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The Implications of Biofuel Subsidies on Africa's Food Security and Trade

Prepared by

Ms. Heyna Cho, on behalf of

CUTS International, Geneva
geneva@cuts.org

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Introduction

In the recent decade, the world has been increasingly focused on finding alternative energy sources that may alleviate the energy crisis and help offset the changing climate. The sharp rise in oil prices pushed many countries into economic recession, and many grew alarmed at the extent of their dependence on oil imports. With concerted effort, developed nations have been encouraging each other to invest in improving technology for alternative, renewable resources, setting various agendas and creating international channel of communications for the very purpose.

Despite such efforts, progress has been slow. In 2001, 35.1% of world energy consumption was oil, followed by 22.6% of coal, 21.7% of natural gas, and about 10% of renewable energy sources (World Energy Assessment by UNDP, 2004).[1] By 2010, the consumption pattern had barely changed. Oil still dominated the energy consumption by 32.4%, followed by 27.3% of coal, 21.4% of natural gas, and 10% of biofuels and waste (Key World Energy Statistics by IEA, 2012).[2]

Recently, the use of biofuels as an alternate energy source has been receiving much attention in the international community. There is a debate in the scientific community as to whether biofuel is indeed a suitable replacement for oil. Nevertheless, much of the world is pushing for expansion of its use.

Proponents of biofuel argue the following:

- The yield of energy crop is promising, and therefore, it could be extended to provide enough energy comparable to conventional energy sources.
- Harvesting of biofuel feedstock provides additional income to the farmers
- Biofuel combustion releases less environmentally-harmful chemicals, reducing greenhouse gas emission
- Being able to produce enough biofuel to be self-sufficient reduces dependency on imported oil

The use of biofuel is actually not a new concept. Humanity has been using what we now call "traditional" biomass-derived fuels for centuries. For example, households have burned wood or dung to cook food over stoves. The "modern" biofuels of the 21st century refers to the ethanol or diesel derived from biomass. These fuels are used mostly for generating electricity or fueling the transportation sector. They are mainly divided into two types: bioethanol, which is based on crop and prevalent in the Americas, and biodiesel, which is based on oilseeds and more widespread in Europe. They are most commonly blended with gasoline/diesel because they boost the octane level, and thus enhance the engine performance.

There are many different types of feedstock that are used in biofuel production. Crops such as corn, sweet sorghum, sugarcane, cassava, switchgrass, and oilseeds such as soybean,

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[1] Jose Goldemberg and Thomas B. Johansson, *World Energy Assessment: Overview 2004 Update*. (New York: UNDP, 2004) p. 28 http://www.undp.org/content/dam/aplaws/publication/en/publications/environment-energy/www-ee-library/sustainable-energy/world-energy-assessment-overview-2004-update/World%20Energy%20Assessment%20Overview-2004%20Update.pdf

[2] International Energy Agency, *2012 Key World Energy Statistics*. p. 6 http://www.iea.org/publications/freepublications/publication/kwes-1.pdf

rapeseed, and jatropha are all major sources of biofuel. There is now a movement towards second-generation biofuel that uses algae, but the technology is still rudimentary.

As great as biofuel may sound, it has been creating much controversy across the globe. The main issue is the food vs. fuel argument. Because biofuels are extracted from agricultural products, some find it unacceptable that we are directing precious food resources to fuel when a significant portion of the world population is suffering from starvation, malnutrition, and hunger. This paper seeks to examine the implications the government subsidies of biofuels have on Africa's food security and trade, the prevailing situation and the future.

Biofuels Subsidies

Multitudes of international agencies and organizations have published reports that urge governments to cut back on their subsidy programs. However, most developed nations continue to provide support for biofuel manufacturers.

In 2007, the European Commission recommended that by 2020, the member states increase the share of renewable energy consumption up to 20% of the total energy consumption, 10% of it being biofuel. By 2009, the 20% target became a binding obligation through the Directive 2009/28/EC. This directive also endorsed the implementation of government "support schemes" that would promote the growth of alternative energy sector.

The United States also passed a bill named *Energy Independence and Security Act* in 2007 for the purpose of dealing with energy security through more environmentally-friendly approaches. It set the goal of increasing biofuel consumption from 0.6 billion gallons per year—which was the base estimate in 2009—to approximately 37 billion gallons per year by 2022. In order to facilitate production, it also offered various forms of subsidies to the manufacturers.

There are several different forms of government support for the production of biofuels:

- Crop Subsidy: direct payment subsidy to farmers that grow feedstock that is used for biofuel
- Tax Credit: volume-based tax credit for the manufacturers of biofuels
- Blending Requirement: requiring the use of certain ratio of biofuel and gasoline/diesel blend in vehicles
- Tariff: prohibitive import tariff on foreign biofuels to protect the domestic producers
- Non-tariff Barriers: such as setting higher sanitary standards and sustainability standards
- Biofuel Mandate: governments have ordered that a certain portion of energy consumption must come from biofuel by a specified time

The current estimates of government spending on subsidizing biofuel industry of selected developed countries are as follows:

	Ethanol	Biodiesel	Total Liquid Biofuels
US	5.4-6.6	0.5-0.6	5.9-7.2
EU	1.6	3.1	4.2
Canada	0.15	0.013	0.11
Austrailia	0.035	0.021	0.05
Switzerland	>.001	0.009	0.01
Total	7.2-8.4	3.6-3.7	10.8-12.1

**measured in billions of US $ **taken from IISD 2006 Report*
**** includes market price support, production payments/tax credits, and various subsidies*

As these countries continue with their goal of expanding the percentage share of biofuels, the amount of government spending is projected to increase more rapidly. In addition, the amount of biofuel demanded will also be supported by an increase in demand for flex-fuel cars. The U.S Energy Information Administration forecasted that by 2035, sales of cars that use flex-fuel (gasoline blended with bioethanol up to 85%) will represent the largest share of new vehicles sold.[3]

The Consequences of Biofuel Subsidy

The major concern with biofuel subsidy is the fact that it may lead to world food price increase. By subsidizing, the government provides an incentive for the farmers to increase biofuel production since there is profit to be made. When the supply increases, the price of biofuel becomes cheaper, especially compared to fossil fuel. Therefore, there is an increase in quantity demanded for biofuels.

One should note that there is a very close relationship between the price of oil and biofuel. If there is decrease in demand for oil because of biofuel, then the price of oil would fall. If the price of oil falls, then quantity demanded for oil may increase again. There would be more demand for biofuel only if the price of oil remains higher than biofuel.[4] In addition, if the price of biofuel rises above oil, the government spending would also need to increase in order to sustain the competence of biofuels in the market.

The world food security is affected on two levels: As the farmers produce more biofuel, they would redirect feedstock from the food market into the fuel market. This becomes a serious issue particularly in the U.S because it primarily uses corn/maize to produce bioethanol, and corn is one of the major staple foods in the world. The U.S produces 40% of total corn production in the world, so any change in the U.S production has a significant influence in the world corn market.[5] As the supply of corn decreases, the price of corn increases. Corn is also an important feed for livestock. If the price of corn is higher, the more expensive it is to feed livestock, and the more expensive the dairy products will be since the input cost has risen. A study done by the IMF

[3] U.S Energy Information Administration, *Annual Energy Outlook 2012.* (Washington D.C, 2012) p. 85
http://www.eia.gov/forecasts/aeo/pdf/0383(2012).pdf

[4] Joseph Schmidhuber, "Impact of an Increased Biomass Use on Agricultural Markets, Prices, and Food Security: a Longer-Term Perspective" (Global Bioenergy Partnership, April 2007) p. 10-11
http://www.globalbioenergy.org/uploads/media/0704__Schmidhuber_-_Impact_of_an_increased_biomass_use_on_agricultural_markets__prices_and_food_security.pdf

[5] Oxfam International, "Truth or Consequences: why the E.U and the USA must reform their subsidies or pay the price" Oxfam briefing Paper, Nov 2005 p. 15
http://www.oxfam.org/sites/www.oxfam.org/files/truth.pdf

indicates that during 2007-2008, increase in demand for biofuels has accounted for up to 70% increase in the price of corn and 40% increase in the price of soybean.[6]

Other consequences of biofuel subsidy are absence of free trade, market inefficiency, competition for land, and water resources. As mentioned above, one of the government support mechanisms is import tariff. In order to protect the domestic producers, many have instituted tariffs against biofuels. For example, the U.S implemented $0.54 per gallon import tariff against bioethanol. Such provision is more costly for both the consumers and the government because they are forced to pay for biofuels at a higher price than they would have had to. Furthermore, due to the artificial pricing of the fuel, inefficiency gets created in the market. When there is a subsidy, it seems like both the producer and consumer surplus have risen since the producers are willing to produce more goods at lower prices. However, the government is actually paying for the difference in surplus, and it does so from taxation. Deadweight loss also gets created in the process, ultimately outweighing the benefits.

Lastly, many opponents of biofuel subsidy believe that in order to expand production of biofuel, famers may begin planting feedstock for biofuel instead of foodstuff that is vital to survival. Moreover, many kinds of the feedstock are known to require sophisticated irrigation system that can supply plenty of water. If places like Africa were to focus on producing fuel crops, scarce resources such as irrigation system and arable land would become even more limited for food.

Implications for the EAC and the greater Africa

Africa, despite its vast agricultural potential, is a net food-importing continent. Most of the farming is done in small scale, often by the female members of the families. Most of what is produced in Africa is consumed within Africa, but there is still a high starvation and malnutrition rate. It is not because there isn't enough production of food in the world, but it is because many African families cannot afford to pay for food. Studies indicate that total world production of food, if distributed correctly, would be able to feed everyone.[7] However, the means of transporting food from the surplus region to other areas are very limited. Therefore, they must cope by importing food at higher prices.

One may be curious as to how Africa became a net food-importing continent, despite its rich natural resources. African nations have not been successful in securing enough food due to various obstacles that are mostly man-made. For example, countries like Somalia are experiencing political instability and violence, which has caused a disruption in food production, as well as blockage in transportation of food to many parts of the country. Others include insufficient food

[6] 2009 IMF Commodity Prices cited in Vera Wange, "Food, Financial Crisis, and Complex Derivatives: a tale of higstakes innovation and diversification." *Economic Premise*, no. 69. (World Bank, Nov 2011) p. 5 http://siteresources.worldbank.org/INTPREMNET/Resources/EP69.pdf

[7] The report says that the world produces 17% more calories per person today, even with the 30% increase in population. Food and Agriculture Organization, "Reducing Poverty and Hunger: the critical role of financing for food, agriculture, and rural development." (paper prepared for the International Conference on Financing for Development, Monterrey, Mexico, 18-22 March 2012) p. 9 ftp://ftp.fao.org/docrep/fao/003/Y6265E/Y6265E.pdf

storage system—harvests cannot be stored for long periods of time, nor can they be distributed to different areas without rotting— inadequate infrastructure, absence of sophisticated market structure, and lack of government aid in agricultural inputs such as fertilizer. These obstacles hinder effective utilization of the arable land and water reserves throughout Africa, forcing them to import food from outside of the continent.

There have also been environmental circumstances in creating the shortage of food. Multiple cases of food price shock occurred in 2007 because of drought in major food-producing countries. Then again in 2011, East Africa was hit with a major drought, which was estimated to be the driest or the second driest year since 1951. From these cases, it is clear how vulnerable Africa is to the rise in food prices.

*Released Oct 2012

Amount of Raw Food Import in the EAC

	Exports			Imports			Net Imports		
	1980/81	1990/91	2000/01	1980/81	1990/91	2000/01	1980/81	1990/91	2000/01
Burundi	0	1	0	1	1	5	-1	0	-4
Kenya	37	85	157	51	45	112	-14	40	44
Rwanda	1	0	0	2	2	6	-1	-2	-6
Tanzania	18	33	18	69	10	37	-52	23	-19
Uganda	0	3	7	7	4	7	-6	-1	0

** Measured in millions of US dollars **Based on UN COMTRADE statistics*

As the data indicates above, the majority of the EAC countries are still reliant on food import. In 2011, the EAC devised the EAC Food Security Action Plan. It has already set some goals to combat food crisis. For example, they plan on creating a food reserve information network among EAC, impose mandatory food reserve for all the states, increase government funding for agricultural input, and liberalize agricultural trade among the member states.

Now let us turn back to biofuel subsidy. Experts have projected the world food price to rise even more.[8] This may significantly hinder EAC's Action Plan in expanding food reserve because it will cost more to accumulate food. It would be vital for EAC to seek different channels of funding for this purpose, possibly from international donor agencies. Unfortunately, many parts of famine-stricken Africa have only received half of the promised donation from the rest of the world.[9] If EAC cannot establish the food reserve soon, a

[8] Agricultural Outlook 2012 predicts 10~30% increase in nominal price by 2021. Overall food production must rise by 60% in order to meet the ever-increasing demand for food. OECD/FAO, *Agricultural Outlook 2012-2021: Summary.* http://www.oecd.org/site/oecd-faoagriculturaloutlook/Summary%20of%20OECD%20FAO%20Agri%20Outlook%202012.pdf

[9] Anup Shah, "Foreign Aid for Development Assistance" Global Issues. Last Updated April 08, 2012. Accessed Nov 5, 2012. http://www.globalissues.org/print/article/35#ForeignAidNumbersinChartsandGraphs

sharp rise in starvation and malnutrition rates are to be expected.

The most severely impacted group would be the women. Women are still subject to inequality in terms of income, level of education, and access to healthcare, just to name a few. In EAC, women have increasingly taken on the role of breadwinner of the families, even though their wages are substantially lower than their male counterparts.[10] When food gets more expensive, they tend to cut their consumption in order to feed other members of the family first. This becomes a serious issue as malnourished mothers are more likely to die in childbirth, and the children have less chance of survival past the age of 5. The World Food Programme terms it "inter-generational undernutrition" problem. With the rise in food prices, women will be left even more vulnerable to economic and health issues.

Shifting our view of Africa as being passive to becoming active, consider now the possibility of African nations producing biofuel themselves. First of all, the European Union will face difficulty in fulfilling the biofuel mandate due to limited production coming from within the EU. Hence, there will be a continued demand for biodiesel import. This is a great opportunity because African nations can export biodiesel at very competitive prices; LDCs are not subjected to import tariff under the Everything-But-Arms Initiative of 2001, and all states in EAC besides Kenya are categorized as LDC.

There are mainly two benefits for manufacturing biofuel in Africa. One, due to income multiplier effect, African countries may be able to offset the food price increase. If farmers can export biofuel to Europe, they would have more income at disposal to purchase food, and have enough purchasing power to keep the money flowing in domestic economy. Then, the small-scale merchants would also benefit from consumer spendings, raising their own income in turn. Like in a chain reaction, the overall income will increase.

Another benefit is that Africa can solve its own energy security problem. If African nations can produce enough biofuels to be self-sufficient and less dependent on foreign import, they could redirect government spending from oil import to investment in domestic infrastructure and other areas that need further developing. In the long-run, this may be the best strategy for sustainability.

However, there are of course obstacles to achieving the ideal level of biofuel production. Africa is already suffering from low yield and less-than-stellar productivity in its agriculture sector. One reason is inadequate irrigation system that cannot connect land to water sources. There is also no safety-net/insurance program for the protection of farmers in case of price volatility.

Expanding the production of fuel crop also means more investment in capital such as fertilizer, higher-quality machines, oil-extracting mechanism, tractors, etc. Small scale farmers will not have access to necessary resources, which means the income gap between small scale farmers and large plantation owners will become

[10] Mathias Marie Adrien Ndinga, "Gender Income Inequality and Development in Africa: Analysis Based on Kuznet's Inverted U-Curve," *Journal of African Studies and Development*, Vol 4(2) p. 46 Appendix 1. http://www.academicjournals.org/jasd/PDF/pdf2012/mar/Ndinga.pdf

deeper. When we take into account that these farmers might be competing against subsidized farmers in more developed countries, it is highly likely that they may be grossly outcompeted. Subsidized farmers not only have more access to input materials, but they can also keep their products at a price lower than the market. Price advantage of African farmers will only last as long as the artificial price remains higher than the price that African farmers are offering. It is possible that the price margin is so small that African farmers are discouraged from producing biofuel at all.

Another issue to consider is the question of land grab. Food security is a major concern for many countries around the globe, and recently, there had been a trend of developed nations buying large tracts of African land. For example, a UK energy company named CAMS Group leased over 45,000 ha of land in Tanzania.[11] Their case draws special attention because they aim to produce both food and bioethanol. It would be safe to expect more land acquisitions of foreign firms for the purpose of food and biofuel production. Where would that leave African farmers? States that have sold land seem to believe that foreign presence would usher in better technology, investment in infrastructure, and job creation. On the other hand, it is worth noting that crop production on these lands is intended for export, thereby not helping domestic food security. Due to ambiguous land ownership in many African states, small-scale farmers, especially women most of whom are not entitled to land[12], may experience forced dispossession of their land, and therefore their livelihood.

Each state would have to decide for themselves whether this process of biofuel production is worth the cost or not.

Conclusion and the Way Forward

With the onset of food crisis and energy crisis, the world has been at odds in prioritizing which is more important: food vs. fuel. Obviously, developed nations, developing and the LDCs have different agendas. Yet, the world is so interconnected with the web of trade that they need to acknowledge that their policies would inevitably have implications on one another.

Biofuel subsidy has now been known to create a surge in world food commodity prices. This in turn has left the poor in Africa very vulnerable to poverty and starvation. Leading international agencies such as Oxfam and UNDP are raising their voices against such government subsidy. There seemed to be a great stride in this direction when the 2008 Farm Bill with biofuel-related subsides expired in 2011. However, the Senate drafted a new bill for 2012 which still includes biofuel subsidies. According to the new bill, they are here to stay for at least until 2017.

The EAC is standing at a crossroad with many different paths to development. The task of

[11] Lorenzo Cotula et al., *Land Grab or Development Opportunity?: Agricultural investment and international land deals in Africa.* FAO, 2009. p. 38 ftp://ftp.fao.org/docrep/fao/011/ak241e/ak241e.pdf

[12] Women in Development Service (SDWW), "Women and Sustainable Food Security," SD Specials of FAO. Accessed 14-11-2012 http://www.fao.org/sd/fsdirect/fbdirect/FSP001.htm

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coping with food insecurity may seem daunting, but the EAC is in no way lacking in knowledge. The EAC should continue to push for realizing the goals laid out in their Food Security Action Plan. It is indeed important that they set a certain quota for the amount of food reserve fund in the government, especially in case of emergencies.

They must also focus on improving agriculture productivity. Revitalizing the agricultural sector is crucial to their development because successful farming will not only feed the country, but also give cash income to the people. Better economy will then help EAC become less dependent on foreign aid and investment, and therefore become self-sustaining. This will not be an isolated project; it will go hand-in-hand with revamping the infrastructure, creating a better market, and providing monetary support to the farmers.

Increasing conversation among states and co-monitoring the food supply level can also enhance the overall food security of EAC. However, they must make sure that interstate trade liberalization actually occurs. According to the Action Plan, the amount of interregional trade in EAC falls below 10% of all trade. It aims to increase the amount of trade up to 30% by 2015. Yet, in the case of Tanzania, there was an export ban on maize, despite experiencing surplus, because of food security concerns.[13] Meanwhile, its neighboring country Kenya suffered serious shortage of food and starvation. If there had not been such a ban, farmers in Tanzania could have earned extra income, while Kenyans would have been fed. Ensuring that food trade happens among states will increase security of the EAC region as a whole, and therefore help them become more self-sufficient.

[13] Bernard Kagira, "Background Paper on the Case Study: Tanzania Drops Export Ban on Grains." (paper prepared for 3rd USAID Feed the Future East Africa Regional Meeting, Dar es Salaam, Tanzania, 8-9 December, 2011) http://www.competeafrica.org/Files/Case_Study_-_Tanzania_Export_Bans_02122011.pdf

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