

Socio-economic Impact of Biodiesel Production In Rwanda

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1 Introduction and Background

1.1 Rwanda , a land locked country

- **The demand for increased fuel for transport and other uses like industrial production and agriculture is an intricate issue in many countries of the world.**
- **The problem is more acute in developing countries, especially in Rwanda.**
- **What is that problem?**

- **The problem is the impact of the rising prices of fuel, especially petrol and diesel.**
- **The rising cost of fuel in Rwanda is a result of many factors, including:**
 - **(i) the high cost of crude oils that has reached US \$ 145 in July 2008, and**
 - **(ii) the long distance from the East African harbours to Kigali , the capital of Rwanda which is the main destination of most imported goods including fossil fuel.**

Rwanda is a land locked country which can compete in a very difficult manner with his eastern neighbours.

- **The East African countries use mainly Dar-es-Salaam port and Mombasa port for their external trade.**
- **Mombasa is the only Kenya's international sea port that handles goods for Kenya, Uganda, Sudan, Rwanda, Burundi, the Democratic Republic of Congo (DRC) and Northern Tanzania.**
- **The road Kigali-Mombasa is paved.**

- **Dar-es-Salaam is the principal port of Tanzania, and is a major sea outlet for Zambia, Rwanda, Burundi, Malawi, DRC and Uganda.**
- **The Dar-es-Salaam-Kigali road has gravel sections that are difficult to pass during rainy seasons, but should be completely paved by end of 2008.**

- **Rwanda uses Mombassa port of Kenya and Dar-es-salaam port of Tanzania as major import ports.**
- **The following Table 1 shows the distance from Kigali to Mombassa and Dar-es-Salaam:**

Table 1. Distance (km) between sea ports and the Rwanda neighbours

Main ports	Kampala	Kigali	Bujumbura
Dar-es-Salaam	1588	1530	1400
Mombasa	1300	1800	2100

- **Such great distances have serious negative impacts on the economy of Rwanda in terms of increasing prices and delays.**
- **The economy of Rwanda suffers even more when Rwanda is importing strategic commodities like fuel which is used in industry and transport.**

- **In 2007, the Rwandan imports of fuels reached an average CIF (Cost Insurance and Freight) cost of US \$ million 4,125,000 of which US \$ million, 1,054,300 for diesel only.**
- **It is estimated that Rwanda used about 5160 barrels of petroleum oil per day for its energy consumption.**

It is therefore obvious that Rwanda has a serious constraint in the procurement of fuel for power generation and for other uses including motor vehicles.

1.2 Rwanda strives to find a solution to the problem of being landlocked

- Rwanda has implemented some measures to try to alleviate the problems caused by long distances from the east African harbours used for its trade to Rwandan towns, such as Kigali.**

- **The aim was to reduce the price of fuel at the pumps as an incentive to the industrial, agricultural and commercial sectors. Rwanda decided to provide fuel subsidy.**
- **Generally it is a common practice for countries to impose tax on fuels because taxation on fuel increases fiscal revenues that can be used to finance economic activities like the transport and infrastructural sectors.**
- **This means that any fuel subsidy reduces country revenues that could come from fuel.**

1.3 Other measures

- **Subsidies, although reduce hardship of consumers they result in reduction of fiscal revenues.**
- **In an effort to find a solution to the current problem of fuel in Rwanda the IRST is exploring the use of biodiesel as a renewable energy (eg. Biodiesel Project, Lab., Business plan, etc)**

1.4 Review of Impacts of Rwanda biodiesel project

- Biodiesel production in Rwanda has been thought of as a rational alternative to the problem of high imports of fuel in Rwanda because of the numerous positive impacts that a biodiesel production project can bring to the society and the economy.**

2. Methodology

- **The following methodologies and tools were used:**
 - i. Description of the main geographical features of Rwanda**
 - ii. Data collection through the review of available literature**
 - iii. Data collection through web-browsing on internet**

3. Results and discussion

- **There is increased interest in biodiesel production on global level (eg. Europe, USA, Asia, Latin America & Africa).**
- **In Africa, however, talks on environmental protection are high on the agenda, but implementation remains difficult because of many bottlenecks including insufficient political will, inadequate capital and insufficient technologies.**

3.2 General Biodiesel Facts

- Biodiesel fuel burns up to 75% cleaner than conventional diesel fuel made from fossil fuels .
- Biodiesel substantially reduces unburned hydrocarbons, carbon monoxide and particulate matter in exhaust fumes .
- Sulphur dioxide emissions are eliminated (biodiesel contains no sulphur) .
- Biodiesel is plant-based and adds no CO2 to the atmosphere
- The ozone-forming potential of biodiesel emissions is nearly 50% less than conventional diesel fuel

- **Biodiesel exhaust is not offensive and doesn't cause eye irritation**
- **Biodiesel is environmentally friendly: it is renewable, "more biodegradable than sugar and less toxic than table salt"**
- **Biodiesel can be used in any diesel engine.**
- **Fuel economy is the same as conventional diesel fuel.**
- **Biodiesel is a much better lubricant than conventional diesel fuel and extends engine life**
- **Biodiesel has a high cetane rating, which improves engine performance: 20% biodiesel added to conventional diesel fuel improves the cetane rating 3 points, making it a Premium fuel.**

- **Even a small amount of biodiesel means cleaner emissions and better engine lubrication: 1% biodiesel will increase lubricity by 65% .**
- **Biodiesel can be produced from any fat or vegetable oil, including waste cooking oil.**
- **Biodiesel is energy efficient: biodiesel requires only 0.31 units of fossil energy to make 1 unit of fuel.**

3.2 Socio-economic benefits of biodiesel for Rwanda

- **As shown below the benefits brought about by the development of a biodiesel industry are numerous:**
 - i. Employment and income**
 - ii. Improved environment and health**
 - iii. Lower exploitation price**
 - iv. Easy storage**
 - v. Easy blending with petroleum diesel**
 - vi. Better engine lubrication**
 - vii. Safe handling and transportation**
 - viii. Useful glycerin and other by-products**

4. Conclusions and recommendations

- There are huge benefits that can result from the development of a biodiesel industry in Rwanda.
- Emphasis, however, needs to be put on plants capable of improving land productivity and which do not compete with agricultural food crops
- A great involvement of smallholder farmers in biodiesel production is also a convenient way of alleviating rural poverty through generation of employment
- However, the expected benefits will be maximized only if a policy providing incentives to all the stakeholders is defined and implemented through laws and regulations.
- There is a need to support biodiesel research and development as a major component of renewable energies.
- There is also a need to provide subsidies to biodiesel and to implement measures that promote the farming of oil seed plants and the use of biodiesel without jeopardizing adequate food supply.