

Biofuel Production

Examining the development of sub-Saharan Africa through the concepts of land grabbing, environmental justice and different views on development theories.

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Abstract

This paper examines and problematize the effects of biofuel production by focusing on local communities in sub-Saharan Africa (SSA). The premise lays in a critique of neoliberal thoughts of development and the concept of sustainable development. The establishment of biofuel production in SSA has been depicted to carry with it opportunities of development for the rural population. However, there have been a big interest from foreign actors looking to invest in sub-Saharan biofuel production which have raced concern for land grabbing. A conflict of interest has emerged between Southern and Northern interests. A literature study is used as the method to examine reported outcomes on local communities in the proximity of biofuel production in order to determine if sub-Saharan biofuel production is established for the development need of SSA or the interest of the North. To analyze the results a theoretical framework has been constructed from concepts of large-scale land acquisition (land grabbing), environmental justice and the four worldviews market liberalism, institutionalism, bioenvironmentalism and social greens. The paper concludes that the large-scale production of biofuels is highly problematic due to the risk of land grabbing and Northern mitigation schemes are based on Southern lands raises the question of environmental justice. Depending on which worldview one adopts there can be several explanations to why this occur.

Keywords: Sub-Saharan Africa, biofuel production, land grabbing/large-scale land acquisition, environmental justice.

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Introduction

The focus of this essay is the problem of the situated conflict of interest in sub-Saharan biofuel production, between the regional goal to promote development and the specific interest of the global North. The premise lays in a critique of neoliberal thoughts of development and the concept of sustainable development.

Sub-Saharan Africa (SSA) is one of the poorest regions in the world, it has the highest proportion of multidimensional (several aspects of poverty combined) poor people in the world, something that urges the need for development (OPHI, 2017, p. 1). One instrument to enhance the development rate in the region is the establishment of biofuel production. For SSA, biofuels provide the opportunity to create employment in rural areas, mentioned effects are employment creation which influences economic growth. Supposed benefits with biofuels is that they are cheaper and a more accessible source of energy than fossil fuels. Countries dependent on imports of fuel must pay customs which makes noncoastal countries especially exposed to high expenditures for fuel (Mitchell, 2010, pp. 13-23).

The global demand for biofuels is expected to rise which makes biofuels a lucrative business for domestic and international actors. One reason for this is the European Union directive on the promotion of renewable energy to mitigate the union's greenhouse gas emissions (EU, 2009). The opportunity to earn money on the international market does not only apply to African interests but also foreign ones. The acquisition of African land by international actors to produce biofuels has risen over the years and SSA is a prime target for investors. The interest is driven by the desire for non-African nations to enhance their domestic food and energy security (Havnevik, 2011, p. 20). In 2008, the prices for food and other commodities spiked on the global market and this revealed itself as a rude awakening for nations relying on the import of such goods. This relaunched an interest in the agrarian sector (Deininger, 2011, p. 217). Due to cheaper land in the global South compared with the global North foreign actors are incentivized to allocate their agri-businesses in sub-Saharan regions (McMichael, 2012, p. 683). Additional reasons to the high interest in making land deals in SSA are the assumptions that land as a resource is abundant and some argue that transforming these land with the help of investments is crucial not only for local development but also for global purposes. When foreign interest results in large-scale plantations to assure their supply for food the concern for land grabbing or large-scale land assessment have been raised. While the investors claim that the transaction made for African land is legitimate the critics stress the importance of sustainability criteria to avoid negative consequences for the local communities. Thus, investors that neglect the importance of regulations acknowledging the local populations could be accused of land-grabbing (synonymously used as large-scale land acquisition). (Borras & Franco, 2013, pp. 1723-1724) Voices that are raised often belong to African NGO's who claims that land grabbing are occurring, and that local populations are being displaced, deprived of their livelihoods and degradation of the environment (Wolde-Georgis & Glantz, 2009, p. 13). The theoretical framework will be based on theories regarding large-scale land acquisition, environmental justice and development theories of market liberals, institutionalism, bioenvironmentalism and social greens.

Problematization

Countries in SSA see possibilities to attain a sustainable development through the production of biofuels. The interest in the biofuel sector have been sparked on the international market as well, the European Union for example wants to phase out fossil fuels by promoting biofuels instead. The rising demand for biofuels has also attracted foreign developers to acquire land in SSA for the production of biofuels. Foreign actors have acquired large areas of land to produce biofuels that NGO's accuse to be forms of large-scale land assessment (land grabbing) that displace people and deprives them of their livelihoods. A conflict of interest has arisen, and the question is who the production of biofuels really benefits; the global North or the global South?

Purpose

This study shall analyze and problematize the conflict of interest between the global South right to development and foreign actors interest in biofuels. Earlier studies have illuminated the consequences that may occur as an effect of biofuel production while this study will address the question why they occur. With the use of a literature overview with focus on the negative socioecological consequences of biofuel production affecting local communities this paper is accordingly a critique of neoliberalism and the concept of sustainable development as a tool for development.

Research Questions

The research questions are expressed in a way to actualize and raise the awareness of land grabbing, environmental justice and the four worldviews related to the sub-Saharan biofuel industry. Accordingly, the definition of land grabbing mentioned earlier, is that the concern for the outcomes for local communities are rather nonexistent. The first question will highlight the consequences for local communities both on the social and ecological levels and in the latter the theory of environmental justice comes to place. The second question is somewhat entangled with the social aspect of the first question, but also consider the effects on the livelihoods of the local communities.

- What socioecological impacts has the biofuel industry had on local communities in sub-Saharan Africa?
- How has the local communities' ability to maintain their livelihoods changed due to the biofuel production in sub-Saharan Africa?

Disposition

The essay begins with the theoretical framework that includes elaborations of large-scale land acquisition, environmental justice and the four worldviews of development. It is followed by a walkthrough of the literature study and a method discussion. Later, the result is presented and an associated discussion that analyzes the result through the theoretic framework.

Theory

Foreign large-scale land acquisition

Foreign large-scale land acquisition (land grabbing) in the global South is used to facilitate new lands and resources to the expanding capitalistic system of neoliberals (McMichael, 2012, p. 681). The conflict between economic growth and ecological boundaries that large-scale land acquisition is a result of is one of capitalism contradictions (O'Connor, 1988, p. 14). The criteria for a large land deal to be considered as land grabbing is if the consequences for the local communities is neglected (Hansson, 2017). The current food regime, that is how the present geopolitical agricultural relations came to be, is the result of neoliberalism. Neoliberal institutions like the World Bank with its a structural adjustment programs and the WTO that promotes free trade and the idea that the South shall open its economy to the international market where the global North rule. The geographical change that lead to the current food regime is that the agro-industry is relocating from the North to the South due to cheaper lands. Lands are acquired by targeting lands that are commonly used by smallholders or nomads, these lands are categorized as unutilized but can produce higher yields which can lead to rural development through foreign investments. (McMichael, 2012, pp. 682-683) This is called 'agriculture for development' in the words of the World Bank (The World Bank, 2008, p. 15). Though this can also be used as environmental blackmail that can be described as two choices in this scenario, as either you accept the World Bank's capital and obey by the rules or you lose the opportunity to develop (Martinez-Alier, 2009, p. 104).

Large-scale land acquisition can be elaborated upon by adding the concept of Wolfgang Sachs *global ecology* which is defined as "the rational planning of the planet for Northern security" (1993, p. 20). As a result of the Earth Summit 1992, Southern forests came to be carbon sinks that benefited the whole world and thereby making them global commons. By the ordination of local commons to global needs, the livelihoods of the local people were marginalized by giving the same rights to foreign actors. (Hildyard, 1993, p. 34) Large-scale land acquisitions do not only occur due to cheaper lands but also for the North to be able to secure their supply of food and energy which they acquire through access to the global commons (McMichael, 2012, p. 685).

The demand for new land takes form in large-scale land acquisition mainly in Africa where most of the worlds so called unutilized land is located and it is also characterized by weak land rights. Case studies has shown that local communities have been neglected by policies that marginalize land rights, insufficient consultations and no concern regarding social and environmental problems during land transfers. (Deininger, 2011, p. 218) The agricultural shift from the North to the South can be portrayed by numbers, from 1990-2007 arable land expanded in the South by five million hectares per year while decreasing in the North by two million hectares. This trend is unlikely to stop due to the rising demands for biofuels and the need to increase global food security (Hertel, 2011, p. 260). Expansion of arable land is expected to grow with six million hectares per year until 2030 (Eickhout, et al., 2008, p. 30). One reason for this could be Northern schemes to mitigate their emissions of greenhouse gases by using biofuels. The EU-directive on renewable resources will be hard to fulfill internally. It would take an additional 21 million hectares dedicated to biofuels at current yields for the EU to be able to meet its designated quota of renewable resources. The total arable lands in Spain and Italy combined would not

be enough to meet this demand and it is nearly the duplicated area devoted to biofuels in the EU in 2012 (Against the Grain, 2013, p. 3).

Sub-Saharan Africa has risen to be the main target for land acquisitions; 39.7 million hectares are involved in SSA compared to East and South Asia on second place with 8 million hectares. 21 % of the projects with data on commodities acquired land for production of biofuels. The median project size stretches to 40.000 hectares and 25 % is larger than 200.000 hectares. Countries with large available uncultivated land with no forests and low people density are going to attract more foreign investment in general. Inadequate rural land right recognition is another factor that will appeal to investment and enhance the risk for social and environmental degradation. Countries that can be categorized by weak land rights and institutional policies are often found in sub-Saharan Africa and are targets for opportunistic investors (Deininger, 2011, pp. 223-233).

Environmental Justice

Out of the capitalistic contradiction, environmental movements have emerged claiming that social consequences and ecological degradation are externalized from the cost of economic growth. During large-scale land acquisition investors pay for the land, but social and ecological externalities of land acquisition are not paid for. This collateral damage to local communities and the environment gives the investor a larger ecological space than the space bargained for and this is a question of an ecological debt as well as environmental justice (Martinez-Alier, 2009, pp. 91-92). The advocates of ecological debt argue that the North have been able to reach their level of development due to the fact that it has been dependent on the exploitation of Southern resources. This dependence on off-shore acquisitions of land and resources continues in modern production of commodities. (Rice, 2009, p. 333) One example on the subject of ecological debt can be found by looking towards global consumption. The majority of global consumption is taking place in the global North. A comparison between how many global hectares it takes to provide for the average consumption in a high-income contra a low-income country is quite staggering, it takes 6.4 global hectares for the former and 0.8 for the latter. (Howell, 2007, p. 80) It is the Northern high standard of living with exaggerated consumption that have fueled on the climate changes, but it is the global South that are being affected the most by it (Rice, 2009, p. 235) Ecological debt is one way to underline different kinds of environmental (in)justice, countries in the North are consuming more than their national boundaries can support, thus leading them to exploit undervalued resources of other countries. Through large-scale land acquisition the Norths ecological debt is increasing on the behalf of the South. (Martinez-Alier, 2009, pp. 93-94)

Four worldviews

Jennifer Clapp, professor in global food security and sustainability and Peter Dauvergne, professor in global environmental politics, present four different worldviews and discuss how the issues regarding climate change is entangled with the global economic market. Each view has its ideological assumptions how the world is supposed to reach sustainable development and points out what mechanisms that prevents development or even leads to underdevelopment (Clapp & Dauvergne, 2011, p. 3). The four worldviews approach to sustainable development all proceed from the definition in the 1987 World Commission on Environmental and Development report *Our Common Future* that states that we shall

not venture future generations ability to fulfill their needs to survive. Sustainable development shall also consider not only economic aspects but also social and ecological aspects. (1987, p. 16)

The first worldview is called *market liberals*, as the name foretells it has its similarities with neoliberalism as both have its roots in neoclassical economics. Market liberals believe that economic growth is the only way to reach sustainable development, they argue that a high level of GDP (gross domestic product) per capita will generate the funds and the political will to address the effects of climate change. Market liberals look at the well-developed global North as an example that economic growth generates a better environment as water and air pollution isn't as common as in the global South. They do admit that some short term ecological degradation is needed to stimulate growth and a better environment in the long run. The factors that prevent economic development and in the view of market liberals also sustainable development is market imperfections such as national/international policies and regulations. Thoughts of market liberals is often promoted by institutions and organizations as the World Trade Organization and the World Bank. This reflects the ideas of the market liberals that a globalized open market where trade is liberated from regulations will lead to economic growth worldwide. The economic tools to address climate change are specialized markets for production of sustainable resources as biofuels among others. (Clapp & Dauvergne, 2011, pp. 4-7)

The second worldview – *institutionalism*, share some of the same thoughts and arguments of the market liberals regarding the importance of economic growth, trade and globalization for development. Institutionalists do urge the need for powerful institutions, like governmental and local capabilities to redistribute capital to the South. In contrast to market liberals' institutionalists stress the issue that the autonomous globalization can enhance the global degradation of the environment. They see the need to redirect and guide globalization towards an approach that emphasize the importance of a sustainable management of the environment. Another way to tackle the environmental degradation is for institutions like United Nations Environment Program (UNEP) and the World Bank to allocate capital in the form of technology, finance and knowledge to the South. (Clapp & Dauvergne, 2011, pp. 7-9)

The third worldview – *bioenvironmentalism*, has its reference point in environmental science and they are underlining that the world does have biological limits that mankind is well underway of overreaching. The never-ending desire for economic growth is leading to exploitation of natural resources like fishing, logging and mining in a non-sustainable way. Globalization has paved the way for a global tragedy of the commons where the South is unfavored because the lack of effective environmental regulations which attracts pollutive industries from abroad which leaves the South to endure the most severe consequences of climate change. The bioenvironmentalists solution to the problems with climate change and ecological degradation is to implement limitations to economic growth since this is the main factor to climate change. (Clapp & Dauvergne, 2011, pp. 9-11)

Social greens are the fourth worldview and is considered the most radical one in the social spectra and the opposite to the market liberals. In their view social, economic and ecological inequalities are intertwined and fueled on by the globalized market which extracts resources from the South and exposes them to environmental harm. Social greens see these imbalances between the North and the South as neocolonial structures driven by capitalism. Other than classical Marxists thoughts social greens also take into account Gramsci's thoughts about hegemony, that transnational companies and industrialized

countries dictates what is considered as environmental problems. (Clapp & Dauvergne, 2011, pp. 12-13) There are more to the hegemonic mode of discourse set by neoliberalism, the normalization of environmental exhaustion is needed for economic growth is having the effect that environmental degradation is experienced as business as usual (Harvey, 2005, p. 12). As a contrast to the market liberals praise of globalization, social greens see globalization to spread capitalism and large-scale industries that only benefits the rich. In the footprints of globalization inequalities rise within and between nations. Its manifesting the North at the top of the world order, marginalizes native people and women. The possibilities for corporations to exploit land and natural resources of the developed world is also something that is a part of globalization according to the social greens. (Clapp & Dauvergne, 2011, pp. 12-13)

Putting the different theories in the same context

The large-scale land acquisition is an effect of the neoliberal food regime that has shifted the production of Northern agricultural commodities as well as biofuels to the global South. The World Banks concept of agriculture for development paints the picture where the energy and food security of the North is met while also developing the South. If it is only the interests of the North that is met and there are no benefits for the local communities close to the biofuel plantation it is a matter of land grabbing. If this is the case, the probability that the establishment of foreign plantations in SSA is to benefit the local communities are quite oxymoronic. The way that transnational corporations are establishing biofuel plantations in SSA also brings up the question of environmental justice. The ecological space of SSA is encroached by Northern methods to mitigate their greenhouse gas emissions and their forests are spared from deforestation. There are different modes of production when it comes to biofuels, some are large-scale, some are through outgrower schemes and some are small-scale. The different kinds of production have similarities to the four worldviews presented by Clapp and Dauvergne.

Method

The method used in this study is based on a literature study of earlier research on the consequences of biofuel production in sub-Saharan Africa. This study is examining biofuel production as a way to reach development and SSA is suitable area to study. Sub-Saharan Africa is a region where development is lagging behind and there are both domestic and foreign interests looking for developing biofuel production in this region. A literature study is a way to use the earlier work of experienced scientist which adds more validation to the study since they are published work in reviewed journals. In this study there are information from non-governmental organizations (NGO) that are not considered to be as scientific as peer-reviewed articles. NGOs do play a crucial role on raising awareness of social and environmental injustices that later on catches the attention of scientists. For instance, on the field of land grabbing the scientific research is still catching up on the work of the NGOs (Borras & Franco, 2013, p. 1724).

A literature study is not a systematic step by step method on how to do scientific research that is more common in the natural sciences, this study leans towards social science where a qualitative method is more appropriate. However, in order to gather relevant studies to be able to answer the research questions somewhat of a systematic approach has been implemented. Earlier studies have been found via search engines on the internet like söderscholar, google scholar and on databases of scientific journals. Examples of search words that have been used are different combinations regarding biofuel production like *biofuel production in sub-Saharan Africa*, *consequences of biofuel productions* and *food security*. Studies regarding the theoretical framework have also been found through the same search engines but with search words regarding *environmental justice* and *large-scale land acquisition*.

Since there is no cemented way how to use a literature review except reading several studies the author of the study need to design its own specific method. By doing so, the strength of the method used is that is custom made for the study in question, weaknesses can be that the author designs an inadequate design that will influence the result. The weakness of this design is that it cannot decide if biofuel production brings development in its wake or not. That kind of a conclusion can only be made from case to case, neither is it possible to make conclusion in general. What this study can conclude is if there are any doubts regarding the claims about the concept of agriculture for development in general and particularly biofuel production.

The approach for this study includes using the theory as a method to analyze the data that is the earlier studies in the field. The theoretical framework is based on theories about development, large-scale land acquisition and environmental justice that highlight different kinds of social and environmental problems related to development and global relations and why they appear. These theories have been shaped to illuminate the consequences of globalization and free trade on people in the global South and that may be regarded as a tendentious. Still, environmental justice and large-scale land acquisition is well-known and acknowledged theories. African countries and foreign stakeholders alike are proposing that biofuel production in rural parts of Africa is a good way to promote development, how they proceed with the production of biofuels have its foundation in different development theories and that is why the four different worldviews from Clapp & Dauvergne comes to be one part of the theoretical framework. Large-scale land acquisition is not a unique phenomenon for

biofuel production, it is a concept that is frequently recurrent when it comes to foreign development investment in agriculture. Biofuels are also crops and by adding the interest from abroad makes the question of land grabbing relevant for researching the effects of biofuel production. By adding the perception of environmental justice, the study will be given more depth concerning the effects on the local communities. Using environmental justice in the theory will give the study a more explanatory scope by not only focusing on the effects local communities, but also problematize it in a righteous manner.

The theories of environmental justice, large-scale land acquisition and the worldviews on development will also delimitate and define the study partly due to the fact that the issue examined is defined from these theories, but it will also distinguish relevant information from non-relevant. As a screening method, information that is not brought up in theory will not be included in the study, in other words will it not contribute with any relevant information it will be excluded.

Material

Beside the important authors that already mentioned I would like to draw attention to two other important scientists that have contributed to the concept of land grabbing in the modern age and the effects of biofuel production in SSA.

Philip McMichael is a historical sociologist that do research on modern capitalism by examining agrarian questions in general and among these are agrofuels. His current focus is on the relocation of agriculture to the global South in the context of global land grabbing. The article, *The land grab and corporate food regime restructuring* (2012) is fundamental for the understanding of the agriculture for development and the renewed interest in foreign land investments.

Alexandros Gasparatos have a PhD in ecological economics and have been co-writing two articles that have been referred frequently in this study. *Biofuels, ecosystem services and human wellbeing: Putting biofuels in the ecosystem services narrative* (2011), have been contributing with import information on what impact the biofuel production have on the ecosystem services and how it will affect the local communities. *Biofuels in sub-Saharan Africa: Drivers, impacts and priority policy areas* (2015) is a literature review of documented impacts of biofuel production in Africa and points out in what areas there needs to be better policies.

Results

What socioecological impacts has the biofuel industry had on local communities in sub-Saharan Africa?

There are many aspects of the consequences considered in this study. Aside from the social impacts that the biofuel industry has there is also impacts on local ecosystems. The large-scale plantations have an impact on many environmental levels, deforestations, irrigation and the use of chemicals are all affecting the local communities. Ecosystem services provided by fresh water is facing the risk of overexploitation and pollution because of biofuel production (Gasparatos, et al., 2011, p. 115). The effects on water quality and quantity depend on the mode of production, some plantations are rainfed and some are irrigated. What kind of crop that is grown does also matter, jatropha is able to grow in arid and semiarid climates but the yields are greater when under irrigation. (Achten, et al., 2010, p. 674) When implementing biofuels in the rural parts of Africa you add one additional sector that crave water and people in Africa are already under water stress¹ (Wolde-Georgis & Glantz, 2009, p. 15). In Uganda, the National Forest Authority warned the government that by cutting down forests they would jeopardize the providing ecosystem service of rainfall in the country (Zommers, et al., 2012, p. 192). A reduction in water quantity due to increase in usage and less precipitation will not only affect the individual rain-fed farmer but also regional food security as there are plenty of farmers that are dependent on rain (Wolde-Georgis & Glantz, 2009, p. 2). Deforestation itself may have large impacts on water quantity, forests play a crucial role in binding water from precipitation and often works as a watershed that redistributes water to rivers. One example is the Mabira forest that works as a watershed to rivers that connects with the Nile, low water levels in the Nile can affect livelihoods by affecting agriculture through droughts and flooding and lower rates of electricity generated by hydropower. (African Biodiversity Network , 2007, p. 8)

Fertilizers and pesticides is also used to achieve greater yields of biofuels and the run offs from the plantations can end up in local water assets. There are documented cases on rivers where plantations have affected the water by acidification and high nitrogen levels. (Gasparatos, et al., 2011, p. 116) Soil erosion is an indirect consequence from deforestation to establish agricultural practices and plantations of sugarcane. The agricultural method used often involves leaving the soil bare for periods of time and exposing it to wind and rain erosion. The usage of heavy machinery associated with large scale plantations also make the soil compact, this changes the physical characteristics of the soil particles which leads to even more erosion as porosity and infiltration declines. (Martinelli & Filoso, 2008, p. 887) Soil erosion is expected to increase in sub-Saharan Africa as a consequence of biofuel production among other things (Alcamo, et al., 2005, p. 22).

The threat to food security is one of the most severe consequences associated with biofuel production. One factor that makes biofuels a threat to food security is that farmers might see biofuels as a more lucrative business than producing food and therefore switch from producing food to producing biofuels (Wolde-Georgis & Glantz, 2009, p. 11). Eventually the demand for food will exceed the supply which will increase the prices for food globally, biofuels is considered a major factor of the 2008 high

¹ Fetching water is also a typical chore for women.

food prices (Tscharntke, et al., 2012, p. 55). The people who are the most vulnerable to high food prices are in general poor people that are net consumers of food, they buy more food than that they produce (Ewing & Msangi, 2009, p. 522). The most economic deprived people spend most of their incomes on food, higher food prices will have a substantial negative effect on these people (Food and Agriculture Organization of the United Nations, 2009). One contradiction to this is through the employment that biofuels supposedly will create also increases the employees purchasing power through monetary salary which they can buy food for (Arndt, et al., 2009, p. 103). The mode of production that increases the rural populations salary the most (purchasing power) is the small-scale production (Arndt, et al., 2012, p. 1930)

Large-scale plantations that through deforestation establishes themselves have an impact on biodiversity. Forests are one of the most species rich habitats on land, they also offer people providing, regulating and cultural ecosystem services. In countries in the global South, forests can make up more than 10 % of the GDP, formal employment is estimated up to 10 million people and informal employment about 30 – 50 million people. (FAO, a) The Mabira forest in Uganda provides the local people with medical herbs, fuel, timber and mushrooms and certain trees are a place of worship. These people livelihoods will be turned upside down if the forest is given up for biofuel production. The Mabira forest is also a large tourist attraction that account for a large amount of foreign exchange income in Uganda. (African Biodiversity Network , 2007, pp. 7-8) One benefit that is frequently occurring in the promotion of biofuels is that biofuels can grow on unutilized and arid lands and that's why it would not interfere with food security. Especially jatropha has gotten the reputation that it can produce high yields in arid or semi-arid regions but that is not entirely true. (Trabucco, et al., 2010, p. 148) The reality is that the most successful jatropha plantations have occurred on abandoned land that used to be cultivated, active farm lands or deforested areas and not in arid conditions (Gasparatos, et al., 2015, p. 881). Regions of lands that receives high levels of precipitation and that have access to infrastructure that facilitates export will appeal more to large-scale acquisitions, but these lands are probably already occupied (Vermeulen & Cotula, 2010, p. 903).

When local farmers are displaced from their lands they are transferred to a permanent resident accommodated by the government, *villagization* as it is called gathers displaced farmers close to each other. This causes problems with overcrowded areas that makes it harder for people to continue with their traditional livelihoods. Villagization is justified by claims that the evacuated people will get better access to the social services that is allegedly provided by the investors. (Moreda, 2016, p. 705) It is not only the displaced people that will put further stress on ecosystems through land exploitation, the African population in general has increased and their numbers is expected to continue increasing. The growing population will not only have to be fed, the demand for non-agricultural land will also increase to build housing and infrastructure. In addition to this, large-scale plantations will put further stress on suitable lands as a resource. (Vermeulen & Cotula, 2010, p. 903)

How has the local communities' ability to maintain their livelihoods changed due to the biofuel production in sub-Saharan Africa?

Agriculture is the most common way for poor people in the global South to provide for their livelihoods (World Bank, 2008, p. 72). In sub-Saharan countries, agriculture and other sectors associated with agriculture provide these countries with food security and economic growth (World Bank, 2008, p. 1). Incomes can also be diversified by fishing and gathering forest products when the regular farming falls short (FAO, 2014, p. 1). In these countries, farm sizes smaller than one hectare makes up for 60 % of all farms and farms smaller than five hectares makes up for 95 % of all farms (FAO, b). The small-scale farms are seen as stagnant and unproductive by some African governments since they only work as subsistence. In a way to boost agricultural production, many African governments see to foreign investors for technology and to generate employment in rural areas. (Moreda, 2016, p. 699). In Uganda, the government proposed that large areas of the Mabira Forest Reserve should be available for biofuel production. The government stated that it would boost the domestic biofuel production as well it will provide social services like schools, roads and hospitals to the local communities, reduce poverty and secure Uganda's energy assets (Zommers, et al., 2012, p. 178). These chosen words can also be found in the *Agriculture for Development Report* that points out that the agricultural sector can be an economic factor for growth in the global South if they open up for private investments and foreign exchange (World Bank, 2008, p. 3). Development has become a destination where the global market is regarded as the best way to take us there, nowadays development is also characterized by sustainability which has led sustainable development also to be solved by market solutions. This can be seen by schemes that can be described as *market environmentalism* that is synonymously to market liberal/institutionalists, examples are carbon trading, clean development mechanism and biofuels where the South exports sustainability to the North. (McMichael, 2009, pp. 247-248)

Through market environmentalism, the global South and sub-Saharan Africa have attracted a great deal of attention from foreign investors that are looking for land for their large-scale production of biofuels (Moreda, 2016, p. 699). Sub-Saharan Africa is one of the regions in the world that is the least developed but with an agricultural potential that appeals to foreign investors. Another factor when it comes to foreign interest in agricultural land in sub-Saharan Africa are the different kind of ownership over the land. There are two kinds of land tenure in sub-Saharan Africa, they are multifaceted and country specific, but in general they are either statutory or customary. It is more common with the customary land tenure where the state owns the land and the people get access to it by leasing it. Freehold lands are also common in the region. As mentioned earlier, small-holder farmers are in majority by numbers but also when it comes to land area and they have their farms on customary lands owned by the state. Thus, putting the small-scale farmers in vulnerable position due to the risk of displacement when the government are offered a deal for leasing out land for larger production of agricultural commodities. (von Maltitz & Setzkorn, 2013, p. 34) Investors are especially interested in acquiring land in countries with plentiful available land and water, the countries that often provide this are countries with weak land rights (Giovannetti & Ticci, 2016, p. 686). This makes an incentive for African governments to alter their policies on land rights but also on favorable lease deals and limited regulations to attract investors (Moreda, 2016, p. 699).

In Ethiopia, the government has embraced investments from international actors, in 2011 3.6 million hectares was estimated been given to investors. The area's best suited for agricultural development are in the peripheral low lands and are categorized as unutilized by the Ethiopian government. Through capital and technology from investors two limitations to development are disposed of, according to the Ministry of Agriculture and Rural Development. Even though promises of rural development through employment, technology transfers to local farmers and infrastructure concerns have been raised that large-scale land acquisitions will negatively affect local communities. Foremost the marginalized and the poor. (Moreda, 2016, p. 703) For instance, one region in Ethiopia, the Benishangul-Gumuzis known for its nature and the home of different ethnic communities that sustain their livelihoods in multiple ways. Through the years an increased interest for land acquisitions in the region have emerged with promises of social and economic revenues. But the local people have been dispossessed of their ancestral lands and their traditional way of life, limiting them to extract natural resources and degrade their environment. (Moreda, 2016, p. 704) One local Gumuz- farmer gives an example of one investor claiming 50 000 hectares of land, this resulted in ten households got their land taken away and the lasting villages are being surrounded by the large-scale productional lands. The traditional practices of the Gumuz- farmers are characterized by shifting cultivation of various parts of the region. One plot can be cultivated for a period of a couple of years before moving on the next one, if there is too great of a distance between the settlement and the new plot they settle closer to the new plot of land. This sort of cultivation and the ability to support themselves by gathering and fishing is endangered by the accelerating amounts of large-scale land acquisitions that are cutting them off from accessing these land as well as cutting down forests for plantations. (Moreda, 2016, p. 705)

Similar events have occurred in Mozambique, the biofuel company ProCana received 30 000 hectares of land categorized as unutilized, marginalized and would therefore not be conflicting with food security or with the livelihoods of local communities. Though the land was not utilized in the meaning of large-scale production the land was indeed used by local communities through wide-range of agricultural ways and grazing for livestock. Furthermore, the deal that ProCana got over this land ranged over 50 years which can be renewed, thus striking down on any hopes from the local communities to regain their lands anytime soon. (Borras, et al., 2011, p. 222) The effects of large-scale land acquisitions related to biofuels are often permanent and negative for the local communities, even when compensation is offered the outcomes for them is hard, having trouble to relocate and re-form their livelihoods (Giovannetti & Ticci, 2016, p. 686). When the state is sole holder of the land rights in a region, they can confiscate the land legally for the greater good for the country and for example lease to foreign investors. By stating that this will lead to development the government are not obliged to compensate the people being displaced. (Moreda, 2016, p. 699)

One of the claims in favor of biofuel production is the supposedly increase in rural employment. There are uncertainties regarding this claim, in Ethiopia, large-scale biofuel productions are to a high degree dependent on labor carried out by workers from other regions². These jobs are based on seasonally periods and when their contracts run out the workers often stay put and start establishing close by, illegally attaining land which they farm and later moves their families there. This causes

² There also concerns that women will be disadvantaged by biofuels, further reading <http://www.fao.org/docrep/010/ai503e/ai503e00.htm>

further stress on the environment and scarcity of land which effects the already negative affected local communities. (Moreda, 2016, p. 707).

The outcomes of poverty alleviation for people that are working in the biofuel industry varies depending on the modes of production. Mudombi., et al made a study about multi-dimensional poverty (MPI) effects around biofuel projects. They compared people working in the chain of production (including large/small-scale and different kinds of biofuels) with two control groups, one as described as local and the other as habitat, neither of the control groups were involved in the biofuel industry. The MPI consisted of parameters such as deprivation of electricity, drinking water and improved sanitation etcetera. The study showed that people working for large-scale sugarcane plantations were significantly less poor than the other intervention groups, all intervention groups had though lower MPI than the control groups which indicates that people are better off working in the biofuel industry than not. The authors give several explanations to why this might be³, one example is that workers in the large-scale productions gets accommodations by the company and there for scores better on the MPI (Mudombi, et al., 2016, pp. 2-12). Studies also show that large-scale production of biofuels have a large impact on economic growth but small-scale outgrower schemes are more effective on poverty alleviation (Schuenemann, et al., 2017, p. 312).

One common trait of corporate land acquisitions is that they want large areas of land, sizes can range from thousands to hundreds of thousands of hectares with monocultures with the drive to export. Many of the concerns of dubious sustainability connected to biofuels are derived from this kind of plantations (von Maltitz & Setzkorn, 2013, p. 39). For a company to be profitable it strives to be cost-effective, worker's salaries and the productivity of the plantation are key areas to lower the production cost (Arndt, et al., 2014, p. 223) One way to lower the wage-cost and increase productivity of large-scale biofuel-production is by applying large labor forces or through the use of machinery (von Maltitz & Setzkorn, 2013, p. 45). Wages for unskilled labor, which is the kind of employment that local people usually get are very low (World Bank, 2008, p. 202).Voices have been raised about how much employment the large-scale biofuel plantations creates. One estimation made on the large-scale production of sugarcane in Tanzania evaluates that it takes 7.2 farm workers to produce 100 000 liters of biofuels from sugarcanes (Arndt, et al., 2014, p. 225). These numbers can be inflated to justify the large-scale plantations contribution to employment in rural areas. Examples of exaggerated employment numbers can be found in numbers from the Indonesian Palm Oil Board that reports number that their plantations employ five workers per hectare, but there is only one worker per four to ten hectares of land (Li, 2011, p. 284).

Companies can also contract farmers under a outgrower scheme where the farmers grow biofuel crops under contract on their own lands. The harvested biofuel crops are then sold to the companies, this method is not as productive as large-scale plantations, but they employ more people but at low wages. From a rural employment perspective, this mode of production is more beneficial for the local communities than large-scale production. (Arndt, et al., 2014, p. 224). It will take 75.8 employees to produce 100 000 liters of biofuels through the outgrower scheme compared to the 7.2 employees it takes

³ For further explanations and reasoning (too long to include and off topic) concerning the result, see Mudombi et.al. 2016: 10-12.

through large-scale plantations (Arndt, et al., 2014, p. 225). Small-scale farming including outgrower schemes lack the technical innovations that are applied at large scale productions and are not seen as reliable to supply the demand for biofuels (Arndt, et al., 2014, p. 224). Farmers that are contracted under outgrower schemes can seek financial and technical capital from their employers but might have to commit themselves to a contract stretching up 30 years with the company (von Maltitz & Setzkorn, 2013, p. 41). Corporations may also paint a picture of high hopes of economic revenues for the potential contracted farmer and then not sign their part of the agreement (German, et al., 2011, pp. 11-12).⁴ Farmers in Zambia gets a one-time payment of 60 US\$ and extra 15 \$ monthly to farmers that grows five hectare of jatropha or more and there are not many small-scale farmers that have that much land (German, et al., 2011, p. 5). Another aspect regarding small-scale farmers engaging in outgrower schemes is that they probably can earn more money working on their own lands rather than leasing it and their labor to a company. For example, one farmer in Zambia growing sugarcane on one hectare of land can make up to six times more money on his/her own compared with working the same plot with wage from an outgrower scheme (Li, 2011, p. 285).

A third alternative to large-scale plantations and outgrower schemes is the smallholder producers. They grow biofuels on their small-scale farms that range from one to ten hectares and the end purpose is to bring electricity to rural villages. (Gasparatos, et al., 2015, p. 882) Jatropha is most common biofuel crop used by small-scale farmers and farmers tend to integrate the jatropha in their already existing cultivation. Some farmers even use the jatropha as living fences (Gasparatos, et al., 2015, p. 890) Companies tend to recommend that farmers grow the biofuels in monocultures to meet their demand (von Maltitz & Setzkorn, 2013, p. 41). An integrated cultivation of jatropha with a nitrogen fixating food crop can give higher yields of biofuels at harvest. Some corporations that have farmers contracted under outgrower schemes have tried to prevent or forbid farmers from doing so. (Oxfam, 2008, pp. 33-34) Biofuels can help African countries to secure their energy needs and save money from importing fossil fuels from abroad, in the same way small-scale farmers also can save money and boost their energy security by growing biofuels for local use (Gasparatos, et al., 2015, p. 885). Especially women could draw benefits from this since gathering fuel for cooking, heating and lighting is a burden that falls upon them (The Food and Agricultural Organization , 2011, p. 2).⁵

⁴ Further reading about the contracts, see German, et al., (2011), p. 12.

⁵ This issue is considered off topic and therefore it is not further elaborated in this paper.

Discussion

Analyzes of the socioecological implications regarding local livelihoods and environmental justice due to large-scale land acquisition in the sub-Saharan biofuel sector.

To be considered as stepping stone to reach development there are many concerns regarding biofuel production and the consequences that are affecting local communities close to the plantations. The question of what the cause is to the harm that biofuel production generates are a debatable question. Though there are the same patterns in the way the World Bank are promoting agriculture as a development tool and by the ways that biofuel production is establishing in sub-Saharan Africa. (World Bank, 2008) The large-scale projects in the Mabira forest in Uganda (Zommers, et al., 2012), the Benishangul-Gumuz region in Ethiopia (Moreda, 2016) and the ProCana (Borras, et al., 2011) plantation in Mozambique have all been promoted with promises of development for local communities and the nations as whole if they accept foreign capital. These areas subjected for biofuel production is also areas that are described in the words of the World Bank and the governments as unutilized, unproductive and marginalized. The terms used to describe the land are also spilling over on the people that are living and supporting their livelihoods on these lands, these people are not unproductive as they provide for themselves, but this rhetoric are contributing to their marginalization. The description of the land (and implicitly the locals) are a way to legitimize the large-scale land acquisitions by foreign actors as it devalues the current use of the land and dehumanizing the local residents making it easier to displace them. African countries with weak tenure rights, land that is constituted by customary rights (state owned) and the inhabitants do not have any formal rights to the land is a common target for developers in the biofuel industry. Insufficient land rights lay a questionable foundation to the promises that by transferring land that supports a large amount of people to a transnational corporation will benefit the local people in question. In these situations, the people that are losing their traditional ways to support their livelihoods are not even entitled to reimbursement. Even when compensated it is not a guarantee that the displaced people will come back on their feet (Giovannetti & Ticci, 2016). They might be given new lands, but it is uncertain that it will give them the same conditions to cultivate as before, if the new land given to them have the same potential then the plantation could establish themselves there instead.

The World Banks answer on how to transform the unproductive land to a fruitful region is to open up for foreign investors that will provide the assumed missing pieces of the puzzle – capital and technology (McMichael, 2012). The recipient countries seem to swallow this method hook, line and sinker as they welcome foreign investments to establish large-scale productions of biofuels and the usage of the same arguments to legitimize the land deals. An example is Ethiopia that transferred millions of hectares to foreign investors in 2011. (Moreda, 2016) Many states in sub-Saharan Africa are in a precarious state with wide spread poverty and a growing population that requests jobs to be able to provide for their families. It might be a bit too harsh to blame the African governments that they accept the hand of foreign investors with the support from international organizations as the World Bank. The urge for development in the sub-Saharan African countries provides an opportunity for environmental blackmail by the World Bank and other international actors as they offer investments as a quick fix to enable economic development. Consider that African governments have their people's desperation to account for they almost have to accept the only hand with substantial economic capital that reaches out. By accepting capital input (loans) from the World Bank the country in question binds them to get rid of

regulations and restrictions that in the neoliberal World Bank eyes are constraints on economic development. It is similar to the structural adjustment programs during the 1980's which had severe effects on the populations of the global South (McMichael, 2012). By following the World Bank's demands on revoking regulations and opening up to the global market and free trade to be able to receive investments, the biofuel sector has shown to have negative effects on some groups of the sub-Saharan population. These groups are small-scale farmers, indigenous people and pastoralists and their way of life makes up the majority of the livelihoods in sub-Saharan Africa and not least, makes up for a considerable part of African food security. The biofuel production and its associated large-scale land deals do not threaten all of them but of those that are affected they are likely to be a part of one of these groups.

This is not a distinguished problem of biofuels but is a problem derived from globalization and the relocation of the agro-industry from the global North to the South. It is a money saver for Northern countries and companies to acquire land in sub-Saharan Africa, there are also cheaper labor and no legislations regarding social and environmental harm. Northern countries are not that willing to expose their own inhabitants to displacement and other harm. When investors seek land for their projects they tend to drift towards countries with lack of regulations that favors them. As Moreda (2016) concludes that countries in sub-Saharan Africa are even shifting their policies to be able to attract investors. This might turn in to a race to the bottom among sub-Saharan countries to win favor from the investors. When a plan created to bring development ends in deregulations that endangers and violates human rights then something has gone terribly wrong on along the way, or the plan leaned towards one part instead of the other from the beginning. Whatever this is the direct result of the policies driven by the World Bank or an unfortunate turn of events, the deregulations are not really a preventive factor.

Transnational corporations, domestic governments and other international organizations also have responsibilities when promoting international capital as a development tool or it might just result in land grabbing. A transaction of land rights from a host country to an international actor is struck with the expectations on development for rural communities, if this agreement is not fulfilled and the locals instead are affected in a negative manner then it becomes a question of land grabbing. The research mentioned in this study regarding the effects on local communities is not a fairytale of people prospering in the footsteps of large-scale biofuel production, quite the opposite. In the equation, there is the people being displaced from their homes, losing their connection to their ancestral land and their traditional livelihoods, they sure would be getting something extraordinary from the plantations to make things even. Information presented in these studies points to that the promises of rural development seem to be overexaggerated. Concerning large-scale plantations, that the most foreign corporations are establishing when land is acquired (von Maltitz & Setzkorn, 2013) seems not to create that many employment opportunities as accounted for (Arndt, et al., 2014). This is not that strange when most companies want to make as big a profit as possible, by using machines and technology they do not have to employ that many people even if the wages are not especially high. There are also no certainties that the locals are offered employment at the plantation, in Ethiopia some plantations employed people from other regions as plantations often stimulate migration. The jobs generated are only seasonal which cannot provide a steady income for the workers the year round. (Moreda, 2016) Large-scale plantations reportedly have an impact on GDP (Schuenemann, Thurlow, & Zeller, 2017) but that kind of index does not assure that the economic growth is evenly spread out on the entire population. But this

maybe is the famous trickle-down effect that has been made famous by neoliberals. The economic benefits of large-scale biofuel production (also promoted by the World Bank) will trickle down on the rural communities sooner or later. A comparison of these effects to the worldview of the market liberals (Clapp & Dauvergne, 2011) will conclude that large-scale biofuel production provides development from their point of view. Large-scale plantations generate an increase in GDP that will offer the possibility to put financial capital in areas concerning environmental harm. Mudombi et al., (2016) reports that large-scale production has some effects on poverty alleviation, but they discuss this as an effect of the workers are provided with housing, water and electricity from the biofuel company. If they would lose or lose their job they would probably be deprived of these benefits. This gives the corporation some leverage over their workers making them dependent of the company, a dependency that does not seem that sustainable. Deregulations, lack of regulations and shifting policies in SSA are also neoliberal ways to development fulfillment.

If biofuel producers really mean that they want to contribute to poverty alleviation in the rural communities they should favor the outgrower schemes instead of implementing large-scale plantations (Schuenemann, et al., 2017). Regarding outgrower scheme, there are reports about contracts where corporations take great advantages from the farmer not signing their part of the deal but tying the farmer to 30 yearlong binding contracts (von Maltitz & Setzkorn, 2013). The advantages are that there is no displacement of people if the farmers grow biofuels on their own lands and implement them with other crops, avoiding the large monocultures of the plantations. Outgrower schemes are more labor intensive as the general farmer does not own machinery and technical equipment, for a company to be able to produce enough biofuel crops through outgrower schemes they need to employ more people than on a large-scale plantation (Arndt, et al., 2014). In the current globalized free market where companies are faced with competition worldwide corners are cut to bring down the production costs which ends up in a conflict with the welfare of the local people. From this there are some aspects from institutionalism that can be distinguished. Outgrower schemes are a way to open up sub-Saharan markets to foreign investors but the schemes put some regulations to the automatization of globalization by contracting already cultivating farmers to the corporations. To be able to maximize yields corporations need to offer the farmers with technical and financial capital that can create beneficial spillover-effects on other agricultural areas. Institutionalism state the need for redistribution of capital from the North to the South for the latter to reach development. Outgrower schemes have been proven to have its shortcomings that underlines the need for powerful institutions to supervise that consequences on socioecological sectors are avoided.

The small-scale production of biofuels. *Jatropha*, for instance is cultivated for local use and is mainly beneficial to the local communities in the form of clean energy sources and a diversified income (Gasparatos, et al., 2015). This kind of production though falls under the “unproductive” agricultural practice since is not large-scale and its end-purpose is not export but rather on electrifying the rural landscape. A few examples of synergies generated by small-scale biofuel production are the time-consuming activity of gathering wood for cooking fires, lighting and warmth are no longer needed, this also spares forests from a small part of deforestation and people also spares them the hazard of air pollution from open fires. This benefit local communities of rural sub-Saharan Africa, but this kind of development is not exactly what the World Bank had in mind and the since there is no big profits to earn international companies leaves it be. Bioenvironmentalism are of the notion that mankind is pressing

through the biological limits that supports life on earth by the never-ending hunt for large-scale economic growth. This have created environmental havoc as the North draw benefits from the absence of substantial environmental laws and repositioning damaging industries to the South. Nature and the environment have biological limits even if projects like biofuel production is considered to be green and sustainable but if the production is too intense and causing too much deforestation it will undermine the sustainable aspect. In the end the economic profits might carry more weight than the environment. Social greens would see the large-scale production and the land grabbing as a neoliberal way to fortify the uneven structures of the world that keeps the North rich and the South poor. So, in their book there is no way that by establishing foreign-owned large-scale biofuel production will contribute with any development for sub-Saharan countries. Social greens would promote the small-scale production of biofuel because it has showed that it benefited the local communities and there is no involvement from transnational companies seeking profit.

Development can be defined in many ways; the worldviews are just four examples represented in the modernized world. Pastorals, small-scale farmers and indigenous people that represent a traditional way of life have their view of development. Development plans like agriculture for development might not shar the same views on development as the people it is imposing itself on. The livelihoods of various traditional groups and their everyday life is obstructed by the World Banks premise of development. The establishment of a plantation is based on the premise that it will boost development in a designated region, this falls short when the people get displaced and deprived of their livelihoods. For these people it is more of a question of de-development.

The production of biofuels on large-scale plantations usually goes on export, there is a contradiction to be found as the energy security in many regions are low and then comes a company promising development by producing lots of energy (in the form of biofuels) that in the end gets exported. Biofuels have been blamed for causing a part of the 2008 food crises (Tscharrntke, et al., 2012) but it also argued for that employees in the biofuel industry increases their purchasing power (Arndt, et al., 2009) that would increase their food security. That might be, but when there is a global food shortage and a peak in food prices the increased purchasing power of the workers will not be able to compete with people in the North.

Beyond the question of development is the issue regarding environmental justice. A big part of the rising interest in biofuels is that international institutions like the United Nations have addressed the question concerning climate change and the need for mitigation of greenhouse gases. The implementation of biofuels instead of fossil fuels have fueled the demand for biofuels which have spurred companies to expand their production. Factors that might prompted the foundation on which sustainable development is attained through biofuel production could be the current food regime, shifting the agricultural production of the North to the South and the turning of Southern natural resources into global commons during the 1992 Earth Summit (Hildyard, 1993). Northern agricultural interests have been represented in the South before the boom in the biofuel sector, food production for instance had earlier shifted from the North to the South (McMichael, 2012) so the North had already been acquiring land in these regions and now the same patterns repeat itself in the mitigation schemes. Producing biofuels in the sub-Sahara Africa for Northern interests have gained strong mandates as by converting “unutilized” lands in the South to produce biofuels that have lower GHG-emissions than

fossil fuels and by that benefits the global community. The injustice in this is that populations in the biofuel producing regions is carrying a big burden for a major part of the world that also is the originator of the problem. Sustainable development as a concept comprises economic, social and ecological sustainability. In the case of biofuels managed by foreign actors generate economic and ecological sustainability in their part of the world since they do not have cut down their domestic forests nor are their fellow countrymen that is being displaced by the industry. They benefit from the economic earnings and they can continue living their lives business as usual. There ought to be a common understanding that the three cornerstones of sustainable development must be fulfilled in the same region as the biofuel plantation itself.

Conclusion

This essay has examined and problematized the effects of biofuel production by focusing on local communities in sub-Saharan Africa (SSA), the establishment of biofuel production in SSA have been depicted to carry opportunities of development for the rural population with it. Employment and social infrastructure is supposed to be generated by the green readjustment of biofuel production. Information has been gathered from different countries in the region and different plantations is contextualized as examples of the deficient consideration of the rural populations in SSA. Large-scale production with investments from international actors have been promoted by the World Bank to carry out development, but this has been crystalized in severe consequences for groups of people in the direct proximity of the plantations. They face the risk of displacement and their food security is undermined making them vulnerable for starvation for being deprived of their livelihoods. Based on the material examined, it is possible to conclude that there can emerge some highly problematic issues from the production of biofuels. The question if biofuel production as a way to develop the South is paving the way for land grabbing cannot be neglected due to the consequences that been reported. Due to this, foreign investment in SSA also becomes a question of environmental justice when Northern mitigation schemes are encroaching on Southern lands. Biofuels produced in the South may have negative effect on local communities, deforestation and displacement of ethnic groups have been reported to mitigate the greenhouse gases of the North. The four worldviews presented by Clapp and Dauvergne presents themselves in different ways in the essay. Large-scale plantations established by transnational corporations is the way of the market liberals. Institutionalism also promotes the offshore investments but also declares strong institutions to be able to address the social and environmental consequences. Bioenvironmentalism would rather promote the small-scale production of biofuels, the large-scale production is part of the same large and intensive industry that depletes natural resources. Social greens would point out that the foreign owned large-scale plantations only make the North even richer while keeping the South in underdevelopment. Addressing climate change with a market solution (market environmentalism) as large-scale biofuel production only constitute neoliberal structures that keeps depriving the South from its resources. It also criticizes neoliberal ways to develop the global South and the shortcomings of the concept “sustainable development” as a way to address climate change and promote development. Biofuel can be a sustainable source of energy, but it depends on the mode of production. Even if the finished product can be considered clean and green the consequences of the production needs to be accounted for, the externalized consequences needs to be internalized to be able to make a just judgement on sustainable development. Finally, there are examples of development

without the involvement of large-scale industries. The practicing of small-scale production of biofuels challenges the preconceived notion that development is reached through large financial investments.

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