Everyone Must Eat?

Liberia, Food Security and Palm Oil
July 2013


Lakshmi Balachandran, Elizabeth Herb, Erin O’Reilly, Shahbano Tirmizi
Columbia University. School of International and Public Affairs

For inquiries, please contact LiberiaPalmOil@caa.columbia.edu
# TABLE OF CONTENTS

## EXECUTIVE SUMMARY 5

## INTRODUCTION 7

## BACKGROUND 9

* Liberia: Socioeconomics and Food Security 9
* World Market Demand: Food Prices and Increasing Agricultural Foreign Investment 10
* The Role of FDI in Liberia 11
* Survey Districts Overview 12

## METHODOLOGY 13

* Research Objectives 13
* Assessment Methodology 13
* Theoretical Framework 14
* Quantitative Analysis Methodology 14

## FINDINGS 15

* Quantitative Analysis and Trends 15
  * Baseline Analysis 15
  * Temporal Analysis 15
  * Comparative Analysis 15
* Qualitative Findings 17
  * Gbarpolu County: Non Project Affected Communities (NPACs) 17
  * Grand Cape Mount: Project Affected Communities (PACs) 18

## DISCUSSION 20

## RECOMMENDATIONS 22

## APPENDICES 25

* Appendix A: Maps 25
* Appendix B: Graphs 27
* Appendix C: Tables 31
* Appendix D: Statistical Analysis 32

## BIBLIOGRAPHY 37

## ENDNOTES 39
EXECUTIVE SUMMARY

Oil palm industry demand for arable land in West Africa is increasing, with broad implications for food security. The impacts of large-scale oil palm cultivation are particularly significant for post-conflict, resource-rich Liberia, where attraction and utilization of foreign direct investment has been a key objective of the nation’s Poverty Reduction Strategy. The development of Liberia’s diverse natural resources, particularly its agricultural capability, has the potential to generate substantial wealth and prosperity for the nation. Therefore, since cessation of the conflict, the government has signed over 22 natural resource contracts with foreign companies, encompassing more than 45 percent of the country’s landmass.¹

Liberia’s natural resource endowment presents the country with one of the greatest opportunities to navigate towards regional stability and become a hub of international commerce. The task of developing Liberia’s agricultural wealth into sustained, long-term socio-economic development is of significant but not insurmountable complexity and will require the collaborative and coordinated efforts of various stakeholders. As one of the world’s poorest countries, Liberia faces high unemployment and significant barriers to human capital development. Food and fuel account for half of Liberia’s total imports, making it one of Africa’s most vulnerable countries to economic impacts when food and fuel prices increase.² A “hunger hotspot”, Liberia depends on imports for 60 percent of its food, of which the national staple, rice, constitutes 65 percent.³ Food insecurity and poverty are also more acute in rural areas. Therefore, in addition to Liberia’s food insecure state, increases in food insecurity due to rises in food or fuel prices or a reduction in livelihoods will have an amplified effect in more vulnerable rural Liberian communities.

Recognizing that food security, nutrition and livelihood security are critical pillars to survival, social stability and the success of developing a nation’s economic and human capital, this paper presents a preliminary impact assessment of food security and livelihoods in one of Liberia’s largest concessions that was granted in 2009 to Malaysian palm oil company Sime Darby. Based on field research conducted in March 2012, this paper compares household survey data from rural communities currently affected by appropriation of arable land by Sime Darby to those that will be affected in the next year. The analysis is complemented by qualitative data gathered from community representatives, local leaders, NGOs and government officials. This paper aims to provide data on changes in food security to public and private sector policy makers as well as the Liberian community, in order to facilitate sustainable development of Liberia’s economy, society, and environment.

Findings

As the first to quantitatively measure impacts of commercial oil palm cultivation in Liberia, this study reveals negative impacts on food security and limited opportunities for affected communities to manage livelihoods as the plantation grounds expand. Specifically, the data indicates that households in affected communities experience inadequate food for 4 more months in a year than those not affected by the project. The average Food Insecurity Access (FIA) Index score in these communities is 8.20/9.0, indicating a highly food insecure environment. Conversely, households not affected by the project are able to consume a significantly more diverse and nutritious diet. Socioeconomic conditions in the two sets of communities also exhibit significant differences. 63 percent of households in affected communities are in debt (compared to less than 37 percent in non-affected communities), and most debt was taken to buy food or meet health expenses, as opposed to agriculture or higher education in non-affected areas. The differences in prevalence, amount and composition of debt in both communities points to an economically insecure and subsistence living in affected areas, driven by land appropriation and absence of livelihood alternatives.

Qualitative information corroborates these findings, revealing decreased access to food and increasing food prices (particularly of rice, the staple food) in affected communities. Access to water has noticeably declined after forests were cleared for the plantation, and communities are also experiencing a noticeable reduction in the amount of fish they consume (a primary source of protein) as the fish population has reduced. Access to
healthcare for community members who are not full-time employees of Sime Darby remains poor. However, construction of schools by the company has provided additional access to education opportunities for some community members. Most significantly, affected communities also report a lack of alternate livelihoods. Specifically, reduced forest reserves limit fishing, hunting, and production of charcoal. Affected communities are experiencing inward migration from other parts of the country as people look for jobs with Sime Darby. The increased migration not only increases competition for jobs but may also become a source of tension should means of livelihoods and income generation continue to become sparser and food insecurity increases.

Overall, both quantitative and qualitative findings point to an adverse impact of the land appropriation on food security and livelihoods in affected communities. Given the prevalence of marginalized communities and increasing food and fuel prices, a significant increase in food insecurity in the Sime Darby concession area could drive social unrest beyond the tensions that already exist.

**Recommendations**

Based on these findings, the research team has prioritized recommendations to all stakeholders, actionable in the near-to-medium term, to mitigate the negative food security and livelihood impacts of commercial oil palm development. Below is a summary of the authors’ proposals, detailed recommendations can be found in the body of this paper.

Primarily, it is recommended that *Sime Darby* (i) establish transparent and regular engagement with current and future project affected communities through community liaison officers, (ii) prioritize livelihood development by expediting the out-growers program, revisiting the compensation for land appropriation, and establishing clear employment guidelines to manage expectations and reduce corruption, and (iii) conduct and publish regular social and environmental impact assessments (ESIA) that are inclusive of food security monitoring.

The *Government of Liberia* is recommended to (i) ensure transparent and regular community outreach in current and future project affected communities through government representatives, establishing systems for raising and addressing concerns, and facilitating comprehensive community understanding of plantation expansion implications, (ii) engage with international and donor communities on implementing agriculture, food security, and livelihood programs in the impacted areas, in addition to monitoring Sime Darby’s contractual obligations in this regard, and (iii) increase capacity to monitor and mitigate social and environmental impacts.

It is recommended that *communities* collaborate with Sime Darby, the Government, Liberian civil society, and the international community to raise concerns and develop solutions to mitigate potential negative impacts of the commercial palm oil project. *Liberian Civil Society* is encouraged to continue monitoring the social, environmental and economic conditions inside the concession areas, and facilitate partnerships between the community members and other stakeholders.
INTRODUCTION

Liberia remains one the poorest, aid dependent nations in the world. The Liberian civil wars marked two of Africa’s bloodiest conflicts, killing over 200,000 people and displacing millions. Since the cessation of violence in 2003, Liberia’s rich mineral and agricultural resources have attracted significant FDI and been a primary driver of national GDP growth. Under the leadership of President Ellen Johnson Sirleaf, foreign direct investment has totaled more than USD 16 billion. Aiming to attract and utilize FDI as a tool to bolster regional security, reinvigorate the economy and promote development, officials have signed concessions — natural resource contracts — that encompass more than 45% of the country’s landmass. The Government had identified oil palm as an ideal investment because it is believed large plantations will provide employment and is in line with “agricultural investment” goals.

Global demand for palm oil is anticipated to double by 2020, requiring 6.3 million additional hectares of oil palm to meet growing demand. In Malaysia and Indonesia, where 85% of the world’s palm oil is currently produced, land is becoming increasingly scarce. Therefore, to capitalize on the expected rapid increase in the world market price for palm oil, investment in foreign markets to commercially produce oil palm is increasingly necessary for companies like Sime Darby which are experiencing rapid land scarcity in their countries of origin. Africa, particularly West and Central Africa, is experiencing significant palm oil FDI. For palm oil investors, Liberia has an ideal growing climate and is offering large amounts of arable land for a relatively good price, making it an attractive investment despite its history of conflict. Estimated at USD 3 billion with the potential to generate 30,000 jobs, the Sime Darby concession in Liberia allocates 220,000 hectares for 63 years to palm oil cultivation in Northwest Liberia, one of the country’s poorest regions. As of 2012, Sime Darby has developed approximately 5,021 hectares (2.3%) of the concession.

At a national economic policy level, oil palm agriculture investment seems to be a “silver bullet” for development in Liberia as it is supposed to provide needed jobs in the local communities and a source of revenue for the government. However, communities are highly exposed to the positive and/or negative externalities that result from an oil palm concession. While employment and some social services are made available to a limited percentage of the community that is employed full-time by Sime Darby, the repercussions of concession activities such as reallocation and reduction of access to critical resources like arable land and water must be examined further.

Agriculture is the primary source of livelihood and/or employment to the majority of Liberians in the Sime Darby concession area. Since the cessation of the war, the unemployment rate remains very high (nationally and locally) and thus access to agricultural practices is vital to supporting livelihoods. Given the prevalence of marginalized communities and increasing food and fuel prices, a significant increase in food insecurity in the Sime Darby concession area could drive catalytic social unrest that surpasses the tensions that already exist. It is not an unreasonable scenario that the current level of food security uncertainty in the Sime Darby concession area could devolve into violence if food insecurity increases.

When regulated and implemented as part of a structured national development strategy, FDI can contribute to poverty reduction and peace building in post conflict states. Conversely, FDI that does not manage community expectations and translate positive economic impacts at the local level can decrease local economic growth, increase food prices, magnify food insecurity and exacerbate the weaknesses of a fragile state. As Liberia moves into the second phase of its national Poverty Reduction Strategy, implementing a robust framework for utilizing FDI and ensuring food security – particularly in concession areas – is critical.

---

a Palm oil is one of the most consumed and globally traded vegetable oils, used in food, beauty products and biofuel.

b Recent palm oil investment priority countries include Liberia, Ghana, Gabon, Nigeria, Cameroon, Republic of Congo, Angola, Cote d’Ivoire, Zambia and Democratic Republic of Congo.

c Benefits do not extend to temporary day-laborers.
This research project collected baseline data on food security in the Sime Darby concession area of Grand Cape Mount and Gbarpolu Counties. It also analyzed the impact that changes in access to arable land and sources of income generation have had on food security in the oil palm concession area. The intent of the research is to provide quantitative and qualitative data that did not previously exist to the oil palm concession stakeholders. It thus presents a preliminary assessment and understanding of the:

1. Food security situation in Grand Cape Mount and Gbarpolu Counties
2. Capacity (limited or otherwise) of PACs and NPACs to cope with food insecurity and changes in food prices
3. Potential implications a rise in food insecurity as a result of the concession may have in the area
4. National and international food price trends and the significant influence global food and fuel prices have on Liberian food prices

With this baseline data on food security in the Sime Darby concession area, consistent monitoring of changes in food security in these areas is now possible. The study also provides data on food security for districts that are not currently a primary area of focus of international aid, IGO or NGO agricultural assistance.
Since 2003, Liberia has endeavored to recover from its 14-year civil war. Between 1987 and 1995 Liberia’s GDP fell 90%. In 2005, when President Sirleaf was elected, the average income was 25% of what it had been in 1987. One of the poorest countries in the world, Liberia imports 60% of its food. Approximately 68% of the rural and 55% of the urban population live on less than USD 1 a day.

Maternal mortality in Liberia is one of the highest in the world. Malnutrition causes an estimated 44% of under-five child deaths each year (approximately 4,600 children), “accounting for more than USD 40 million in lost economic productivity annually”. While 39% and 7% of children under-five experience chronic and acute malnourishment (respectively), 27% of children under-five are underweight. Unemployment is estimated at 85% and 68% of human capital is largely unskilled labor due to the low access to education during the conflict. The majority of Liberians are engaged in vulnerable livelihoods such as subsistence level farming. Even in instances where rural households engage in subsistence food production, households spend two-thirds of their income on food.

Therefore, food insecurity affects a significant portion of Liberians, particularly when food and fuel prices fluctuate. The West African nation is considered a hunger hotspot with an “extremely alarming” state of hunger. With hunger rates more prevalent in rural areas, 14.3% of Liberians (0.5 million persons) are food insecure while 34.9% are considered highly vulnerable to food insecurity. (See Map A1 and A4) The food price spikes from 2007-2008 that thrust a large portion of the population into a food insecure state when the cost of an average food basket for a typical household increased by approximately 25% illustrate the mass vulnerability to food insecurity in Liberia. There is now a concern that the expansion of food insecurity could return. In 2012, no major regional changes in fuel prices were reported except in Liberia, where fuel prices increased 7% from May 2011. This increase in the cost of transportation, in addition to the depreciation of the local currency, is putting upward pressure on domestic food prices. Should the price of rice increase by 20%, it is expected that poverty will also increase by 4%.

Nationally, food and fuel account for half of Liberia’s total imports, making it one of Africa’s most vulnerable countries to economic impacts when food and fuel prices increase. Of Liberia’s food imports, rice constitutes 65%. (See Map A3 a,b and Graph B5) Rice is the primary staple for the Liberian diet. Smallholder, subsistence-level agriculture is centered on rice and cassava production and fishing. Rice consumption provides about 28% of dietary needs and rice accounts for 25% of expenditure for urban households and 17% for rural households. For most households, a meal is not considered a “meal” without rice.

In 2012, the price of imported rice was approximately 20-30% higher than in 2011 primarily due to changes in international supply. Consistent with projections, from April 2011 and April 2012 the price of a 50kg bag of imported, parboiled rice was (on average) 31% higher from 2011 to 2012. Rice purchased by the cup is 32% more expensive than by bag – an additional burden for vulnerable groups that cannot afford to purchase in bulk. These recent developments are particularly significant for the roughly 49% of Liberians who are either food insecure or vulnerable to food insecurity. Casual laborers in the agricultural and construction sectors are also impacted as recent estimates show their trade and purchasing power has diminished up to 40% due to increases in rice prices.

---

\[d\] In November 2011 rice prices were 57% higher in Tubmanburg than in the previous year.

\[e\] China’s restrictions on rice exports in 2011 resulted in a shift in international consumption from Chinese butter rice to parboiled rice (a Liberian import variety staple)
In Liberia, the price of food, particularly rice, has historically been a delicate issue intrinsically linked to socio-political instability. During the rice price spikes in 2008, the Government removed taxes on rice imports and promoted agricultural inputs for rice production in an attempt to mitigate potentially destabilizing effects. However, “despite the return of global prices to near previous levels, rice prices remain high and are of acute political focus.”27 As Liberia’s population is expected to double by 2041 and half the population is under 20 years of age, the Government of Liberia has voiced concerns that “progress in restoring peace and security in Liberia could be undermined if the availability of, access to, and proper utilization of food are constrained.”28

Lack of food has also historically been closely associated with social unrest and conflict.29 During the world food price spikes in 2007-2008, food protests and riots broke out in 48 countries.30 Fragile states such as Liberia that are import dependent, have nascent institutions and face post-conflict conditions, often have limited capacity to respond to conflict driven by more systemic, complex problems like food insecurity. This is particularly the case in rural areas that are farther from government purview and tend to be poorer and more dependent on agriculture for both food and livelihoods.31 Thus, the anticipated increase in challenges to ensuring food security creates a risk of civil unrest in many such regions.

**World Market Demand: Food Prices and Increasing Agricultural Foreign Investment**

World food prices are inherently volatile. The world is currently at 7 billion people and will reach 9 billion by 2050. Agricultural production must increase by 60-70% over the next 35-40 years to meet the rising demand for food.32, 33 As demand for food is relatively inelastic, small changes in supply greatly influence prices. Staple food price variations also impact the cost of basic food products and increase real prices of food commodities.34

Import-dependent and/or small countries, such as Liberia, are more sensitive to changes in food prices because there is limited capacity to insulate their economies and adjust for shocks through trade and fiscal policies. Higher food prices and price volatility are also heavily influenced by strong linkages between agriculture and energy markets. Anticipated increases in production costs, weather shocks and constraints on natural resources, such as land and water, will also likely increase food prices and volatility by negatively impacting food supply in fragile and vulnerable states such as Liberia.35, 36

In developing countries, staple foods like rice contribute 40-80% of daily energy intake for vulnerable populations that often have food baskets comprised of very few food items.37 Minimal increases in staple food prices such as rice, the staple food in Liberia, can magnify impacts on household purchasing power and overall food consumption. Since the fuel and grain price spikes in 2008, global rice prices have increased 19% in Q2-2012.38 Medium to long-term forecasts estimate that food commodity prices will remain elevated over the next ten years. World prices for rice are projected to be 40% higher, in real terms, from 2015/16 to 2019/20 compared to prices from 1998/99 to 2002/03.39 During the 2008 global food price spike, undernourishment increased by 6.8%, or 63 million people globally.40 Therefore, if the price of rice in Liberia dramatically increases without sufficient alternatives available to vulnerable populations, a significant increase in undernourishment could likely happen again.

Furthermore, global high food and energy prices are creating competition for arable land use. In particular, there is increasing demand from foreign entities to lease land for mass agricultural food and biofuel production. From governments to private industries representing developed and emerging market nations, foreign investors are leasing or buying significant tracts of arable land in developing countries in an effort to secure long-term food or raw material supplies for their countries. Following the 2007-08 rise in food and fuel prices, the demand for arable land has consistently increased. Two-thirds of the demand for arable land is in Africa, where “demand in 2009 alone was equivalent to more than 20 years of previous land expansion.”41 As world demand for vegetable oils is expected to increase by 36% from 2007 to 2017, with biofuels accounting for one-third of the increase, a large portion of this expansion is for palm oil production.42
Since 1965, the World Bank has granted nearly USD 2 billion to support over 45 oil palm related projects in 12 countries in Africa, Latin America, and Southeast Asia.\textsuperscript{43} Currently, palm oil is the most popular, most widely traded tropical vegetable oil in the global oils and fats industry in terms of production value. Approximately 80% of world palm oil production is consumed in the form of food.\textsuperscript{44} However, the rising demand for food coupled with growing demand for non-food products such as soaps, cosmetics and, in particular, biofuel – is creating multiple lucrative incentives to expand operations. From 1980 to 2009, oil palm production increased tenfold and cropland increased by nearly eightfold, from 4.5 million tonnes to 45 million tonnes and 1.55 million hectares to 12.2 million hectares (respectively).\textsuperscript{45} The current price of crude palm oil is 183% above the long run price trend.\textsuperscript{46}

Indonesia and Malaysia are the world’s largest exporters of palm oil, accounting for nearly 90% of the world’s production in 2009.\textsuperscript{47,48} As demand for edible oils is income elastic, and therefore projected to increase faster than demand for basic cereals and starches, Indonesia’s government announced its objective to increase its own production to 40 million tonnes of palm oil by 2020.\textsuperscript{49} Achieving this goal requires devoting up to 300,000 hectares of new land to oil palm annually over the next 10 years. Counter to rapid expansion of the industry in Indonesia, Malaysia’s domestic development of oil palm production is expected to slow down in light of limited domestic land availability.\textsuperscript{50} Malaysia’s palm oil industry is thus increasingly investing in arable land abroad to continue to produce-increasing volumes of palm oil and meet increasing world demand.

**The Role of FDI in Liberia**

FDI concessions are vital to Liberia’s GDP growth and the national budget. In 2011 Liberia’s economy expanded by 6.9%, the eighth consecutive year of post-war growth. In 2012 and 2013, GDP is expected to increase by 8.8% and 7.2% (respectively).\textsuperscript{51} This marked growth is in line with Liberia’s 2030 Strategy and driven by foreign direct investment. Liberia is rich in iron ore, diamonds, gold, timber, rubber, petroleum and a variety of base metals. Prior to 1990, the mining sector represented about 25% of Liberia’s GDP and 65% of the nation’s export earnings.\textsuperscript{52} FDI decreased significantly during the conflict and while extractive industries are rapidly recovering, it is in the Government and the nation’s interest to maintain a healthy investment climate, particularly in mitigating potential sources of preventable conflict.

Approximately 173 companies engage in the extractive industries sector, which included the agriculture, forestry, and nonfuel and fuel minerals sectors. From 2009 to 2011, FDI increased from USD 153 million to USD 431 million.\textsuperscript{53} By 2012 FDI is expected to almost double to USD 821 million and reach USD 903 million by 2013.\textsuperscript{54} The nonfuel mineral sector and the fuels sector accounts for approximately 53% and 13% (respectively) of Government revenues.\textsuperscript{55} Liberia’s iron ore exports are expected to support national GDP growth, and in the short run it is expected to become the mineral commodity with the largest potential to generate fiscal revenues for Liberia.\textsuperscript{56} As the national budget is supported by FDI, total overseas development assistance, including UNMIL, at USD 1,035 million in FY 2011/12 will begin to decrease to USD 923 million in FY 2012/13.\textsuperscript{57}

Liberia’s climate is ideal for palm oil production. (See Map A2) It is home to approximately 40% of West Africa’s rainforest.\textsuperscript{58} In September 2010 Golden Veroleum Liberia, a subsidiary of the Indonesian company Sinar Mas, invested an estimated USD 1.6 billion dollars in exchange for a 65-year concession to develop a 250,000-hectare palm oil plantation that will include portions of Sinoe, River Cess, Grand Kru, and Maryland Counties.\textsuperscript{59} The previous year, Sime Darby, a Malaysian palm oil producer, signed a contract for approximately USD 3 billion dollars in exchange for a 65-year concession to develop 220,000-hectars of oil palm trees in Grand Cape Mount, Bomi, Bong and Gbarpolu counties.\textsuperscript{60,61} The initial plantings cover a 5,000-hectare plot of land (approximately 2.3%) and by 2020 the company is projected to clear and plant over 120,000 hectares or half of the concession.\textsuperscript{62,63} \textsuperscript{f}

\textsuperscript{f} With respect to the research area of focus, Sime Darby’s operations and community engagement is of interest given the research team focused on Grand Cape Mount and Gbarpolu counties.
Palm oil production is inherently labor intensive, as the oil palms require hand harvesting. Thus, Sime Darby’s promise of employing roughly 30,000 people is enticing in a country with one of the highest unemployment rates. However, oil palm seedlings are required to remain in a container in a nursery for approximately 16 to 18 months before it is ready to be planted in the palm grove. An additional 3-4 years after it has been planted is required before the oil palm begins to produce fruit. Thus, in the interim, the land is cleared and remains relatively barren for several years while there are low levels of consistent, full-time employment available as there is no harvest.64

Survey Districts Overview

Gbarpolu
Known as Lower Lofa until 2001, Gbarpolu County is a rural, heavily forested region in northwestern Liberia. Gbarpolu shares a border with Sierra Leone and was one of the most affected districts during the war. As part of the Belle Tribe’s Chiefdom, most community members have Tribal Land Rights. The county consists primarily of farmers who predominately grow upland rice, cassava and vegetables. Peripheral micro and small enterprises, such as making liquor distilled from cane, making coal, etc., provide other livelihood opportunities. A substantial portion of household cash income also comes from informally sold fish and bushmeat, which are fished and hunted in the dense and biodiverse forest. Market access is low relative to other regions due to poor infrastructure. Surveys show that the average travel time to the nearest market in Gbarpolu County is 6 hours, far above the national average of 2.5 hours.65 Poor infrastructure also exacerbates the current low access to healthcare.

Mining was the primary economic activity in Gbarpolu County prior to the Liberian Civil War, and timber, diamond and gold mining activities continue to operate. The county is slotted to be the next district to be cleared and cultivated for oil palm under the concession contract with Sime Darby. It is estimated at 51% (approximately 4,300 sq km) of the district will be cleared for planting in the short-to-medium term.66

Grand Cape Mount
Located approximately 2 hours from Monrovia, Grand Cape Mount County borders Gbarpolu County to its northeast and was also a location of intense fighting during the war. Prior to the war, Grand Cape Mount accommodated FDI concessions under Guthrie and then Goodrich rubber companies. The county is afforded a tarmac trunk road and many of the communities are concentrated along the road where market access is higher. Though rubber tapping has historically been a primary source of livelihood, Grand Cape Mount’s Gola Forest also provides an environment for hunting for some communities. Traditionally communities also fished and farmed rice and vegetables. Grand Cape Mount was the first area that was cleared for oil palm cultivation under the concession agreement with Sime Darby.

Liberia faces several challenges. It is evident that the nation is highly food insecure, with a significant portion of the population moderate-to-highly vulnerable to price fluctuations in food (particularly rice) and fuel. There is also minimal data available on how the rapidly changing economic environment, and oil palm investment in particular, is impacting communities’ ability to manage their livelihoods under these conditions. In this research report, we therefore ask: How has land appropriation for oil palm production under Sime Darby impacted food security in West and Northwest Liberia?
METHODOLOGY

Research Objectives
To address the information gap, the following research questions guided the rapid assessment methodology. These questions facilitated a comparative analysis between communities affected by the concession (Project Affected Communities, or PACs), and those that have not yet been affected (Non-Project Affected Communities, or NPACs). In addition, they also allowed for a broader temporal analysis, with communities also responding on food security and livelihood questions for two years ago.

1. Household Food Consumption
   1.1. Is the quantity of food intake in households different and to what extent?
   1.2. Is dietary quality (including micronutrient intake) different, and to what extent?
2. Access to Food
   2.1. Is household income different, and to what extent?
   2.2. Are spending patterns different, and how?
3. Farmed Land Productivity
   3.1. Are there differences in the size of plots managed?
   3.2. Are there differences in quantity of outputs?
4. Are there livelihood substitutes available to households in Project Affected Communities (PACs)?
   4.1. Are these livelihood substitutes equivalent?
   4.2. Are substitutes equally available to all PAC households?

Assessment Methodology
The following research methods were used to conduct the research.

1. Households Surveys were used to gather detailed quantitative information on household food security. The area covered by the oil palm concession was stratified into communities already affected by the land appropriation (PACs), and those that will be affected in the near future (NPACs). Two communities were randomly chosen from each group, one with access to paved roads and markets (Community 1), and the other with low or no access to paved roads and lower access to markets (Community 2). While pure randomization at the community level was not possible due to the nature of the project, care was taken to ensure that the communities were matched by similar socioeconomic backgrounds and similar livelihood sources prior to the land appropriation. Level of remoteness (access to paved roads and markets) was a further criteria in the selection to ensure the study captured project impacts on both types of communities. Thus, there were a total of 4 communities selected to be surveyed – 2 each in PACs and NPACs. 20 households were randomly chosen within each of these communities. This stratified sampling thus allowed for 80 household surveys in total, 40 each from PACs and NPACs.

2. Focus Groups with men, women and youth were facilitated to understand local perceptions of food security and livelihoods, with qualitative in-depth answers supplementing survey data.

3. Semi-structured one-on-one interviews with key informants, including local leaders, community members, government officials and company employees, were carried out to ensure that views of a wide range of involved stakeholders were incorporated in our analysis.

Note: while most of the PACs in Grand Cape Mount County previously resided on a rubber plantation, most NPACs in Gbarpolu County live on tribal land with stronger land rights and little or no experience of land appropriation. This difference is noted as a research limitation in the discussion section.
Theoretical Framework

The following four tools, developed and used extensively by USAID (United States Agency for International Development), FAO (Food and Agriculture Organization), FANTA (Food and Nutrition Technical Assistance) and the WFP (World Food Programme), amongst others, were used to capture quantitative data on food security in the representative communities.

1. **Food Security**: Household Food Insecurity Access Scale (HFIAS)
   Household food security is defined as the consumption of sufficient quality and quantity of food to meet all household members’ nutritional requirements for productive lives. The HFIAS tool specifies a set of nine questions (thus giving a potential score from 0 to 9) that identifies different levels of household food insecurity across cultural contexts. The score measures the prevalence of food insecurity and is used specifically to detect changes in food security of a population over time.

2. **Food Availability**: Months of Adequate Household Food Provisioning (MAHFP)
   The MAHFP indicator uses food provisioning as a proxy to capture that total number of months out of the previous 12 months that the household was unable to meet their food needs. On a scale of 0 to 12, each one-point increase in MAHFP indicates an additional month of inadequate food provision in the household.

3. **Dietary Diversity**: Household Dietary Diversity Score (HDDS)
   The HDDS measures household diet patterns by the number of food groups a household consumes over a time period. This study uses 13 food groups, modified to be locally and culturally relevant, to capture both daily and weekly diet diversity. A household thus receives two scores between 0 and 13, indicating the number of food groups consumed by the household in a day and week respectively.

Quantitative Analysis Methodology

Quantitative Analysis of the household survey data was carried out in two stages: (a) Temporal analysis, comparing data on food security and livelihood indicators for the present with corresponding responses for two years ago, and (b) Comparative analysis, comparing data from PACs with those from NPACs.

The Temporal Analysis was limited to PACs as there was no significant change in indicators over the two year period in the NPACs. As data regarding circumstances from two years ago were collected on a recollection basis, this data was only collected for a limited set of questions, where probability of correct recall was high. For example, respondents were not asked about what they ate 2 years ago, but a question on how much land they owned 2 years ago was included. The temporal analysis hence looked at changes in socioeconomic conditions, including land ownership, livestock, livelihood sources and expenditure patterns. Differences over the two years were analyzed using statistical difference-in-means tests, means tables and scatter plots.

The comparative analysis, on the other hand, sought to establish the impacts of the land appropriation by comparing the PACs to control communities (NPACs) that have not been affected by the project yet. This analysis focused on the core research questions of food security and livelihoods, with a regression analysis of three indicators of food security to infer the relationship, if any, between the oil palm project and food security. Note that this analysis looks purely at differences in indicators across the two sets of communities, and is not an examination of difference-in-differences. In addition to the regression analysis, t-tests and graphical analysis was also conducted.
FINDINGS

Quantitative Analysis and Trends
This section describes the findings of the quantitative analyses, with statistical tables presented in Appendix D.

Baseline Analysis
This analysis sought to establish whether the NPACs are similar enough to the PACs to be used as a comparison group. As mentioned, randomization at the community level was not possible due to the nature of the land appropriation. However, care was taken to match the selected communities on socioeconomic backgrounds and sources of livelihood, and “baseline” data (recall data for 2 years ago) was collected in the household surveys.

Table D1 compares the PACs and NPACs on this baseline data. Note that baseline data was only available for a limited set of variables – where probability of correct recall was likely to be high. The analysis demonstrates that there was no statistically significant difference between NPACs and PACs on amount and type of land used 2 years ago, with no significant difference in proportions of households with a farm, small garden or no land at all. Similarly, the amount and type of livestock owned as well as proportion of households who spent money on food and water, were not statistically different across NPACs and PACs 2 years ago. However, the analysis points to a statistically significant difference in expenditures on education and health, with a higher proportion of households spending on education and health in PACs 2 years ago. This is likely due to the presence of free government schools and clinics in the NPACs.

Overall, the baseline analysis indicates a strong similarity across PACs and NPACs before the land appropriation, particularly on factors (land, livestock, and expenditure on food and water) that would impact baseline food security and livelihoods.

Temporal Analysis
The temporal analysis (Table D2) compared data from the present to recall data from 2 years ago, to establish whether there was a difference in household characteristics after the land appropriation. The analysis reveals a direct impact on land ownership in the PACs, with a significant decrease in the size of farmland owned in PACs over the two years. On average, the proportion of households who do not own or farm any land increased from 10% to 44%, with the impact in the PAC Community 2 being much more drastic (increased from 5% to 50%). Significantly, over the 2 year period, the proportion of households in PACs who owned a farm (distinguished from a garden) decreased from 54% to less than 5%.

On the other hand, on average, the livestock profile in PACs (measured by poultry, the most common livestock type) remained fairly constant, with a slight (but statistically insignificant) increase in ownership now as opposed to two years ago. Expenditure patterns however did change, with a statistically significant decrease in proportion of households who spend money on food and education from two years ago. The decrease in education spending was particularly substantial for PAC Community 2, where the community’s school was located on the land cleared by the company and hence no longer available for students. Survey respondents highlighted a decrease in the amount of money spent on all items, and a noticed increase in the proportion of the household’s income spent on food as a result of much lower incomes.

Comparative Analysis
The comparative analysis (See Tables D3(a) and D3(b)) compares current household characteristics across PACs and NPACs through difference in means tests. This analysis is supplemented by the regression analysis (See Tables D4(a), D4(b) and D4(c)) that seeks to establish a causal link between the land appropriation and the changes in the Food Security indicators. Eight separate OLS regressions – two per food security indicator – are used to examine these changes. The first set of four regressions use remoteness as a control, while the second set includes a more comprehensive list of control variables for each indicator. These are discussed briefly below and can be examined in detail in Table D4(b) and Table D4(c).
The most significant finding of these analyses is the difference in the four Food Security indicators between the PACs and NPACs. *Table D4b* reveals that all four food security indicators are statistically significantly (at 99% level) worse in PACs. Further, the variable “PAC” is statistically significant at the 99% level in all eight regression equations. These indicate that the project has had a direct causative impact on food security.

Specifically, the regression analysis (after controlling for the remoteness of communities) indicates that on average, NPACs have a 1.582 unit higher Daily Household Diet Diversity Score (DHDDS) and a 2.005 unit higher Weekly Household Diet Diversity Score (WHDDS) than PACs, keeping all other variables constant. When further controls are added, this difference decreases slightly (to 1.294 HDDDS and 1.71 WHDDS), but remains strongly statistically significant. Overall, this means that households not affected by the project are able to consume a significantly more diverse and nutritious diet, with access to 1.5 more food groups daily and 2 more food groups weekly. Significant differences in Food Security are further demonstrated by the MAHFP (Months of Adequate Household Food Provisioning) index, where regression analysis indicates that on average, households in PACs experience inadequate food for 4.396 more months in a year than those in NPACs (controlling for remoteness). This difference is statistically significant at the 99% level. In addition, PACs score 2.26 points higher than NPACs on the on the Food Insecurity Access (FIA) Index (statistically significant at 99%, controlling for remoteness), which measures severity of food insecurity in communities. The average FIA score in PACs is 8.20/9.0, indicating a highly food insecure environment, while households in NPACs, on the other hand, score 5.97, indicating a medium food insecure environment. These significant differences in indicators exhibit that the land appropriation for the Sime Darby Palm Oil Plantation has had a substantial impact on communities’ food security.

*Table D4(a)* below provides an overview of these regression analyses, refer to *Tables D4(b) and D4(c)* in the Appendix for further details.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Food Insecurity Access</th>
<th>Months of inadequate Household Food Provisioning</th>
<th>Daily Household Dietary Diversity</th>
<th>Monthly Household Dietary Diversity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS (1)</td>
<td>OLS (2)</td>
<td>OLS (3)</td>
<td>OLS (4)</td>
</tr>
<tr>
<td>PAC</td>
<td>2.2616***</td>
<td>1.7816***</td>
<td>4.3967***</td>
<td>3.6305***</td>
</tr>
<tr>
<td>Remote (yes/no)</td>
<td>1.6315***</td>
<td>1.4254***</td>
<td>-0.1401</td>
<td>-1.4395***</td>
</tr>
<tr>
<td># chicken owned currently</td>
<td>-0.0618*</td>
<td>-6.1811*</td>
<td>0.0275</td>
<td>0.0529*</td>
</tr>
<tr>
<td>Debt (yes/no)</td>
<td>1.1956**</td>
<td>1.3912</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expenditure on food (yes/no)</td>
<td>3.4240</td>
<td></td>
<td>-2.8726*</td>
<td>-2.0964</td>
</tr>
<tr>
<td>Expenditure on agriculture (yes/no)</td>
<td>-1.0523</td>
<td></td>
<td>0.4995</td>
<td>0.5061</td>
</tr>
</tbody>
</table>

Socioeconomic conditions in the two sets of communities also exhibit significant differences. Difference in means tests reveal significantly higher debt prevalence in PAC households as compared to NPACs. 63% of households in the PAC are in debt, with particularly high credit prevalence in PAC Community 1 at 76%. On the other hand, on average, only 36% of households in the NPACs are in debt. The amount of average household debt in PACs is also more than double that of NPAC households, at Liberian Dollar 9,474.04 (USD 127) as opposed to LD 3,392.86 (USD 46) in NPACs. Most debt in PACs was taken to buy food or to meet health expenses. In NPACs, on the other hand, debt was mostly for agriculture or higher education, indicating a more subsistence existence in PACs. The prevalence, amount and composition of debt in PACs as compared to the NPACs points to an *economically insecure and subsistence living* in these areas, driven by land appropriation and absence of livelihood alternatives.
Lastly, in confirmation with the preceding temporal analysis, the land profile in NPACs is also more stable than PACs, with 54% households on average owning farms, compared to 5% of households in PACs. This is also reflected in the proportion of households that do not have a farm, which stands at 44% in PACs and only slightly above 8% in NPACs. Given the recent land appropriation for the Sime Darby Palm Oil Plantation, this is of course expected.

Qualitative Findings
Gbarpolu County: Non Project Affected Communities (NPACs)

As mentioned, Gbarpolu County is a sparsely populated, densely forested, rural, low access region of Liberia. Focus groups reveal that access to healthcare is quite poor. Cough, malaria and/or fever, seasonal diarrhea, and maternal mortality seem to be the primary health challenges.\textsuperscript{67,68,69} Education is poor-to-modestly accessible and the quality is questionable. Access to streams and rivers seemed sufficient for some community needs at present but access to improved water sources for drinking and sanitation is very poor.\textsuperscript{70,71,72}

Low infrastructure quality upon departing from Tubmanburg (the nearest large town) significantly hinders regional travel and increases time and transportation costs. During the rainy season the main road is not passable except via motorcycle or high clearance truck. Thus, as road travel requires 6-8 hours to travel from Tubmanburg to Bopolu (the county capital), the region is significantly cut off from other counties and markets during the two rainy seasons. Higher transportation costs put upward pressure on food prices in the local market during these times. Overall, food prices in the local market seem to be increasing. The price of rice has noticeably increased over the last two years.

Despite evidence of malnutrition among the adult population, many or most of those who lived in refugee camps during the civil war, access to food and dietary diversity is not adverse. Most, if not all, households eat at least one meal (i.e. with rice) per day. Most households also consume animal protein, either via fish, eggs, or bushmeat, at least 1-2 times per week.

Most, if not all, households have access to land that is typically rain-fed. The majority of households practice slash-and-burn agriculture. In NPAC 1, a local agriculture technician is also providing training on improved sedentary agricultural production via intensification, utilizing piggery liquid waste for fertilizer. Households grow most of their rice and vegetables and sell surplus production at the weekly local market for additional income. Almost every household has chickens and in some instances, goats and sheep. In a few instances, and more commonly in NPAC 1, households also have access to milk and honey. Hunting in the Gola, Kepelle and Yoma forests and fishing in the streams, conducted by men and women respectively are vital to livelihoods in the communities surveyed. These activities provide an important source of protein and/or are sold at the weekly market nearby for additional income. High access to the local forests and streams also assist households to weather food production and price shocks.

Common challenges to access to food in these communities are the typical risks associated with agricultural livelihoods, including weather and pests. However, these shocks did not seem to significantly affect a household’s food security as community support helps mitigate the impact. In the instance of “chicken disease” infecting a household’s flock, a neighbor will typically lend the affected house a pair of chickens to help replenish their flock. Should a crop be destroyed by a bush cow\textsuperscript{h} or weather variability, households will often be able to subsist from hunting and gathering in the forest to eat as well as sell the balance at the weekly local market to buy rice. In extreme cases of food scarcity, as is more often the case for widows and the elderly, neighbors sometimes take turns sharing small portions of their meals. There are also a few limited cases, again more closely associated with widows and the elderly, where adults in the household may periodically eat less or skip a meal(s).

\textsuperscript{h} A bush cow is a short horned, West African buffalo
Diversity of livelihood sources is vital to household food security. In Gbarpolu, a moderate level of entrepreneurship and micro-enterprise development visibly exists. Recently, a women’s palm oil seller cooperative was established. Technically skilled people, such as a mechanic, carpenter and tailor, sell their services. Many women also grow cassava and make gari\(^1\) to sell in the market. In NPAC 1, some cane farmers mill and distill their cane juice and then sell it locally. These additional income opportunities were reflected in a higher number of noticeable investments in household infrastructure, such as improved zinc roofs.

Although the communities in Gbarpolu County serve as control communities, there are impending changes to land allocation that is projected to occur in the short-to-medium term. Under the concession agreement signed by the Liberian government and Sime Darby, approximately 42-48\% of Gbarpolu County will be cleared and cultivated for commercial oil palm production. At the time of writing this report, the community’s leaders were still in conversation with the government as to how to best allocate land to comply with the concession agreement. However, given the size of the concession of the county and community disbursement, it is inherent that land allocation, land management and access to land will change.\(^1\) It will also likely be necessary for agricultural practices to change in order to comply with the moratorium on slash-and-burn practices near the plantation. Given these forthcoming changes, it is not possible to definitively predict how they will affect food security for communities in Gbarpolu County. However, NPACs are beginning to interact with PAC leaders to learn from their experiences.

Grand Cape Mount: Project Affected Communities (PACs)

Grand Cape Mount County presents a very complex case as geography, infrastructure and degrees of impact by oil palm operations vary. For communities living near the tarmacked trunk road that bisects the county, access to markets and possibly healthcare and education is higher. Populations also tend to be more densely populated. Conversely, communities further from the trunk road have lower access to markets, healthcare and education. PAC 1 and PAC 2 fit the profile of the former and later respectively.

However, focus group and interview respondents at both communities unanimously agree that there has been a significant decrease, and in some instances elimination, of access to land and an acute reduction in ability to grow food. Therefore, households that do not have alternative livelihoods eat less and/or eat less often. Currently both communities have limited to no forest reserves, experiencing a significant to extreme reduction in environments to fish and hunt bushmeat. Thus since oil palm operations began, there has been a negative impact on access to sources of protein.

For both communities, access to water has noticeably declined. Many respondents suggested that the land was much drier because Sime Darby had cleared the forests. This hypothesis was supported by a few village wells that have gone dry since the forest was cleared. Community members also perceived that the river and local streams levels were markedly lower than in the previous two years.\(^2\) They now had to spend twice as long walking to gather water than two years prior. The communities are also experiencing a noticeable reduction in the amount of fish they consume (a primary source of protein) as fish populations have reduced.

Based on focus group and household responses, access to healthcare is quite poor. Malaria, seasonal diarrhea, maternal mortality and increasingly, malnutrition, are the primary health challenges. Almost every respondent communicated that food prices are continuously increasing as well as the price of fuel, particularly biomass (such as charcoal). This is consistent with recent official estimates. In July 2012, gasoline prices were slightly lower but prices for charcoal and other traded goods were approximately 20% higher than in May 2012.\(^3\)

---

\(^1\) A common local food of granular cassava flour made from cassava tubers

\(^2\) At the time of writing this report, the Liberian Land Commission was in the process of drafting the Land Rights Policy to try to reform Liberia’s various, and sometimes contradictory, land laws.

\(^3\) This observation may be explained by general scientific theory that lower density of ground cover reduces ground water retention and soil exposure increases evaporation.
Community members who make coal as a primary source of income to support their livelihood also expressed concern that the trees they have been making coal from are expected to soon run out.

PAC 1, having higher market access, is more densely populated and experiencing increasing rates of inward migration as people look for jobs with Sime Darby. The increased migration not only enhances competition for jobs but may also be putting upward pressure on local food prices as demand increases and local household production has decreased. While tensions between the local population and migrant population were not witnessed at the time of the survey, it is not an unreasonable scenario that tensions may develop over time if livelihood sources and income levels continue to become sparser and food insecurity increases. Twelve percent of respondents in the PACs were employed by Sime Darby, a majority of whom were employed as “casual day labor”, as full time employment opportunities were fewer. These respondents, on average, report improved livelihoods due to a consistent source of income. Sime Darby employees also benefit from a weekly rice subsidy and the ability to access the company clinic, which is strictly for Sime Darby full time employees (i.e. not accessible to casual day laborers employed by Sime Darby). However, some employees reported negative impacts on livelihoods with instances of corruption in the weekly rice subsidy disbursement that reduced the agreed portion of rice allocated. The reduced access to land and agricultural production also outweighed the gains from employment for some. On the other hand, access to education seems to have increased in PAC 1 due to the operation of Sime Darby schools. While these schools are technically only accessible to children of Sime Darby employees, households who have an employed family member will often “adopt” non-employee children for enrollment purposes. Corruption by teachers, through demanding informal school fees, was also reported.

PAC 2 has been acutely affected by the significant reduction in arable land availability. In addition to lower market access, there seems to be fewer opportunities for members to become Sime Darby employees as compared to PAC 1. Thus, the reduction in sources of livelihood (i.e. farming) and other income generating activities is not offset by alternative employment opportunities. At the time of the survey, household consumption and dietary diversity was almost entirely dependent on cassava (a non-preferred food compared to rice). The cassava consumed was from fields previously owned and/or used by PAC 2 households now under the lease of Sime Darby for oil palm cultivation. Households walked behind Sime Darby tractors on tilling days to collect their harvest from their old fields. As the school, which used to be on the land that is now part of the oil palm plantation, was destroyed, child labor also seems to have increased. Respondents state that it is necessary to support the increased need to forage for cassava and process into gari that is consumed or sold at a market. When surveying community members, concern was also expressed about the future of the cassava supply. Respondents estimated that the cassava they were gathering behind the tractors in their old fields would run-out by late May or early June 2012.

Community members, local non-government organizations and members of the government also repeatedly spoke of a formal protest against Sime Darby operations, particularly with respect to employment and compensation agreements. In December 2011, members of PAC 1, PAC 2 and surrounding communities in Grand Cape Mount staged a protest to Sime Darby operations. Some community members stole approximately 15 pieces of heavy machinery near PAC 2 from Sime Darby and protested the decline of their living conditions. In response, the President set up an inter-Ministerial committee headed by the Liberian Land Commission to resolve the issues through three sub-committees addressing compensation, water and land.

---

1 Inward migration (in this context) is the relocation pattern of foreign and national people to mega-project investment areas. Migrants are typically seeking improved livelihoods through employment opportunities (that may or may not be available), prospecting land that may come under a concession and/or other reasons.

2 Migrations to PAC1 included migrants from neighboring communities as well as from distant counties. As such, migrants from neighboring communities and those who had migrated at least a year prior to the land appropriation were both perceived as “local”, while other migrants were perceived and treated as non-local.

n A common local food of granular cassava flour made from cassava tubers.
DISCUSSION

The findings detailed in the previous section clearly indicate a cause for concern for food security for the PACs in Grand Cape Mount County. There is a definite reduction in overall dietary diversity, an increase in the number of months of inadequate food and an overall decrease along the food insecurity scale which, in combination with the qualitative discussions on access to food, markets and land ownership point to an adverse impact of the change in land appropriation in these communities. The affected communities also experience an increase in the prevalence and scale of debt, lower incomes, and higher percentage expenditure on food and other basic necessities were impacted, and access to schools, clinics and water points were compromised to varying degrees.

These points are of concern because the PAC data compared with the NPAC data shows that the land appropriation as a result of the Sime Darby oil palm plantation’s operations has had a substantial impact on the PACs food security. Without adequate livelihood or income generating substitutes, households in PACs will become increasingly vulnerable to food price shocks. Households will be less able to cope and/or adjust to increases in food prices or other social, market and/or environmental changes. Therefore as global rice and fuel prices are projected to rise, and significantly influence Liberian food prices, it is increasingly likely that PACs will be highly exposed and unable to manage increases in local food prices. Additionally, the increase of inward migration to the region and reduction in secondary sources of income (such as hunting, making coal, tapping rubber, etc.) exacerbates competition for employment with Sime Darby, as it is one of the only sources of employment in the County. Therefore, there is also increasing demand for food and available resources, pushing additional upward pressure on local food prices.

With respect to Gbarpolu County, which at present appears more food secure relative to Grand Cape Mount County, there are many opportunities for NPACs to learn from the lessons that are transpiring in Grand Cape Mount. As Sime Darby expands plantation operations into Gbarpolu County, it is inherent that land allocation and management will change. To what extent and how is the area of opportunity which the communities, Government and Sime Darby must explore further. Liberia has ratified the International Covenant on Economic, Social and Cultural Rights, the Convention on the Rights of the Child and the Convention on the Elimination of All Forms of Discrimination against Women all which recognizes the right to food. To ensure that these agreements are fulfilled, Government, Sime Darby and communities must explore interventions that will smooth changes in livelihoods and income generating opportunities that will help strengthen food security in the oil palm concession area.

Overall, Liberia remains one of the poorest, aid-dependent countries at the crossroads of a complex history and a potentially promising future. Its status as a food insecure state, further complicated by world market fuel and grain price sensitivity, could undermine the fragility of the state unless timely, localized action to mitigate vulnerability to local food price shocks is taken. Strengthening food security in concession areas, particularly where rising food insecurity is a result of the concession is critical to local and national stability.

Research Limitations

Limitations in the research design, introduced primarily by resource and time constraints, are highlighted in the methodology section of this paper. Foremost, the restricted sample size of 80 households (40 households each in PACs and NPACs) leaves limited room for statistical analysis and significance. Sampling, while random at the household level, was less so at the community level. While baseline analysis and qualitative analysis indicates that the communities surveyed were well matched on socioeconomic indicators, they may still not be valid comparison communities. Particularly, there are historical differences in the PACs and NPACs analyzed. Most of the PACs in Grand Cape Mount County previously resided on a rubber plantation,

---

As noted in the methodology section, pure randomization at the community level was not possible due to the nature of the project, but care was taken to ensure that the communities were matched by similar socioeconomic backgrounds and similar livelihood sources prior to the land appropriation.
while most NPACs in Gbarpolu County live on tribal land with stronger land rights and little or no experience of land appropriation. Displacement and migration during and after the civil war have also had different effects on the communities. Overall however, given the nature of the project, this selection methodology was considered the closest approximation of a strong comparative study.

As with most quantitative research projects, survey response was dependent on presence of household heads and willingness of respondents to respond to the survey. Survey questions also capture food security data at present more reliably, relying on respondents’ ability to recall information for baseline data from 2 years ago. This is largely due to limited disaggregated current and historical food security data on Liberia to use as a baseline or a benchmark. The potential for inaccuracy in recall data informed the statistical analysis methods for the research, with more emphasis placed on the comparative analysis as opposed to the temporal analysis. The comparative analysis also avoids a difference-in-differences examination as a result.

As such, the authors recognize and acknowledge the limitations of their research implementation, and intend this analysis as a preliminary assessment of the food security and livelihood impacts of the palm oil concession only. Nonetheless, despite research limitations, the statistical strength and magnitude of the food insecurity in the communities affected by the project indicate that the land appropriation has indeed had a severe negative impact on these communities.
RECOMMENDATIONS

Based on the research findings, below are a concise list of areas that the research team finds high priorities to mitigate the negative food security and livelihood impacts of recent commercial oil palm development in Grand Cape Mount and Gbarpolu Counties. These recommendations have been developed specifically as they are actionable in the near-to-medium term. They are also limited to the impacts on food security and livelihood, which was the central research question. Several members of Liberian civil society and the international community have released, and continue to release, public reports and recommendations for other aspects of the concession.75

Recommendations to Sime Darby

Community Outreach
1. Establish concession community liaison officers to engage and communicate with PACs and NPACs in the Sime Darby concession area. A principal concern of community members in both counties was the lack of communication from the company and an inability to express their concerns to them. Through regular-to-periodic community visits and town-hall style meetings community liaisons allow for communication opportunities where challenges can be addressed and opportunities can be identified. Community outreach also keeps the community engaged, reduces uncertainty around company activities and thus reduces hostility and potential for conflict. The long-term effectiveness of community liaison officers, however, is contingent on Sime Darby’s noticeable actions and corporate policy.

    2. Ensure transparency in operations and make all contracts and reports available to the public by the end of each fiscal year.

Livelihood Development
3. Prioritize and expedite the development of the out-growers program that would help offset negative impacts on food security due to restrictions on access to arable land and traditional slash-and-burn farming practices.
   a. Consider allocating smaller portions of land designated for PAC agricultural production, located near communities (within 15-20 minutes’ walk) and near irrigation sources (within 10 minutes’ walk).

4. Create an agricultural mentorship program between agricultural technical advisors and community members with the intent to assist community members learn and implement agricultural intensification and diversification practices to meet dietary needs and mitigate vulnerability to food price shocks.
   a. Assist aquaculture development to help offset negative protein impacts due to loss of swamplands and restrictions on rivers.

5. Revisit the compensation of community members for the land appropriation, particularly considering market value of land and crop production potential of each season from the current season. Consider recurring payment schemes that mirror agricultural income lost from the land reallocation and ensures steady income.

6. Establish clear employment guidelines to manage expectations and reduce corruption.
   a. To mitigate social instability that may be augmented by inward migration, prior to the commencement of plantation operations, identify community members who are from and/or live in the projected affected area that may be employed by Sime Darby (either as full time employees or as casual day laborers) and establish a degree of priority to these
members. This will also assist mitigate corrupt hiring practices of migrants paying Sime Darby leadership for employment.

Social and Environmental Impacts

7. Work with the Government of Liberia and/or the international community to conduct annual or bi-annual environment and social impact assessments (ESIA) that are inclusive of impact on food security in the entire concession area.
   a. Establish extensive baseline data on food security for Gbarpolu, Bomi, and northern Grand Cape Mount Counties, the next areas planned to come under the concession
   b. Make documents available to the general public by the end of each fiscal year.

8. Regularly monitor changes in food security and livelihood status, in entire concession area
   a. Make documents available to the general public by the end of each fiscal year.

Recommendations to the Government of Liberia

Community Outreach

1. Establish government representatives with the capacity (financial and otherwise) to engage and communicate with both PACs and NPACs. These representatives, different from the Sime Darby liaison officers, would be present at Sime Darby community meetings, and ensure concerns raised at these meetings are addressed by the company and/or through the government. Additionally, these officers would engage and facilitate comprehensive community understanding of plantation expansion implications – temporal, spatial and potential social and environmental impacts – during, and after, the “free, prior and informed consent” process.

2. Make documents, reports and contracts available to the general public by the end of each fiscal year.

Economic and Social Impacts

1. Monitor and ensure Sime Darby’s adherence to contractual obligations – particularly with respect to local employment, the out-growers program, environmental impacts and the creation of social development funds, schools and health clinics – in a transparent and timely manner.

2. Engage with international and donor community on agriculture and food security stimulation interventions that may directly benefit current and near-term PACs (such as agricultural technical assistance and/or training programs, food security monitoring, etc.)

3. Mandate the regular monitoring of changes in food security and livelihood status in concession areas.
   a. Establish baseline data on food security for Gbarpolu, Bomi, and northern Grand Cape Mount Counties, the next areas planned to come under the concession.

4. Clarify and resolve land rights, land ownership and land tenure issues. Recognized as a very complex issue, the resolution of land rights is critical to moving forward with the Sime Darby concession.

Environmental Impacts

5. Work with Sime Darby and/or the international community to conduct baseline environment and social impact assessments (ESIA) that are inclusive of impact on food security in concession areas.

6. Increase capacity of the Liberian Environmental Protection Agency to uphold the minimum principles of its mandate such as:
   a. Ability to test water and soil
   b. Conduct regular-to-periodic site visits to monitor and enforce Liberian environment law and regulations
**Recommendations to Communities**

1. Collaborate with Sime Darby, the Government and the international community to identify challenges and develop solutions and/or coping mechanisms for problems that may arise from changes in access to arable land, fluctuations in food prices and inward migration.

2. Collaborate with Sime Darby and the Government leadership to develop a framework that will assist transparency of local hiring practices and rice subsidy disbursement

**Recommendations to Liberian Civil Society**

1. Continue monitoring social and economic conditions inside the concession areas, and produce public reports about the impacts – both positive and negative – of the concession on communities.

2. Facilitate partnerships and dialogue between community members, Sime Darby and the government to address concerns and implement solutions.
APPENDICES

Appendix A: Maps

Figure A1: Liberia Livelihood Zones

Figure A2: Liberia Production and Market Flows: Palm Oil
Figure A3(a): Liberia Production and Market Flows: Local Rice

Figure A3(b): Liberia Production and Market Flows: Imported Rice
Figure A4: Liberia Food Security Map (2010)\textsuperscript{80}

Poor and borderline food consumption in 2010

Appendix B: Graphs

Graph B1: FAO Food Price Index\textsuperscript{81}

* The real price index is the nominal price index deflated by the World Bank Manufactures Unit Value Index (MUV)
Graph B2: International Cereal Prices

Graph B3: Domestic Grain Price Index

Note: The graph shows average inflation-adjusted trends in domestic prices for rice, wheat and maize across countries from January 2007 to December 2010. The domestic price is set equal to 100 in January 2007 for all countries, and the index value for subsequent months is equal to the average index value across all countries. The domestic price indices for rice, wheat and maize include 42, 27 and 34 countries, respectively, and include all countries for which data were available at the time of writing.

Source of raw data: FAO Global Information and Early Warning System.
Graph B4: Domestic Grain Price Volatility

Volatility of domestic prices for rice, wheat and maize peaked in 2008

Average volatility of domestic prices (percent)

Note: Volatility of domestic prices is calculated as the standard deviation of the logarithm of (P/P_{t-1}), using monthly data. Countries included are the same as those in Figure 5. Source of raw data: FAO Global Information and Early Warning System.

Graph B5: Rice Production Gap

Rice production gap

Source: USDA
Graph B6: Malnutrition in Liberia

Graph B7: Stunting in Liberia
Appendix C: Tables

Table C1: Undernourishment in Liberia

<table>
<thead>
<tr>
<th></th>
<th>Poor</th>
<th>Borderline</th>
<th>Acceptable</th>
<th>Poor</th>
<th>Borderline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater Monrovia</td>
<td>1.2</td>
<td>6.6</td>
<td>92.2</td>
<td>11,650</td>
<td>64,074</td>
</tr>
<tr>
<td>Lofa</td>
<td>3.0</td>
<td>33.5</td>
<td>63.5</td>
<td>8,306</td>
<td>92,749</td>
</tr>
<tr>
<td>Gbarpolu</td>
<td>4.2</td>
<td>32.2</td>
<td>63.6</td>
<td>502</td>
<td>26,851</td>
</tr>
<tr>
<td>Grand Bassa</td>
<td>6.6</td>
<td>27.4</td>
<td>66.0</td>
<td>14,632</td>
<td>60,744</td>
</tr>
<tr>
<td>Margibi</td>
<td>7.2</td>
<td>30.1</td>
<td>62.7</td>
<td>15,114</td>
<td>63,187</td>
</tr>
<tr>
<td>Nimba</td>
<td>9.2</td>
<td>23.2</td>
<td>67.6</td>
<td>42,506</td>
<td>107,190</td>
</tr>
<tr>
<td>Grand Gedeh</td>
<td>10.8</td>
<td>31.2</td>
<td>58.0</td>
<td>13,528</td>
<td>39,080</td>
</tr>
<tr>
<td>Sinoe</td>
<td>12.0</td>
<td>33.1</td>
<td>54.9</td>
<td>12,287</td>
<td>33,981</td>
</tr>
<tr>
<td>Cape Mount</td>
<td>13.1</td>
<td>41.0</td>
<td>45.9</td>
<td>16,647</td>
<td>51,974</td>
</tr>
<tr>
<td>Rivercess</td>
<td>15.8</td>
<td>38.7</td>
<td>45.5</td>
<td>11,298</td>
<td>27,674</td>
</tr>
<tr>
<td>Bong</td>
<td>16.3</td>
<td>37.3</td>
<td>46.4</td>
<td>54,357</td>
<td>124,722</td>
</tr>
<tr>
<td>Rural Montserrado</td>
<td>23.4</td>
<td>51.4</td>
<td>25.2</td>
<td>34,496</td>
<td>75,772</td>
</tr>
<tr>
<td>River gee</td>
<td>28.1</td>
<td>54.4</td>
<td>17.5</td>
<td>18,768</td>
<td>36,333</td>
</tr>
<tr>
<td>Grand Kru</td>
<td>33.6</td>
<td>44.6</td>
<td>21.8</td>
<td>19,459</td>
<td>25,829</td>
</tr>
<tr>
<td>Bomi</td>
<td>38.8</td>
<td>34.8</td>
<td>26.4</td>
<td>32,638</td>
<td>29,273</td>
</tr>
<tr>
<td>Maryland</td>
<td>43.3</td>
<td>29.3</td>
<td>27.4</td>
<td>58,861</td>
<td>39,594</td>
</tr>
<tr>
<td>Liberia</td>
<td>13.0</td>
<td>27.9</td>
<td>59.1</td>
<td>368,000</td>
<td>899,000</td>
</tr>
</tbody>
</table>

\[^{1}\) Based on survey data from 2023.
### Appendix D: Statistical Analysis

#### Table D1: Baseline household characteristics

<table>
<thead>
<tr>
<th>Household characteristics 2 years ago</th>
<th>Treatment (PACs)</th>
<th>Control (NPACs)</th>
<th>Difference in means/proportions (NPAC-PAC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean</td>
<td>std. error</td>
<td>mean</td>
</tr>
<tr>
<td>Livestock Profile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicken</td>
<td>3.44</td>
<td>1.03</td>
<td>2.26</td>
</tr>
<tr>
<td>Others</td>
<td>0.27</td>
<td>0.22</td>
<td>0.92</td>
</tr>
<tr>
<td>Proportion of HH w/ No farm</td>
<td>0.10</td>
<td>0.05</td>
<td>0.26</td>
</tr>
<tr>
<td>Proportion of HH w/ Small garden</td>
<td>0.37</td>
<td>0.08</td>
<td>0.31</td>
</tr>
<tr>
<td>Proportion of HH w/ Farm</td>
<td>0.54</td>
<td>0.08</td>
<td>0.44</td>
</tr>
<tr>
<td>Expenditure Profile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of HH who spend on Food</td>
<td>0.88</td>
<td>0.05</td>
<td>0.87</td>
</tr>
<tr>
<td>Proportion of HH who spend on Water</td>
<td>0.02</td>
<td>0.02</td>
<td>0.03</td>
</tr>
<tr>
<td>Proportion of HH who spend on Education</td>
<td>0.50</td>
<td>0.08</td>
<td>0.05</td>
</tr>
<tr>
<td>Proportion of HH who spend on Health</td>
<td>0.46</td>
<td>0.08</td>
<td>0.00</td>
</tr>
<tr>
<td>Proportion of HH who spend on Agriculture</td>
<td>0.24</td>
<td>0.07</td>
<td>0.00</td>
</tr>
</tbody>
</table>
## Table D2: Temporal Analysis

<table>
<thead>
<tr>
<th>Treatment (PAC)</th>
<th>Grand Cape Mount</th>
<th>Household characteristics</th>
<th>2 years ago</th>
<th>Current</th>
<th>Difference in means/proportions (2y - Current)</th>
<th>p value</th>
<th>significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean</td>
<td>std. error</td>
<td>mean</td>
<td>std. error</td>
<td>value</td>
<td>std. error</td>
<td>t/z statistic</td>
</tr>
<tr>
<td>Livestock Profile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicken</td>
<td>3.44</td>
<td>1.03</td>
<td>5.17</td>
<td>1.23</td>
<td>-1.73</td>
<td>1.53</td>
<td>-1.1332</td>
</tr>
<tr>
<td>Others</td>
<td>0.27</td>
<td>0.22</td>
<td>1.05</td>
<td>0.86</td>
<td>-0.78</td>
<td>0.65</td>
<td>-1.2076</td>
</tr>
<tr>
<td>Land used (farmed + owned)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of HH w/ No farm</td>
<td>0.10</td>
<td>0.05</td>
<td>0.44</td>
<td>0.08</td>
<td>-0.34</td>
<td>0.09</td>
<td>3.4894</td>
</tr>
<tr>
<td>Proportion of HH w/ Small garden</td>
<td>0.37</td>
<td>0.08</td>
<td>0.51</td>
<td>0.08</td>
<td>-0.15</td>
<td>0.11</td>
<td>1.3351</td>
</tr>
<tr>
<td>Proportion of HH w/ Farm</td>
<td>0.54</td>
<td>0.08</td>
<td>0.05</td>
<td>0.03</td>
<td>0.49</td>
<td>0.08</td>
<td>4.8542</td>
</tr>
<tr>
<td>Expenditure Profile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of HH who spend on Food</td>
<td>0.88</td>
<td>0.05</td>
<td>1.00</td>
<td>0.00</td>
<td>-0.12</td>
<td>0.05</td>
<td>-2.3075</td>
</tr>
<tr>
<td>Proportion of HH who spend on Water</td>
<td>0.02</td>
<td>0.02</td>
<td>0.07</td>
<td>0.04</td>
<td>-0.05</td>
<td>0.05</td>
<td>-1.0253</td>
</tr>
<tr>
<td>Proportion of HH who spend on Education</td>
<td>0.50</td>
<td>0.08</td>
<td>0.27</td>
<td>0.07</td>
<td>0.23</td>
<td>0.11</td>
<td>2.1451</td>
</tr>
<tr>
<td>Proportion of HH who spend on Health</td>
<td>0.46</td>
<td>0.08</td>
<td>0.54</td>
<td>0.08</td>
<td>-0.07</td>
<td>0.11</td>
<td>-0.6626</td>
</tr>
<tr>
<td>Proportion of HH who spend on Agriculture</td>
<td>0.24</td>
<td>0.07</td>
<td>0.17</td>
<td>0.06</td>
<td>0.07</td>
<td>0.09</td>
<td>0.8172</td>
</tr>
</tbody>
</table>
### Table D3(a): Comparative Analysis

<table>
<thead>
<tr>
<th>Current household characteristics</th>
<th>Treatment (PACs) Grand Cape Mount County</th>
<th>Control (NPACs) Gbarpolu County</th>
<th>Difference in means/proportions (NPAC-PAC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean</td>
<td>std. error</td>
<td>mean</td>
</tr>
<tr>
<td>Livestock Profile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicken</td>
<td>5.17</td>
<td>1.23</td>
<td>6.08</td>
</tr>
<tr>
<td>Others</td>
<td>1.05</td>
<td>0.86</td>
<td>0.95</td>
</tr>
<tr>
<td>Land owned</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of HH w/ No farm</td>
<td>0.44</td>
<td>0.08</td>
<td>0.08</td>
</tr>
<tr>
<td>Proportion of HH w/ Small garden</td>
<td>0.51</td>
<td>0.08</td>
<td>0.38</td>
</tr>
<tr>
<td>Proportion of HH w/ Farm</td>
<td>0.05</td>
<td>0.03</td>
<td>0.54</td>
</tr>
<tr>
<td>Expenditure Profile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of HH who spend on Food</td>
<td>1.00</td>
<td>0.00</td>
<td>0.97</td>
</tr>
<tr>
<td>Proportion of HH who spend on Water</td>
<td>0.07</td>
<td>0.04</td>
<td>0.03</td>
</tr>
<tr>
<td>Proportion of HH who spend on Education</td>
<td>0.27</td>
<td>0.07</td>
<td>0.79</td>
</tr>
<tr>
<td>Proportion of HH who spend on Health</td>
<td>0.54</td>
<td>0.08</td>
<td>0.21</td>
</tr>
<tr>
<td>Proportion of HH who spend on Agriculture</td>
<td>0.17</td>
<td>0.06</td>
<td>0.54</td>
</tr>
<tr>
<td>Credit Profile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of HH w/ debt</td>
<td>0.63</td>
<td>0.08</td>
<td>0.36</td>
</tr>
<tr>
<td>Average debt for those w/ debt</td>
<td>9474.04</td>
<td>2567.21</td>
<td>3392.86</td>
</tr>
</tbody>
</table>
### Table D3(b): Comparative Analysis

<table>
<thead>
<tr>
<th>Current household characteristics</th>
<th>Treatment (PACs) Grand Cape Mount County</th>
<th>Control (NPACs) Gbarpolu County</th>
<th>Difference in means/proportions (NPAC-PAC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean</td>
<td>std. error</td>
<td>mean</td>
</tr>
<tr>
<td>Daily HDDS (0-13), higher is better</td>
<td>3.15</td>
<td>0.26</td>
<td>4.69</td>
</tr>
<tr>
<td>Weekly HDDS (0-13), higher is better</td>
<td>5.90</td>
<td>0.39</td>
<td>7.87</td>
</tr>
<tr>
<td>Months of inadequate HH food provision (0-12), higher is worse</td>
<td>7.20</td>
<td>0.74</td>
<td>2.79</td>
</tr>
<tr>
<td>Food Insecurity Access (0-9), higher is worse</td>
<td>8.20</td>
<td>0.27</td>
<td>5.97</td>
</tr>
</tbody>
</table>

### Table D4(a): Regression Analysis Summary

<table>
<thead>
<tr>
<th>Food Insecurity Access</th>
<th>Months of inadequate Household Food Provisioning</th>
<th>Daily Household Dietary Diversity</th>
<th>Monthly Household Dietary Diversity</th>
</tr>
</thead>
<tbody>
<tr>
<td>OLS (1)</td>
<td>OLS (2)</td>
<td>OLS (3)</td>
<td>OLS (4)</td>
</tr>
<tr>
<td></td>
<td>OLS (5)</td>
<td>OLS (6)</td>
<td>OLS (7)</td>
</tr>
<tr>
<td>PAC</td>
<td>2.2616***</td>
<td>1.7836***</td>
<td>4.3967***</td>
</tr>
<tr>
<td>Remote (yes/no)</td>
<td>1.6315***</td>
<td>1.4254***</td>
<td>-0.1401</td>
</tr>
<tr>
<td># chicken owned currently</td>
<td>-0.0618*</td>
<td>0.0275</td>
<td>0.0529*</td>
</tr>
<tr>
<td>Debt (yes/no)</td>
<td>1.1956**</td>
<td>1.3912</td>
<td></td>
</tr>
<tr>
<td>Expenditure on food (yes/no)</td>
<td>3.4240</td>
<td>-2.8726*</td>
<td>-2.0964</td>
</tr>
<tr>
<td>Expenditure on agriculture (yes/no)</td>
<td></td>
<td>-1.0523</td>
<td>0.4995</td>
</tr>
</tbody>
</table>
### Table D4(b): Regression Analysis

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Food Insecurity Access (0-9)</th>
<th>Months of inadequate Household Food Provisioning (0-12)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS (1)</td>
<td>OLS (2)</td>
</tr>
<tr>
<td></td>
<td>coefficient</td>
<td>std. error</td>
</tr>
<tr>
<td>PAC</td>
<td>2.2616</td>
<td>0.5252</td>
</tr>
<tr>
<td>Remote (yes/no)</td>
<td>1.6315</td>
<td>0.5250</td>
</tr>
<tr>
<td># chicken owned currently</td>
<td>0.0618</td>
<td>0.0321</td>
</tr>
<tr>
<td>Debt (yes/no)</td>
<td>1.1956</td>
<td>0.5118</td>
</tr>
<tr>
<td>Expenditure on food (yes/no)</td>
<td>3.4240</td>
<td>2.3300</td>
</tr>
<tr>
<td>Expenditure on agriculture (yes/no)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Daily Household Dietary Diversity (0-13)</th>
<th>Monthly Household Dietary Diversity (0-13)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS (5)</td>
<td>OLS (6)</td>
</tr>
<tr>
<td></td>
<td>coefficient</td>
<td>std. error</td>
</tr>
<tr>
<td>PAC</td>
<td>-1.5820</td>
<td>0.3344</td>
</tr>
<tr>
<td>Remote (yes/no)</td>
<td>-1.4395</td>
<td>0.3343</td>
</tr>
<tr>
<td># chicken owned currently</td>
<td>0.0275</td>
<td>0.0212</td>
</tr>
<tr>
<td>Debt (yes/no)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expenditure on food (yes/no)</td>
<td>-2.8726</td>
<td>1.5371</td>
</tr>
<tr>
<td>Expenditure on agriculture (yes/no)</td>
<td>0.4995</td>
<td>0.3741</td>
</tr>
</tbody>
</table>
BIBLIOGRAPHY


Food Security and Conflict. World Bank, October 2010. 

Foreign Direct Investment in Land in West Africa. International Food Policy Research Institute, December 2011. 


http://www.foodsecurityportal.org/beria.


http://eiti.org/Liberia.


ENDNOTES

1 Liberia National Investment Commission, “Concessions in Liberia.”
2 The Impact of High Prices on Food Security in Liberia.
4 Abridged Budget Framework Paper.
5 2011 Investment Climate - Liberia.
7 “Sime Darby Increases Investment in Liberia.”
9 The State of Food and Nutrition Security in Liberia.
12 High Level Task Force on the Global Food Security Crisis Liberia Country Fiche.
15 High Level Task Force on the Global Food Security Crisis Liberia Country Fiche.
19 In November 2011 rice prices were 57% higher in Tubmanburg than in the previous year (GIEWS Country Brief: Liberia.)
20 The Impact of High Prices on Food Security in Liberia.
22 Ibid.
24 Ibid.
25 The Impact of High Prices on Food Security in Liberia.
29 Food Security and Conflict.
30 Brinkman and Hendrix, Food Insecurity and Violent Conflict: Causes, Consequences, and Addressing the Challenges.
31 Food Security and Conflict.
36 Food Security and Conflict.
38 Ibid.
40 Food Security and Conflict.
41 Foreign Direct Investment in Land in West Africa.
43 Ibid.
44 Ibid.
45 Ibid.
46 Ibid.
47 Foreign Direct Investment in Land in West Africa. IFPRI, 2011.
48 Rice, “Palm Oil Producers Face Africa Challenges.”
50 Ibid.
51 Liberia Country Note.
52 “Liberia Extractive Industries Transparency Initiative.”
53 Ibid.
54 Ibid.
56 “Liberia Extractive Industries Transparency Initiative.”
57 *Liberia Country Note.
58 *The State of Food and Nutrition Security in Liberia.
59 Saga and Collins, “Liberia, Golden VerOleum Plan to Invest $1.6 Billion in a Palm Oil Complex.”
60 “Sime Darby Increases Investment in Liberia.”
61 Sime Darby, “Sime Darby To Set Roots In Liberia.”
62 Ibid.
63 “Liberia: Vice President Boakai Impressed with Sime Darby.”
64 FAO, “Modern Oil Palm Cultivation.”
66 Yiah, *The Sustainable Development Institute (SDI) Response to Sime Darby’s February 1 “Statement on UN High Level Panel.”*
68 Webster, *A Study Looking at Health Seeking Behaviour for Diarrhoea in Rural Liberia.*
70 Webster, *A Study Looking at Health Seeking Behaviour for Diarrhoea in Rural Liberia.*
71 *Gbarpolu County Development Agenda 2008-2012.*
72 Republic of Liberia Comprehensive Food Security and Nutrition Survey.
73 *West Africa Remote Monitoring Center; Liberia.*
74 *High Level Task Force on the Global Food Security Crisis Liberia Country Fiche.*
75 Lanier, Mukpo, and Wilhelmsen, *Smell No Taste The Social Impact of Foreign Direct Investment in Liberia.*
76 Livelihoods Zoning “Plus” Activity in Liberia.
77 *West Africa Remote Monitoring Center; Liberia.*
78 Ibid.
79 Ibid.
80 *The State of Food and Nutrition Security in Liberia.*
82 Ibid.
83 *GIEWS Country Brief: Liberia.*
84 Ibid.
85 Ibid.
86 *The State of Food and Nutrition Security in Liberia.*
87 Ibid.
88 Ibid.