

ADB FINESSE Africa newsletter



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G8, record high oil prices and biodiesel.

The focus of G8 leaders on Africa and climate change at their annual meeting held this year at Gleneagles could not have occurred at a more opportune moment.

Africa, Sub-Saharan Africa in particular, is the only region in the world that has got poorer in the last generation. In fact, the development challenges that Sub-Saharan Africa faces, compared to other continents present a compelling call for international cooperation to support the continent's efforts to achieve lasting progress.

As for climate change, there is now global consensus on the fact that climate change is the greatest and long-term risk to human development to date and threatens to undo decades of development initiatives and hence the need for immediate action at all levels. In order to stabilise carbon emissions concentrations in the atmospheres at a level that prevents dangerous anthropogenic interference with the climate system, there is an urgent need for a wholesome shift from the current global energy system which is carbon intensive. This could be achieved through promoting clean technologies, energy efficiency and putting in place concomitant supportive frameworks that include policy, regulatory, financing that would ensure the establishment of sustainable markets and private sector driven technology transfer and dissemination.

Climate change mitigation present Africa with an opportunity increase access to modern energy services, reduce dependency on petroleum products that have high price volatility, increase energy security and take part in the global carbon trade. Furthermore, developing Africa's energy sector will lead to economic stability and development, and attract investment in other sectors.

It is quite clear that record high oil prices are unbearable, if not disastrous, to most countries in Africa that are net importers of oil. Faced with declining export earnings, the high oil prices automatically imply increased allocation of the scare foreign currency earnings to the fuel import bill thereby reducing resources that would be allocated to other sectors like education, health, agriculture etc.

What is however conveniently forgotten is that biofuels can effectively reduce the need to import fuel. Africa has abundant land and conducive climate to grow energy crops like sugar cane, Jatropha etc to meet its energy needs and supply the excess to other continents. The ongoing work to promote Jatropha biodiesel is quite promising and requires everyone's support.

-Yogesh Vyas

Head, Sustainable Development and Poverty Reduction Unit

Time for biodiesel in Africa, a perspective.

by Alois P. Mhlanga

The record high oil prices, the need to take action on global climate change, and the need to reduce poverty by energizing the transition from subsistence to commercial economies are just some of the reasons why countries in Africa should seriously consider directing their efforts towards biodiesel, Jatropha biodiesel in particular. This article reviews the context, benefits and barriers to the development of biodiesel and suggests what needs to be done to develop biodiesel in Africa.

Many factors are driving greater biodiesel production and use, globally. These include, the record high oil prices, ongoing agricultural sector revitalization and policy and trade reforms, local and global environmental challenges, availability of new technologies and high speed information flow and overall, the increased democratization process coupled to the devolution of powers to increase community empowerment.

For Africa, more factors are at play i.e. agriculture is the mainstay of most economies with livelihoods of over 80% of the population reliant on this sector. The agricultural sector is increasingly coming under threat from extreme weather patterns that include floods and prolonged drought periods. With biomass contributing to over 90% of the energy needs while only an average of 5% of rural population has access to electricity, biodiesel can only be relevant to challenges Africa is facing if it is seen to address these issues.

In Africa, biodiesel is mainly being extracted from rapeseed and Jatropha seeds and to a limited extent soya beans. The extraction of biodiesel from the Jatropha plant compared to rapeseed has several advantages that include;

- no competing food uses and Jatropha is a wild tree.
- can be grown on non-arable marginal lands;
- grows rapidly from seeds and cuttings;
- long productive lifespan, in excess of thirty year

Jatropha biodiesel has multiple benefits to Africa that include;

- the potential to substitute expensive petroleum;
- potential to transform rural and national economies;
- creation of parallel income streams for farmers; increase access to fuel by local communities;

reduce environmental degradation and climate change mitigation; and

- creation of jobs and provision of least cost avenue of increasing security of energy supply.
- creation of employment.

Despite of the potential of biofuels that include biodiesel, full-scale development of this sector faces a number of constraints that include;

- competition with food sector needs in terms of land, investment and support.
- need to ensure appropriate interaction with fossil fuels markets especially at national levels;
- lack of conducive frameworks, policies, regulatory and financing;
- ecological implications of large-scale production of biofuel crops;
- lack of capacity to assess the potential contribution of biofuels to national economies; and
- need to balance the three sustainability criterions simultaneously, social, economic and ecological.

However, there is urgent need to take action to realise the potential of biodiesel from Jatropha. Possible action could include;

- development of enabling national and regional policies so as to ensure political commitment and the integration of biodiesel into the overall development plans and policies;
- continued support for research ,development and dissemination so as to develop technologies suitable for various production models;
- develop win-win beneficiation structures that ensure that local communities also benefit.
- promote investment in biofuels either new investments or promote crop diversification around existing farming activities without compromising food needs.

These actions call for multilevel and multi focused interventions that can only be enhanced through collaboration of various stakeholders.

Jatropha can safely be said to be Africa's development imperative which calls for immediate action. Given the continents' conducive climates and vast land expanse, Africa has all it takes to lead the emerging biodiesel market.

JATROPHA; A local Renewable Energy Resource for Poverty Alleviation in Ghana

Introduction

Oil extracted from *Jatropha Curcus* was one of the main sources of fuel for lighting in Ghana before the introduction of Kerosene. The plant is locally known in Ghana as **NKANEDUA** (meaning "light tree" in Ghanaian language). Its botanical name is ***Jatropha Curcus***. The English name is ***Physics Nut***.



Figure 1: Picture of the *Jatropha Curcus* seeds

Characteristics of *Jatropha*

Jatropha Curcus is a shrub with thick leaves and can survive up to about thirty years.

The plant sheds part of its leaves in the wet season but remains green in the dry season and therefore serves as an excellent CO₂ sink and a perfect plant for fire belt to control bush fires in the dry season. It is therefore planted as hedge round the house or compound to serve as a fence as well as provide shade for domestic animals. The plant can be found in almost every community in Ghana and also available in the wild. It thrives on any type of soil and grows almost anywhere: in sandy, gravelly and saline soils. It can survive long periods of drought and Propagation is easy. It is not browsed by ruminants animals such as cattle, goat, sheep etc and therefore requires minimal input for sustainable management.

Its growth is rapid; forms a thick leaf hedge after only a month of cultivation. It starts yielding seed within the first year and continues increase yielding for about 30 years. The seeds have very high oil content similar to pea nuts except that its oil is non-edible.

Why *Jatropha* Bio-diesel

The effect of global climate change coupled with the rising cost of fossil fuel has necessitated the need to look for clean alternate fuel to meet the increasing energy demand globally. Ghana is no exception as it is totally dependent on petroleum imports. The instability in the price of crude oil contributed immensely to the detriment of the national economy causing the government of Ghana to consider the development of *Jatropha Curcus* as suitable alternative to kerosene and diesel fuel. Recent research into bio-diesel extraction from *Jatropha* has established its potential for use in diesel engines without modification to the engine.

Other advantages of blending bio-diesel with standard diesel include reduction in exhaust smoke, elimination of sulphur emission and reduction in carbon monoxide. The *Jatropha* bio-diesel has been tested on a pickup car belonging to the Ministry of Energy. The long-term impacts of 100% bio-diesel from *Jatropha* oil on automobile engines, under Ghanaian conditions, is however yet to be established.

Blending of Bio-Diesel with fossil Diesel.

A substitution of up to 30% of fossil diesel with Nkanedua bio-diesel could be judiciously exploited and utilized to cut down the high cost of crude oil importation by more than US\$60million annually. This will have a significant impact on Ghana's economy and the living standard of majority of Ghanaians who will be involved in the bio-diesel production chain. In terms of volume, diesel fuel is the most fuel consumed (866million liters in 2003) accounting for 52 % of petroleum products in the country. Diesel consumers paid as much as the Cedis equivalent of US\$374million in 2003.

Application of crude *Jatropha* oil for Engines

In fact, the crude oil from *Jatropha* can be used directly to run two stroke engines commonly used in remote rural locations for milling and grinding cereals. The crude oil also works very well as substitute for kerosene in lanterns. Since the *Jatropha* plant can be found in almost every community in the country, potential sites exist for its large scale cultivation in any part of the country without any problem. It is estimated that more than 300,000 unskilled and 20,000 skilled jobs would be created in the combined process of bio-diesel production and thus re-

JATHROPHA; A local Renewable Energy Resource for Poverty Alleviation in Ghana

duce poverty.

Jatropha can help to increase rural incomes, self-sustainability and alleviate poverty for women, elderly, children and men, tribal communities, small farmers. It can as well help to increase income from plantations and agro-industries.

The by-products in the bio-diesel production process which includes the production of organic fertilizer, seed coat powder; and glycerine, could also generate additional employment and income nationwide.



Figure 2 : Jatropha biodiesel being used to power a stationary engine.

Bio-diesel Initiatives in Ghana

Although Jatropha Plant is well known as an indigenous plant in Ghana and has for centuries been used as a substitute for kerosene in rural areas, renewed interest for its development as substitute for diesel began in the late 90s.

The following initiatives are currently taking place in Ghana.

Ministry of Energy: Interest in the development and use of bio-diesel to blend fossil diesel and have supported the testing of the bio-fuel conducted by the Ghana Standard Board (GSB) and the Tema Oil Refinery.

The United Nation Development programme / Global Environmental facility (UNDP/GEF is supporting the development of jathropha oil for poverty reduction and has funded NGOs in the organization of farmers in the organization of farmers and the test growing of Jatropha plantations.

UNIFEM is also supporting the development of jatropha as a means of stimulating employment and creation of

jobs for women in Northern Ghana. The Department of Mechanical Engineering and the Technology Consultancy Centre (TCC) both of the Kwame Nkrumah University of Science and Technology, Kumasi undertakes research in the development of oil press for extracting jatropha oil.

The University of Development Studies, Tamale and the Valley View University, Oyibi are both undertaking research into Jatropha Plantation. New Energy and ADRA are both NGOs undertaking hands-on activities in the mobilization of farmers for the cultivation and harvest of jatropha seeds. Annuanom Industrial Company Ltd. a private company has undertaken extensive research in Jatropha plantation and esterification into bio-diesel. This company is currently in the process of establishing a bio-diesel refinery plant to process bio-diesel for the automotive market.

Challenges in the Development of Bio-Diesel in Ghana

Despite the current initiatives in the development of Jatropha bio-diesel in Ghana, the efforts are not coordinated and exchange of experience and results are very poor. Experience gained in growing Jatropha in Plantations, as intercropping, impact on soil and other crops have not been properly documented. There is also no systematic approach to the development of best agricultural practices, analysis of yields and the economic production cost of the bio-diesel.

In addition to the challenges mentioned, instability of fossil diesel price has deterred potential investors to invest and support the bio-diesel development in Ghana.

Conclusion

In conclusion bio-diesel from Jatropha Curcas is very promising in Ghana. What is currently needed is:

1. Support for research in all aspects of the Jatropha bio-diesel.
2. Local human capacity development.
3. Linkage to potential investors and funding sources to develop large scale production of bio-diesel for the automotive market.

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The objective of the project PARTNERS FOR AFRICA is to demonstrate the role of renewable energy in poverty eradication and to offer support to policy making activities in sustainable resource management, health and enterprise development in the framework of the European Commission's INCO Programme.

Thereby, the action will support and stimulate the activities of the European Energy Initiative for Poverty Eradication and Sustainable Development. This initiative was launched at the Johannesburg World Summit for Sustainable development to help achieve the Millennium Development Goals by creating a focus on better access to sustainable energy services for the more than two billion "energy poor" of our planet.

International and local partnerships will be mobilized to support policy making. The partnerships will be of three essential types: Policy Partnerships, Programme Partnerships and Action Partnerships. Policy Partnerships will support the development of progressive energy policy initiative directly through research activities and stakeholder networking. Programme partnerships will initiate and support training and capacity building initiatives. Action Partnerships will lay the foundations for concrete projects including pilot projects.

Partnership

The consortium comprises 6 highly competent actors, active in the renewable energy and international development fields. The 3 European members of the consortium are the WIP-ETA Consortium (Germany/Italy), ITDG(UK) and SEI (Sweden). This project builds upon the experiences and results of the successful global energy and development networks, initiated by the European Commission's INCO Programme and coordinated by the European consortium partners in collaboration with Africa members that are experienced and have an established reputation in the fields of renewable energy and development.

Activities

A variety of partnerships on renewable energy and sustainable resource management, health and enterprise development have been initiated in the framework of the PARTNERS FOR AFRICA project.

Partnerships:

1. Renewable energy and sustainable resource management

- Policy Partnership: Government Policy on Ethanol-South Africa
- Policy Partnership: Government Policy on Cogeneration –South Africa
- Action Partnership: Pelletisation of Sugar Cane Bagasse-South Africa
- Programme Partnership: Use of Bioenergy and Small-Hydro to improve Access to Modern Energy Services and to produce Renewable transport Fuels –Zambia

2. Renewable energy and health

- Programme Partnership: Reduction of Indoor Air Pollution in Poor Households
- Action Partnership: Water and Sanitation Through Sustainable "Eco-San" Energy and Water Systems

3. Renewable energy and enterprise development

- Policy Partnership: Comprehensive RE Policy Methodology for Zambia-Revision of the Nation Energy Policy
- Action Partnership: Energy Service Companies (ESCOS) for Rural Electrification in Zambia
- Programme Partnership: Provision of Micro-credits and Seed Capital to Entrepreneurs Active in the Field of Clean and Sustainable Energy.

Results

The PARTNERS FOR AFRICA consortium has been deeply engaged in the support of policy making activities in South Africa and Zambia. The main project tools in this respect were the successful project policy dialogue workshops in Durban (14-16 December 2004)

Other policy dialogues discussed success stories and provided several policy recommendations to respective governments.

A major policy dialogue conference on "**The Role of Renewable Energy for Poverty Alleviation and Sustainable Development in Africa**" was held in Tanzania 22-24 June 2005. Among other things, the conference provided a declaration which was presented to the G8. For more information please visit the project website <http://www.partners4africa.org>.

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Africa Energy News

Kengen to Build New Sh3.7bn Power Plant in Kenya

KenGen plans to set up a 30-megawatt wind-power project at Kinangop, Nyandarua District, at Sh3.7 billion. According to the July edition of the firm's newsletter, the Danish International Development Agency (Danida) and the African Development Bank (ADB) will finance 80 per cent of the project. A feasibility study by the firm and the donors has confirmed that the region has adequate wind.

The newsletter says the project will provide a model for further use of wind energy in Kenya and shore up a public-private partnership in power generation. Corporate planning manager James Wahogo says the project could be completed by June, 2007. It is expected to develop a further 120 MW in the area to bring to 150 MW Kinangop's total wind generation capacity in the next few years. The document says the wind farm will be connected through a transmission line to Suswa besides serving the area. Currently, KenGen is exploiting only 0.35 MW of the wind power in Ngong Hills. Nyandarua has a high agricultural potential but lacks reliable roads, electricity and other infrastructure.

KenGen has teamed up with a group of electricity companies to install equipment for wind measurement in Lamu. Managing director Edward Njoroge says KenGen is intensifying efforts to develop cheap and environmentally friendly power sources, such as wind. Lamu is now served by a diesel power plant.

Geothermal sources generate 10 per cent of the national electricity but efforts are being made to increase this to 39 per cent in the next 15 years. Distributed by AllAfrica Global Media.

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ADB Supports Energy Sector Development in Egypt

The Board of Directors of the African Development Bank (ADB), approved in Tunis on Wednesday, a loan of 154.3 million Units of Account* (175.9 million Euro) to finance the El Kureimat Combined Cycle Power Plant Project (Module II) in Egypt. The project will help improve the provision of sufficient energy at minimum cost to the various sectors to promote eco-

nomie growth and improve the standard of living of the population. The project's objective is to increase the generation capacity of the Unified Power System (UPS) to partly meet the electricity demand in the short-to-medium term. The project involves the construction of a 750-MW combine cycle power plant in the premises of the existing El Kureimat Power Station.

The project components comprise: • Civil Works; • Gas Turbine Generator and Auxiliaries; • Steam Turbine Generator and Auxiliaries; • Heat Recovery Steam Generator & Auxiliaries; • Switchyard; • Environmental Monitoring • Wrap-up Insurance; • Project Management

When completed, the project will help make available sufficient and reliable power to the various consumers.

Power generated by the El Kureimat power plant will feed the UPS to partly meet the system demand. The beneficiaries include all categories of existing and potential customers from all parts of the country. This includes households, 98% of which have access to the grid and rely on electricity for their domestic energy requirement. As the electricity requirements of the household sector is increasing faster (10.7% per annum on average) than any other sector, this category of consumers will benefit most from the project. In addition, the agricultural sector will also benefit from the project, since the sector relies extensively on electricity for water to irrigate farmlands. Finally, the industrial sector, which constitutes one of the key pillars of the economy and a major source of employment will also benefit from the project. As the Egyptian national grid is interconnected to the Middle East through the Jordanian grid and to the Maghreb through the Libyan grid, consumers in these regions will also benefit from the project, thus contributing to regional integration. The Bank Group's operations in Egypt started in 1974. To date, the Group has committed a total of UA 1.3 billion, about 1.5 billion Euro on 47 operations in the country. <http://www.harolddoan.com/modules.php?name=News&file=article&sid=4828>

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