that utilize cellulosic feedstocks rather than food and feed crops, and the future price of oil.

So far, the developed countries have committed resources towards research into technologies to convert any type of biomass to biofuels. For example, the EU Biomass Action Plan has put measures in place to prepare for the large-scale use of biofuels by improving their cost-competitiveness through the optimised cultivation of dedicated feedstocks, research into “second generation” biofuels, and support for market penetration by scaling up demonstration projects and removing non-technical barriers (European Commission, 2006). According to section 1514 of the US National Energy Policy Tax Incentives Act of 2005, the Administrator of the Environmental Protection Agency in consultation with the Secretary of Agriculture and the Biomass Research and Development Technical Advisory Committee, will establish an “Advanced Biofuels Technologies Program”, to demonstrate advanced technologies for the production of alternative transportation fuels. In other words, biofuel advocates have put their faith in technologic advancements to make agriculture a reliable supplier of food while also providing feedstocks for biofuels production.

While biofuels may open a new window of opportunity for creating new jobs in the biofuels industry (e.g., production of energy crops, processing, distribution and marketing), substituting for substantial amounts of imported fuels, and partially satisfying local demand for transport fuels, the consequences of biofuels for food supply and prices remain uncertain – BUT they cannot be ignored. There are increased concerns regarding competition between crops for fuel and crops for food and livestock feed.

3.0 Impact of Western and International Biofuels Development on Sub-Saharan Africa

The development of the biofuels industry worldwide and in Africa in particular, has been characterised by controversies. The negative and pessimistic views about the industry are best summarised by an article by Grain (2007) which strongly argues that:

“The truth is that the agrofuels boom in Africa is not about rural development and improving the living standards of poor farmers. On the contrary, it is about foreign companies taking over land by striking deals with government officials and lobbying for legal protection, subsidies and tax breaks; by acquiring scarce fertile land and water rights; by coercing farmers into becoming cheap labour on their own land; by introducing new crops in large-scale plantations; by introducing GM crops through the backdoor; by displacing people and biodiversity based systems; and by enslaving Africa even more to the global market. Land grabbing on unprecedented scale is on the march in Africa”.

Other stakeholders have counter-argued that the impact of biofuels development in Africa largely depends upon how it is managed. For example, the Regional Hunger and Vulnerability Programme (2007) argues that, if managed well, the biofuels sector could increase incomes and employment in rural areas and improve rural energy security in ways that could offset the losses. In the same vein, Janssen et al. (2007) observe that the development of an international biofuels market is a multi-fold task to provide energy security, reduce greenhouse gas emissions, protect the environment, and generate economic growth in rural areas and developing nations.

Against the background of the on-going polarized debates on the pros and cons of developing the biofuels industry, we now examine in some detail the possible and potential impacts of the regional and international policies on the development of biofuels in Sub Saharan Africa. Our primary interest is to assess the positive and negative implications for the Africa biofuels sector development of different policies.

3.1. Impact of WTO rules on the development of the biofuels sector in Sub-Saharan Africa

In this section, we analyse how the biofuels sector fits into the WTO regulatory framework. Literature on trade and biofuels shows that currently, the World Trade Organization (WTO) does not have a specific position on biofuels (Janssen et al., 2007). This is so because energy trade has not been a focus of WTO law and policy. Until recently, a number of key players in energy markets, particularly petroleum, such as Saudi Arabia were not WTO members (International Policy Centre (IPC, 2006).

The absence of a clear WTO position on biofuels trade issues has provided room for different trade analysts and stakeholders to speculate or suggest how the prevailing WTO rules could apply to trade in the sector. According to the IPC (2006), what complicates the international trade policy situation on biofuels is their unusual make-up, that is, they are fuel produced through the transformation of agricultural feedstocks. The complication comes in because the WTO rules were written at a time when biofuels issues were not prominent as they are now.

It is further argued that within the emerging biofuels trade context, three crucial sets of issues concerning WTO rules may affect the production and exporting biofuels. These issues include: (i) biofuels classification within the context of the WTO harmonized system and WTO member obligations, (ii) how subsidies to promote the production or consumption of biofuels fit in the context of WTO rules, and (iii) consistency of domestic regulations and standards with WTO rules on international trade. These are discussed below.

3.1.1 Biofuel products classification

The question of whether biofuels should be classified as agricultural, industrial, or environmental goods has implications for WTO members' obligations, and for achieving a more uniform tariff for biofuels. The IPC (2006) observes that generally, the tariff classifications applicable to biofuels have been based on conceptions of the substances in question as agricultural or chemical products, and are not specific to the

use of the substances as fuels⁸. The HS classifications are the basis for tariff bindings in WTO Member's schedules. The lack of HS classifications more precisely targeted at the substances in question when used as fuels not only makes it difficult to get precise biofuel trade statistics, but may also impede efforts to liberalize tariffs on biofuels. WTO members may have environmental and energy security reasons for craving for tariff reduction on biofuels when used as fuels, but not when they are produced or used in competition with domestic products. The fact that tariff classifications are not consistently aligned with the actual biofuels market not only makes it difficult to ascertain the actual trade flows of biofuels, but also leads to inconsistencies, uncertainty and discrimination in the application of existing WTO obligations.

The harmonized system classifications also determine whether or not a product is an agricultural product under WTO rules⁹. The WTO Agreement on Agriculture not only has separate rules that affect tariff rates, but also different rules on subsidies and other domestic policies that affect trade. To the extent that the Doha Development Round may be revived, complicating the classification issue is the possibility that some biofuels could be classified as “environmental goods” and will be subject to special negotiations to reduce trade barriers as applied to “Environmental Goods and Services.”

The way in which biofuels are classified is not only important as far as tariffs are concerned, but importantly also determines which set of WTO disciplines on domestic subsidies are applicable. Whether a given biofuel falls within the harmonized system classifications of the Agreement on Agriculture will determine if the rules of that Agreement apply in addition to those of the Subsidies and Countervailing Measures (SCM) Agreement. The Agreement on Agriculture contains disciplines on subsidies that are in addition to those that apply to all products under the WTO (SCM) Agreement. The SCM Agreement prohibits export subsidies and subsidies contingent

⁸ Biodiesel is an exception as it now has its own harmonized systems (HS) classification.

⁹ The WTO Agreement on Agriculture (AoA) states that the provisions of the Agreement apply to HS Chapters 1 to 24 (except for fish products) as well as to a specified list of products with other HS headings. We note that while ethanol, is considered an agricultural good in the harmonized system, biodiesel falls under is considered an industrial good.

upon the use of domestic products over imported products (IPC, 2006). Biofuel subsidies are generally not tied to export performance and therefore would not fall into this first category of prohibited subsidies. However, production subsidies contingent upon the use of domestic products, such as locally produced feedstocks are an issue in the biofuels arena. Other subsidies not prohibited explicitly by the SCM may nevertheless under WTO law be “actionable”¹⁰ if they have certain kinds of adverse trade effects (IPC, 2006).

Since the biofuels classification process for purposes of tariff structure and WTO disciplines offers some opportunity for the WTO member countries to provide subsidies. SSA countries need to take advantage of this provision to provide any support to the industry that will boost its production levels without fears of actionability. Understandably, such support to the biofuels sector could be covered under the Agreement on Agriculture and the SCM agreement. In addition, the fact that there is debate that biofuels production could be supported under the environmental goods argument gives the developing countries the much needed leeway to support their emerging biofuels sector.

3.1.2 Subsidies for biofuels feedstock production and consumption of biofuels products

This involves the questions of how subsidies to promote the production or consumption of biofuels should be considered from the perspective of existing or any planned WTO rules. In addition, how possible “crosssubsidization”¹¹ should be evaluated. As Peskett et al., (2007) observe, the production of biofuels for domestic use and exports is dominated by a few countries. The USA and Brazil are the largest producers of

¹⁰ Actionability means that an affected WTO Member can either make a complaint against the measure in question in WTO dispute settlement, or address the subsidy through the imposition of unilateral countervailing duties against the subsidized products in compliance with the procedures set out in the SCM Agreement and pursuant to its domestic law. The World Trade Organization law permits countervailing duties to be imposed only where the country imposing the duties can show that the subsidy has caused or threatened injury to its domestic industry through the import of competing subsidized products.

¹¹ This is the increase in by-products as a result of subsidies to biofuel production or consumption.

bioethanol by a large margin, whereas the EU produces almost 95 percent of the world's biodiesel (European Union, 2006).

The concentration of biofuels production and consumption in these countries and regions is, however, not without public sector support. In particular, the biofuels market has been pervasively shaped in all the major producer nations by a variety of government interventions. Subsidization of biofuels has a basis within the WTO framework. Subsidization can have multiple purposes and these purposes may vary in their consistency with the underlying norms of world trade law. For environmental or energy security reasons, the government may subsidize consumers so as to provide them with an incentive to switch from conventional fuel to biofuels (in whole or part) by compensating, or more than compensating, for the added cost. Unlike in developed countries, most developing country governments do not have the economic resources to provide subsidies and other measures to support the development of biofuels sector.

However, the government still has a role to provide indirect subsidies in the form of research and development that can lead to more efficient technologies for the production of biofuels. This kind of subsidy affects the relative competitive positions of domestic versus foreign producers, although developed countries have a competitive advantage over developing countries due to financial and technological constraints facing most African countries. Most developed countries subsidize producers of biofuels which is not the most cost-efficient way of providing incentives for consumers to switch from fossil fuels to biofuels. Of course, subsidies are sometimes justified, as a policy matter, on “infant industry” grounds.

As pointed out before, in the countries where the biofuels industry is booming, national governments have, on the basis of the provisions of the World Trade Organization law, provided substantial support to their domestic biofuels industry. As shown in Table 1, a tax credit of 51 cents per gallon of ethanol for blending ethanol with petrol is provided in the USA to encourage use of domestically produced fuels. In Sweden, CO₂-neutral fuels are exempt from both CO₂ tax and energy tax; and under the Common Agricultural Policy (CAP) EU farmers

receive a €45 premium for each hectare of land used for bio-fuels production to stimulate domestic biofuel industrial growth. This support has led to the irony of virtually unimpeded trade in oil, while trade in biofuels is greatly restricted. Most experts agree that opening international markets to biofuels would accelerate investment and ensure that production costs are lowest. It is further argued that biofuel producers are now benefiting from low feedstock prices that are themselves the product of agricultural subsidies¹² (UN Energy, 2007).

As for SSA countries, there is need to take advantage of the prevailing WTO subsidization laws to support the infant biofuels industry. However, there is danger that at some point in the future, once the biofuels industry becomes fully established and self sustaining, these countries may start putting pressure to change the subsidy provision in the WTO regulation. At that time, SSA may not be able to hold back the tide of subsidy removal for the biofuels industry. For most developing countries, the removal or reduction of agricultural support regimes for biofuels in the OECD countries may level the playing field in biofuels, but this is likely to be resisted by developed countries having access to OECD markets. With the high demand for biofuels worldwide, the SSA countries which have huge biofuels production potentials will be a hot-spot for the expansion of western biofuels industry to enable developed countries meet their fuel-mix targets.

¹² This depends of the feedstock, and applies importantly to sugar. Prices of feedstocks such as maize would be less affected.

3.1.3 Biofuels WTO rules on international regulations versus national policy regulations and standards

The consistency of domestic regulations and standards with WTO rules on international regulations and technical barriers to trade is another important issue regarding biofuels trade. In the case of biofuels, there is a wide range of internal regulations that may impact trade. These include mandatory targets on biofuels share in the transport fuels; restrictions or limits on the amount or kind of biofuels that can be contained in a blend with conventional fuel; specifications of the properties or performance characteristics of particular biofuels or the materials they must be derived from; labeling for consumer protection and information purposes; health and safety regulations concerning the handling and transportation of particular biofuels or inputs required for the processing of biofuels, and related specifications for processing plants; and broad environmental performance requirements related to the entire life-cycle of the product, including the sustainability of the agriculture used to produce the feedstock from which the biofuels is processed (UNCTAD, 2006).

It has long been recognized that negotiated tariff reductions and other measures such as quotas or bans on the import and export of particular products could undermine the development of domestic biofuels industry. Not surprisingly, tariffs have been progressively reduced over rounds of negotiations, but now increasingly, trade disputes have become focused on internal policies (technical regulations, subsidies, government procurement practices, amongst others) that restrict market access or alter the competitive relationship between domestic and imported products in favour of the former. Many new legal disciplines have been introduced to address these policies where they have trade effects. However, disciplining internal policies that states with many different political and social systems can adhere to is complex. In legislating and regulating, governments, particularly in pluralist liberal democracies, need to accommodate the interests of diverse constituencies.

Often public policies serve multiple objectives and reflect compromises between different groups. In such circumstances, it is not simple to draw a line between internal policies that are legitimate exercises of domestic regulatory autonomy (even if

they have some trade-restrictive effects) and those that can be considered a form of protectionism under WTO rules, in that they undermine market access reasonably expected from commitments on liberalization of border measures in the multilateral trading system. In any case, tax breaks for research and development, might well constitute subsidies within the meaning the WTO Subsidies and Countervailing Measures (SCM) Agreement.

With regard to regulatory issues such as product certification, the United Nations Conference on Trade and Development (UNCTAD) (2006) argues that to ensure that certification does not become an obstacle to international trade, especially for developing countries, sustainability criteria should be developed through a transparent and fair process where countries, both producing and consuming, are effectively represented. To ensure active participation of developing countries, there is need to improve developing country capacity to play an active role in the development of criteria.

Another critical aspect of certification regulations is that developing countries have traditionally encountered difficulties getting certificates issued by their domestic certification bodies recognized by the importing countries (UNCTAD, 2006). As such, in most cases, they have had to rely on the expensive services provided by international certification companies. There is need for financing and technical support to the developing countries to implement certification or labelling requirements.

3.2. Poverty impact of bio-energy production on developing countries

Perhaps the most controversial aspect of the biofuels industry is the poverty reduction implications of the bioenergy sector in developing countries. According to Lanely (2006), given the numerous ways biofuels production and industry could develop, exact impacts are difficult to predict. The difficulty in establishing the exact positive or negative poverty implications of the biofuels sector is due to the fact that current analyses are based on predictions rather than on the actual facts since the industry is underdeveloped.

3.2.1 Food price implications of the growing biofuels market

Despite paucity of data on poverty impacts of the biofuels industry, the price of biofuels is linked to the price of oil as the rising fossil fuel prices will put upward pressure on the price of fuel feedstocks. Since feedstocks for biofuel production are also key ingredients for processed foods, products containing refined sugar, high fructose corn syrup, partially hydrogenated soybean or canola oil, amongst others, these products will become more expensive for food manufacturers to produce which will be transferred to consumers. According to OECD/FAO (2007) structural changes such as increased feedstock demand for biofuels production, and the reduction of surpluses due to past policy reforms, may keep prices above historic equilibrium levels over the next 10 years.

3.2.2 Income and poverty implications of biofuel price trends

The increase in prices for biofuels has significant and varied income and poverty implications for the farming community in developing countries. Modern bioenergy in its many forms holds promise for new jobs and income creation opportunities for rural farmers, foresters, and labourers, as well as improved access to quality energy services. Lanely (2006) observes that if biofuel feedstock prices follow the upward trend of oil prices, farmers in developing countries could see increased returns for their energy crops. Since nearly one-half of the labour force in developing countries is employed in agriculture, this boost to incomes could have significant effects on the purchasing power of rural people; thus the biofuels sector could address some of the poverty in developing countries.

3.2.3 Biofuel value chain development and poverty reduction implications

The income benefits from the biofuel sector could result from other factors in addition to promising price trends. In fact the prices and incomes across the value chain of the biofuels industry have significant income effects for the economies of both developed and developing countries. According to Rutz and Janssen (2007), due to longer value chains within national boundaries, biofuel production creates new employment opportunities. A study commissioned in 2003 by Earthlife Africa showed that an economy creates more jobs when it invests in the biofuels industry than in fossil fuel energy production. For example, 62 000 jobs would be created if 15 percent of South Africa's petrol is substituted with bioethanol.

If diesel were substituted with biodiesel, 288,000 jobs would be created, making a total of 350 000 new jobs (National Biofuels Task Team, 2006)

The UN-Energy (2007) observed that of all biofuel feedstocks in developing countries, oilseed crops are most amenable to job creation, particularly when harvested manually. Although the direct use of oil to power engines is possible, the process of converting plant oils into biodiesel can often occur at a smaller scale thereby creating employment opportunity at the local level.

3.3 Effect of quality control, standards and certification on the bio-energy sector development in Africa

Related to the issue of biofuel classification is the quality control, standards and certification processes. Generally speaking, international standards promulgated by domestic or European standards bodies or authorities exist, for example ISO standards in relation to testing of certain characteristics of the biofuels. However, given the state of art in biofuel production in Africa, such international standards are difficult to meet in order to penetrate international markets. However, some African countries do export sugarcane-based ethanol in the form of alcohol.

There is a potential for the development of trade in biofuels, particularly because countries with the greatest potential demand for biofuels do not have conditions that would enable them to produce biofuels most easily and cheaply. Thus, the increased demand for transportation energy in developed countries and their inability to meet this demand domestically will increase the likelihood of trade in biofuels; this will involve the Africa region with its favourable conditions for producing energy crops cheaply. However, the main driver of regional biofuels development will be to satisfy the regional demand, given that African biofuels cannot be expected to penetrate international markets in the next 10 to more years. In Africa, biofuels have not been standardized as a recognized fuel or fuel blend, neither have national standards been developed. It is for this reason that this study urges RECs and the AU to facilitate the development of regional standards and certification schemes to facilitate trade within the region while efforts are

made to advance their production technologies to meet the international standards. Currently, low levels of production, trade barriers such as tariffs and subsidies, and a lack of international standards limit the international trade of biofuels (Laney, 2006).

3.4 Future demand for biofuels products in developed countries: Potential impact on food security in developing countries

Unlike in developing countries, many developed countries such as the US and EU are under pressure to meet their biofuel mandate. This will entail increased demand for biofuels. For example, the US Energy Policy Act of 2005 states that 25.8 billion litres of biofuels will have to be used to fuel vehicles by 2010. For the EU, the current annual bioethanol production capacity is estimated at 1.5 billion litres. Even with the projected construction of an additional 5.4 billion litres of capacity, the EU would still be considerably short of the 12 billion litres of biofuels needed to achieve its 2010 non-mandatory target of 5.75 percent (European Commission, 2006). In 2006, 1.6 million hectares, representing 22 percent of the total land area, was devoted to energy crops (especially rapeseed and sunflower) for biodiesel production in areas traditionally dedicated to food crop production (Jank et al., 2007). The EU and the US have put in place a variety of policy measures aimed at promoting domestic production; presently large quantities of food crops are used for biofuels production. For example, in 2006, 20 percent of the whole maize crop across the US went to ethanol production, meeting two percent of its automobile fuel consumption. Taking food off the table and using it to produce fuel for cars will make poverty in Africa worse, especially in countries relying on food aid. According to von Braun (2007), price increases affect the availability of food aid such that the diversion of food for fuel is a powerful force affecting the price surge that has contributed to a reduction in food aid flows. For example, in 2006, food aid was 40 percent lower than in 2000 such that, increasingly, food aid is targeted to fewer countries (mainly in Sub-Saharan Africa) and to specific beneficiary groups (von Braun, 2007).

The increased demand for biofuels in developed countries has ramifications for the economies of Sub-Saharan African countries. Despite the tariffs and other incentives that have

been put in place in the developed world to promote biofuels, investors from these countries are rushing to the developing countries to invest in biofuels production. For instance, in Tanzania, the government is fast tracking agrofuels to accommodate a Swedish investor of looking for 400,000 ha of land; in Liberia a UK company is acquiring a forest reserve area of about 700,000 ha and in Ethiopia about 1 million ha is about to be allocated to international agrofuel companies to grow *Jatropha* (Grain, 2007).

As biofuels become commercially more attractive, some observers have expressed concerns about the possibility of food shortages in developing countries, surging food prices and reduced volumes of food aid. Thus, biofuel production will have a strong impact on the relative prices of energy and food crops. For example, if not properly regulated, biofuel crops may displace food crops and lead to clearing of more virgin forests. This may create shortages in food supplies that will push food prices up, to the detriment of the poor communities. In fact, OECD predicts food price increases of between 20 and 50 percent over the next decade if food crops are used for biofuels (UN-Energy, 2007). In addition, IFPRI predicts that in addition to the increase in crop prices, expanded biofuels production will result in a net decrease in the availability of and access to food and a decline in calorie consumption by eight percent (von Braun, 2007).

If not properly regulated, the expansion of biofuels production will have serious implications for food security in developing countries. If biofuels feedstock production will necessitate the use of arable land currently allocated to crop production, then this will lead to food insecurity especially for the developing world. In addition, if most of the feedstock used for biofuel production are grain and other food crops, then this would also have the same serious food insecurity challenges. In view of these challenges, Preskett et. al., (2007) suggest that in food insecure countries or regions, biofuel production should focus on non-staple food crops. Furthermore, the report urges investments in biofuel feedstocks with higher yields that result in less competition over land, or those that could be produced in marginal lands and have soil rehabilitation characteristics.

4.0 Prospects for Biofuels Sector Development in Africa

The high population of more than 900 million people and vast natural resource base that characterise the Africa region offer great opportunities for the production of energy crops for biofuels production and allow for significant gains to be made if the region uses its resources to develop a robust biofuel industry. The African region has a comparative advantage in the production of labour-intensive agricultural commodities including energy crops due to a relative supply of low-cost labour on fairly vast arable land resources. The high population also assures a ready market for biofuel products within the African Region.

In terms of international trade, African countries have a window for increasing their export earnings by exporting biofuels to the European Union markets. The EU has set a policy goal that by 2010, the share of renewable energy sources consumption should increase to 12 percent and the share of biofuels in the market should reach 5.75 percent. Since Europe does not have a climate conducive for growing energy crops, this is a big market opportunity for biofuel products produced by African countries.

However, countries in sub-Saharan Africa face some challenges as well as opportunities, as summarised in Table 2.

Table 2: Opportunities and Challenges for Biofuels Production in Africa

Opportunities	Challenges
<ul style="list-style-type: none"> ▪ Availability of sub-regional policy targets on biofuels. ▪ International demand and EU targets for biofuels. ▪ Availability of land in Africa. ▪ Availability of cheap labour with low opportunity costs. ▪ Sub-tropical rain fed agriculture. ▪ Potential to increase energy crop production through irrigation. ▪ Wide range of non edible oil seeds grown in Africa. ▪ Presence of sub-regional economic communities creating regional trading blocks. ▪ Possibility of tapping financing based on climate change abatement measures 	<ul style="list-style-type: none"> ▪ Absence of clear national policies, and regulatory frameworks on one hand, and the lack of financing on the other in most countries. ▪ Food insecurity for most African countries. ▪ Lack of appropriate infrastructure for biofuels production and marketing. ▪ Lack of standards for biofuels products. ▪ Absence of institutional framework for public-private and farmer partnership in biofuels production. ▪ Lack of investment capital and financing biofuels production. ▪ Lack of understanding of the ecological implication of large scale production of biofuels crops

Sub-Saharan Africa is poised to take advantage of the various opportunities for biofuel development. For example, the need to come up with mitigation measures to counter the effects of climate change provides an enormous opportunity for most African countries to benefit from global financing mechanisms such as carbon trading, funds available under the Kyoto Protocol, the Global Environmental Facility (GEF) and others. Again, rising international oil prices and the need to reduce poverty make it imperative that African countries seriously consider directing their efforts towards biofuels development. Many African countries could lower their reliance on imported fossil fuels, increase the value of exportable products, create much needed employment for the unemployed youths, assist in poverty reduction as well as reduce rural-to-urban drift, enhance agricultural productivity, and promote agro-processing.

4.2 Harnessing the potential of biofuels sector development in sub-Saharan Africa

In general, there are many factors driving greater biofuel production and use. High oil price, agricultural sector revitalization, trade reforms, and availability of new technologies are some of the major global drivers for biofuels development. In sub-Saharan Africa, agriculture is the mainstay of most countries and more than 80 percent of the populations derive their livelihood from farming. Developing the biofuel sector would therefore engage the majority of the population in commercial farming. Again, over 90 percent of the population use biomass energy, while only an average of 5 percent of the rural population has access to electricity. Biofuel sector development will help overcome these challenges in most countries.

Since the biofuel industry is relatively new, a number of trading arrangements especially at the international level are still being worked out. However, there is need for developing international standards for biofuels products. Most components of the standards promulgated by domestic or European standards bodies or authorities may use international standards to ascertain purity and quality of biofuels products. In the absence of such international standards, certain non-discriminatory domestic regulations may be blamed for creating obstacles to cross-border trade in biofuels.

Cross-border trade in biofuels is also likely to be challenged by the WTO law framework that can be used for bio-fuel trade regulation such as: (a) classification of biofuels, that is, whether they are agricultural, industrial or agricultural goods; (b) viewpoints on subsidies to promote the production and consumption of biofuels; and (c) consistency of domestic regulations and regulations. Apparently, the WTO member states are not any closer to reaching consensus on these critical issues. According to Dufey (2007), trade in oil is governed by the rules of GATT on industrial goods but there is no agreement among WTO members as to whether biofuels are defined as industrial or agricultural goods. UNCTAD is promoting trade in biodiversity products and services through its BIOTRADE programme and has launched a BioFuels Initiative that focuses on new trade and investment opportunities for developing countries, the implications for

poverty reduction and the supply-side constraints of increasing the production, use and trade of biofuels.

In order to develop sustainable biofuels production in sub-Saharan Africa, it is necessary that raw material production is linked to the processing plants in the form of out-grower schemes or contract farming. This would bind raw material producers to the processing plant. For farmers, they would be able to make informed production decisions on whether to grow energy crops or not. This means that there must be a clear policy and strategy for creating demand for biofuels, the development of markets, as well as an institutional framework for supporting the development of the biofuels sector.

4.3 The role of science and technology in the development of bio-energy industry

The negative effects of developing the biofuel sector can be mitigated, in part, by technological breakthroughs in the industry. The technological developments that would be significantly beneficial in this case, would be those that cut across the entire value chain of the biofuels industry, but especially and more importantly, in the feedstock production and refinery processes. In terms of biofuels production processes, UNCTAD (2006) observes that the technologies used so far to produce biofuels are rather simple and well-known. Nevertheless, some developing countries still have to improve their capacity to adapt existing technology to the local conditions. The UNIDO report (undated) on sustainable industrial use of biofuels indicates that suitable biogenic feedstocks contain high shares of sugar. The crops which can be converted into ethanol include: sugarcane, cassava, maize, potatoes, sorghum, sugar beet and wheat. The conversion of their starch content into sugar has a high process energy demand, so the cost of the product is quite high.

With respect to biofuels feedstock production, UNCTAD (2006) observes that the present first generation feedstocks can be converted into biofuels using conventional technology. However, the next or second generation feedstocks will be harvested mainly for their cellulosic content. The conversion of cellulosic biomass into liquid biofuels implies a more complex process and more advanced technology.

What is important here is the fact that the shift to next generation or cellulose-rich feedstocks has some major advantages, and hence would be considered a major technological breakthrough in the biofuels industry. The cellulose-rich feedstocks consist of agricultural wastes, including those produced during production of food and non-food crops, and forest products such as wood chips from forest thinning, tall grasses and woody biomass, amongst others (UNIDO, undated). The advantages of the second or next generation biofuel feedstocks include: (i) a much larger array of feedstock options; (ii) less competition on land use, and (iii) greater environmental benefits due to the possibility to use the feedstocks to power the process of conversion from biomass to fuels.

Biofuels extraction from non-food crops and forest products is not the only technological milestone in the area of biofuels feedstock production. Genetic engineering which may produce energy crops with a higher percentage of cellulose or hemicelluloses, lower lignin content and large quantities of the enzymes necessary for feedstock conversion to ethanol is another important step. Such technological breakthroughs are likely to bring efficiencies in biofuels production and reduction in land areas required for the feedstocks through increases in yields. With the introduction of GM varieties, there will be improvement in productivity thereby the amount of land needed to meet food, feed, and energy demands.

4.5 Policy changes and incentives to facilitate biofuels production and marketing in Africa

In spite of the many technical, financial and policy challenges facing the biofuels sector development globally and in Africa in particular, the sector has huge potential for growth. Currently, there is a new scramble for Africa by large-scale investors from the developed world. However, for the African continent to maximize the benefits of the emerging industry, African governments must develop policies and strategies to: (i) promote production of feedstocks without necessarily compromising food security; (ii) attract both foreign and domestic investors in feedstock production as well as refinery processes with conducive internal policy regimes such as tax holidays, rebates, etc within the WTO regulatory framework;

and (iii) actively participate in the international arena in terms of biofuels development.

In developed countries, the commonly used support measures for the biofuels industry development include mandatory blending targets and incentives to spur production and consumption of biofuels. These support measures include subsidies, loan guarantees, loans, direct payments and grants. Subsidies may also exist in the form of tax breaks and incentives to construct conversion plants and other capital equipment or to purchase biofuels and biofuel cars (see, for example, US Energy Act, 2005). Studies have shown that the cost of subsidizing the growing biofuels sector will be at least partly offset by resulting reductions in other agricultural subsidies¹³.

As biofuels gain prominence in political agendas, agricultural policies will need to be more closely reconciled with energy, environmental, trade and overall economic policies and priorities. Ultimately, the question becomes whether biofuels should be subsidised and, if so, for how long. If biofuels provide net societal benefits (e.g., reduction in greenhouse gas emission) that are not captured in the market system, then there may be a case for subsidies. If, conversely, subsidies become a source of revenue from which a small number of large producers primarily benefit, then subsidies may not be warranted. However, following Brazil's experience, it may be necessary to support to the biofuel sector as a nascent ethanol industry. In other countries – where agricultural, climate and market conditions may make the biofuel industry unviable without governmental support – the question of whether it is appropriate to subsidize developing domestic industries remains. For efficiency considerations, feedstock and biofuel production has to take place in the best suited countries in an environmentally and economically sound manner. Public and private support to research and development may be instrumental to making biofuels production less costly and more competitive. In the long run, it may diminish the need to subsidize the biofuels sector.

¹³ For example, set-aside land payments might be reduced if these lands are used to produce biofuels.

5.0 Discussion and Recommendations

This report set out to provide a comprehensive analysis of regional and international policies on biofuels. It is acknowledged that the biofuels industry development may have positive sustainable economic benefits in some instances but may be destructive in others. On one hand, biofuel production, in relation to its benefits, will put a heavy burden on the poor in most countries in Africa if left unregulated. On the other hand, the biofuels era is certainly here to stay. Global production of biofuels doubled over the past five years and is likely to double again in the next four years. In fact, UN-Energy (2007) predicts that, with the ongoing research and technological development, biofuels may provide a full 25 percent of the world's energy needs over the next 15 to 20 years.

The picture that emerges from the analysis of regional and international policies show clearly that the level of support to the biofuels industry in the developed country is a result of a consolidated regional policy that set targets for significant increase in biofuels mix in the total fuel composition for transportation. This policy is supported by large subsidies provided through relief from fuel excise taxes on biofuels, tax credit for the blending biofuels with fossil fuels, provision of farmer incentives for the production of energy crops, increased investment in research and technology in biofuels.

In contrast, Africa, with its abundant land resources, water and favourable climate for growing energy crops, does not have a comprehensive regional policy on biofuels to regulate the growing industry. This lack of a regional policy and strategy has led to underinvestment into biofuels research and development in Africa. The regional economic communities in Africa such as ECOWAS, SADC, AU/NEPD and EAC must play an important role in supporting the development of the biofuels industry in Africa. The RECs/AU need to urgently facilitate the development of a framework for a robust biofuels industry in Africa.

- There is need for RECs in collaboration with African governments to facilitate the development of a regional policy and strategy for biofuels development. A comprehensive regional strategy is needed in Africa to protect nationals from exploitation and ensure full participation in the biofuels production, processing,

distribution and marketing. Such a strategy should make provisions for joint-venture, contract farming and share-holding arrangements to ensure that biofuel benefits will not only go towards importers of biofuels such as the EU and the US but also benefit the producer countries in Africa.

- There is need for global balance in terms of support to the biofuels value chain. In particular, there is need for RECs and AU to influence African policy makers to provide incentives for the development of a robust biofuels industry. These incentives may include, but not be limited to, providing investment capital, credits facilities and loan guaranteed for local biofuels investors.
- Considering that the advances in the biofuels industry by OECD countries have not been without government subsidies, the paper recommends the establishment of a Biofuels Research and Development Fund within the RECs or AU to provide financial resources for capacity building, innovation development and research.
- The AU and the RECs should facilitate the setting up a Biofuels Platform for sharing information and technologies among African states. This platform will be important to make decisions regarding trade and investment in biofuels, as well as developing a common biofuels certification and standardization schemes suitable for the African region.

In conclusion, despite the controversies surrounding the viability of biofuels and its effects on the poor, African countries can play an important role in biofuels production, because of their natural endowment – climate, arable land and water resources. At the pace of biofuels development in the developed countries, “inaction” will be costly to African countries not only because they will miss out on the potential benefits that biofuels can offer, but most importantly, land will be taken away from mainstream agriculture for large-scale, export-oriented production of biofuels. This paper appeals to African governments and AU to take decisive action now by investing in science, technology development with emphasis on building human resource capacity and the physical infrastructure to support the product development.

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Appendix 1: Matrix of Regional and International Policies/ Positions on Biofuels Sector Development

Region	Regional Policy Document	Year	Objectives	Strategies on Renewable Energy	Strategies on Biofuels	Implementation Framework
ECOWAS (West Africa)	White Paper for a Regional Policy in West Africa	2006	<p>Increase access to domestic cooking fuels for rural and peri urban populations of the region.</p> <p>Increase access to production energy services in villages, particularly motive power for productivity and improved community services.</p> <p>Increase access to electricity services.</p>	<p>Action 1: Build capacities of public and private actors.</p> <p>Action 2: Help mobilize soft loans and funds from the private sector for projects to extend energy services to rural & peri urban areas.</p> <p>Action 3: Sharing promoting and disseminating sub-regional experiences relating to the supply of energy services.</p> <p>Action 4: Promotion of local production of energy goods and services.</p>	Establish a regional Biofuels Centre of excellence to serve as a research hub for the region	<ul style="list-style-type: none"> • Managing the energy and regional development information system • Helping Member States set up systems for assessing the impact of policies and programmes. • Holding regional workshops, training sessions and discussions on sustainable energy policies that will bring energy supplies to the poor. • Helping Member States to raise funds through project development and donor conferences. • Establish and manage an innovation fund to encourage innovation.

SADC	SADC Protocol on Energy		<p>It has six objectives amongst which are: To co-operate in the development and utilization of energy in the Region in the following sub-sectors: coal, new and renewable energy sources, energy efficiency and conservation, and other cross-cutting themes of interest to member states.</p> <p>To co-operate in the research, development, adaptation, dissemination and transfer of low-cost energy technologies.</p>	None besides mention of renewable energy in the major objectives.	None	N/A
East African Community	East African Community Treaty	October, 2005	No specific regional energy policy objectives; energy priorities such as: the EAC partner states shall in particular promote within the Community all measures to supply affordable energy to their people taking cognizance of the protection of the environment as provided for by this Treaty.	None	None	N/A

The African Union	Addis Ababa Declaration on Sustainable Biofuels Development in Africa	August 2007	Providing recommendations for the Biofuels development in Africa in view of the rising and volatile oil prices, and the need to stimulate growth and rural development, amongst others.	None	The Declaration makes 12 recommendations for biofuels development which include: developing and enabling policy and regulatory frameworks for the biofuels development as a matter of priority taking into account the following aspects: link to overall sustainable development policies, promote equality including gender equality, ensure participation of all stakeholders, promote local consumption, and enhance energy security.	None
COMESA Region	e-COMESA newsletter	July 2007	Regional integration through trade and investments.	Africa has a comparative advantage in growing crops that can easily be transformed into biofuels and the technology used is relatively simple. Africa is to use this opportunity to lift its populations out of poverty.	If Africa is to take advantage of the increase in demand for biofuels: (i) it will need to significantly increase the land under sugar cane; assessment needed on land availability, both in terms of switching to sugar cane and new land. (ii) assess what investments will need to be made in sugar cane processing mills and work with the private sector to ensure these investments are realised.	AfDB to assist Africa in taking advantage of the Biofuels industry by establishing strong research capacities and working with Regional Organizations such as COMESA.

European Union	EU Strategy on Biofuels: from Field to Fuel	2006	<p>The Strategy sets out clearly the EU view that there must be a coherent approach to the reduction of the EU's dependency on imported oil and gas.</p> <p>Indeed, it goes as far as to suggest that biofuels “are a direct substitute for fossil fuels in transport” and can readily be integrated into fuel supply systems.</p>	<p>(i) To strengthen energy security since the use of ‘home-grown’ biofuels as transport fuel would decrease the volume of oil the EU needs to import.</p> <p>(ii) To capture environmental benefit since using biofuels rather than fossil fuels in the road transport sector reduces CO₂ emissions.</p> <p>(iii) To develop agricultural economies. The emergence of an EU biofuels market is perceived as a possible route through which farmers can enter this new, competitively-focused, agricultural landscape.</p>	<p>Setting of biofuels production and consumption targets for the EU as a whole (5.75% market share by 2010). There have been a lot of biodiesel factories built with up to 50 per cent government subsidies for the construction of the factories.</p> <p>Tax exemption policies such as the Green Tax on fossil-based diesel to complement pure biodiesel's exemption from taxation. Other policies include free parking, exemption from congestion charging, and tax breaks for both drivers and companies.</p>	<p>Implementation structures and institutions are available such as the European Commission itself through the Energy and Transport Directorate; the European Biodiesel Board, amongst others.</p>
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United Nations Industrial Development Organization (UNIDO).	UNIDO's Biofuels Strategy Sustainable Industrial Conversion and Productive Uses of Biofuels.	undated	To reduce and/or remove the obstacles that hinder the access to affordable and sustainable energy in poor rural areas of developing countries, in particular LDCs, and to demonstrate the economic and technical viability of modern energy systems based on locally available renewable sources (biomass, solar, wind, mini-hydro) while building the productive capacities needed to sustain those systems.	To ensure that its client government institutions, private sector and industry related organizations are in a position to take effective and efficient decisions on their biofuels programmes, especially with respect to the selection of available technologies and the steps required to adopt promising technologies currently under development.	Profiling biofuels (reducing risks and uncertainties for investment). South-South technology transfer and commercialization. Promoting production of ethanol from residues and wastes – demonstrating the value chain particularly on the conversion of residues (especially from food industry) to ethanol. Contributing to “bridge” rural biofuels developments with respect to global trade and markets by (i) establishing links between respective SMEs, its own trade activities, and logistic providers to bundle the potential of decentralized biodiesel, technologies for production of biogas from industrial wastes, and Biorefineries (providing clearinghouse service).	(i) Integrated approaches within UNIDO, namely the joint work of its service modules, and collaboration between programmes. In that regard, a Biofuels Team will be formed which would coordinate all focal area activities. (ii) The joint bioenergy unit with FAO should be strengthened and a more active involvement of the work of IEA bioenergy should be sought. In addition, UNIDO will participate in the preparation of REN 21 annual reports, provide inputs on the technology section of BioenergyWiki and join roundtable on sustainable biofuels. These co-operations need to be formalized as soon as possible. (iii) Conferences and workshops will serve as a platform to discuss, identify and develop project ideas and concepts, which could translate into a full operational programme by 2008.
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United Nations Conference on Trade and Development (UNCTAD)	UNCTAD Biofuels Initiative	2005	<p>(i) To provide UNCTAD membership with access to sound economic and trade policy analysis, capacity building activities and consensus building tools.</p> <p>(ii) It will attempt to share lessons from success cases, as well as illustrate problems encountered by developed and developing countries alike in dealing with the technical, policy, and economic aspects of biofuels.</p>	As the one for biofuels.	<p>(i) Help assess the potential of individual developing countries to engage in the emerging biofuels market. In doing so, it will look at the links between domestic energy policies, food security, production and export diversification, environmental management, job creation and rural development.</p> <p>(ii) Deal with trade flows, tariff regimes, and market access and market entry-related issues affecting international trade in biofuels.</p> <p>(iii) Tackle issues related to the use and production of biofuels as emerging investment opportunities for developing countries.</p> <p>(iv) Provide policy guidance, ideas and examples on how to address the challenges that countries will face when engaging in this new market.</p>	<p>(i) Establishing cooperation with other biofuels initiatives sponsored by inter-governmental organizations (e.g. FAO International Bio-Energy Platform, UNEP, IEA, World Bank, UNIDO), governments (G8/Italy Global Bio-Energy Partnership), or both;</p> <p>(ii) Establishing cooperation with Regional Development Banks with a view to carry out specific country/sub regional/regional projects on biofuels;</p> <p>(iii) Establishing partnerships with applied research centres and NGOs aimed at sharing technical expertise and conducting joint activities (e.g. TATA group, UNF, Energy Future Coalition, CENBIO-USP, IIED, WorldWatch Institute, and the IISD's Global Subsidies Initiative among others);</p> <p>(iv) Establishing partnerships with the private sector aimed at creating concrete biofuels opportunities in specific developing countries.</p>
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<p>United States of America</p>	<p>Energy Policy Act</p>	<p>2005</p>	<p>To reduce, to the extent feasible, reliance on energy imports by the year 2012. To increase energy conservation and energy efficiency. To increase use of indigenous energy sources</p>	<p>To conduct programs of renewable energy research, development, demonstration, and commercial application, in order to: (i) Increase the conversion efficiency of all forms of renewable energy through improved technologies. (ii) Decrease the cost of renewable energy generation and delivery. (iii) Promote the diversity of the energy supply. (iv) Decrease the dependence on foreign energy supplies. (v) Improve energy security. (vi) Decrease the environmental impact of energy related activities. (vii) Increase the export of renewable generation equipment.</p>	<p>The goals of the biofuels and bio-products programs shall be to develop, in partnership with industry and institutions of higher education: (i) advanced biochemical and thermo chemical conversion technologies capable of making fuels from lignocellulosic feedstocks that are price-competitive with gasoline or diesel in either internal combustion engines or fuel cell-powered vehicles; (ii) advanced biotechnology processes capable of making biofuels and bio products with emphasis on development of biorefinery technologies using enzyme-based processing systems; (iii) advanced biotechnology processes capable of increasing energy production from lignocellulosic feedstocks, with emphasis on reducing the dependence of industry on fossil fuels in manufacturing facilities; and</p>	<p>Establish the “Advanced Biofuels Technologies Program”, to demonstrate advanced technologies for the production of alternative transportation fuels. Provision of production incentives on a per gallon basis of cellulosic biofuels from eligible entities.</p>
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					(iv) other advanced processes that will enable the development of cost-effective bio products, including biofuels.	
United Nations	Kyoto Protocol (as analyzed by Agrienergy www.agrienergy.com)	11 th Dec. 1997	Commits participating industrialized countries to legally binding emission reduction commitments and introduces flexibility mechanisms, including emissions trading and the Clean Development Mechanism.	Same as Protocol objective.	Fuel ethanol and other liquid bio-fuels are likely to benefit in both Annex 1 and non-Annex 1 countries as a result of the Kyoto Protocol. Policies such as the European Biofuels Directive and the Canadian Ethanol Expansion Program have been implemented, at least partially to assist these countries in meeting their Kyoto commitments.	The Clean Development Mechanism (CDM) as set out in Article 12 of the Protocol, enables countries to implement projects that reduce emissions, and use the resulting certified emission reductions (CERs) to help meet their own targets. The CDM Executive Board (EB) supervises the CDM and is responsible for day-to-day activities relating to the CDM. These activities include the designation of operational entities, registration of CDM projects and issuance of CERs.

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