Everyone must eat? Liberia, Food Security and Palm Oil

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Paper presented at the International Conference on

Global Land Grabbing II

October 17-19, 2012

Organized by the Land Deals Politics Initiative (LDPI)
and hosted by the Department of Development Sociology at Cornell University, Ithaca, NY.

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September 2012

Abstract:

Asian palm oil investment in West Africa is an increasing phenomenon with broad implications for sustainable food security. The impacts of oil palm development are particularly significant for post-conflict Liberia where government, eager to utilize foreign direct investment (FDI) to reinvigorate the economy and promote development, signed a number of natural resource contracts encompassing more than 45% of the country's landmass. This paper compares baseline data and changes in food security and livelihoods surrounding one of Liberia's largest concessions, granted in 2009 to Malaysian palm oil company Sime Darby. This concession, estimated at US$3 billion in FDI over 63 years, allocates 220,000 hectares for palm oil production in one of the country's poorest regions.

This paper presents the initial findings of field research conducted in March 2012. The analysis compares household survey data, conducted in communities currently affected by appropriation of agricultural space to those that will be affected in the next year, complemented by qualitative data from community representatives, local leaders, NGOs and government. Data reveal negative impacts and opportunities for managing food insecurity and loss of livelihoods as plantation grounds expand.

This study, as the first to measure impacts of palm oil development in Liberia, reveals inequitable substitutions of food security and livelihoods in developing areas. The authors recommend that government incorporate stronger measures of food security and livelihoods in national Poverty Reduction Strategies and future concession negotiations to prevent conflict resurgence.

Introduction:

Liberia remains one the poorest, aid dependent nations. The Liberian civil wars marked two of Africa's most bloody conflicts, killing over 200,000 people and displacing millions. Since emerging from the violence in 2003, under the leadership of Ellen Johnson Sirleaf, Liberia's rich mineral and agricultural resources have attracted significant foreign direct investment (FDI) totaling more than US$19 billion. Eager to utilize sustainable investment as a tool to bolster regional security, reinvigorate the economy and promote development, officials have signed "concessions —natural resource contracts— which encompass more than 45% of the country's landmass.

When regulated and implemented as part of a well-defined national development strategy, FDI can contribute to poverty reduction and peace building in post conflict states. However, dependence on natural resources can result in the "resource curse," where mismanaged FDI can decrease economic growth, magnify food insecurity and exacerbate the weaknesses of a fragile state. As Liberia moves into the second phase of its national Poverty Reduction Strategy (PRS) implementing a robust framework for utilizing FDI and planning for food security is critical. Concession stipulations that

limit land availability, ban traditional slash-and-burn farming and curtail charcoal production exacerbate chronic food insecurity. In some instances, acts of social unrest as well as acts of violence against oil palm plantation staff have been documented.

These tensions are particularly evident in one of Liberia's largest concessions, granted in 2009 to Sime Darby, a Malaysian palm oil company. Estimated at US$3 billion with the potential to generate 22,000 jobs, the contract allocated 220,000 hectares for 63 years to palm oil production in {insert name of region}, one of the country's poorest regions. As no studies in Liberia have measured the impact of natural resource concessions, specifically palm oil plantation development, on household food security and livelihoods, four Master in Public Administration in Development Practice candidates traveled to Liberia during the spring 2011 to quantify and gather qualitative data about food security and livelihoods in project affected communities (PACs) in the Sime Darby plantation concession area.

Background

Food Security and World Market Demand Implications
The world is currently at 7 billion people. At current estimates, the earth's population will reach 9 billion by 2050. To meet the rising demand for food, agricultural production must increase by 60-70% over the next 35-40 years.(2, 8)

Food prices are inherently volatile. As demand for food is relatively inelastic, small changes in supply can greatly influence prices. Staple food price variations can also impact the cost of basic food and increase real prices of food commodities.(1) Although the global cereal price index has declined since fuel and grain price spikes in 2008, global rice prices have countered downward market pressures and increased 19% in Q2-2012. (1) 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. (2) Import-dependent and/or small countries, as is the case in Liberia, will likely be more sensitive to changes in food prices because, unlike large economies, there is limited capacity to insulate their economies and adjust for shocks through trade and fiscal policy. Higher food prices and price volatility are expected to be heavily influenced by stronger 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 price and volatility by negatively impacting food supply and (inherently) nutrition.(3,5)

During the 2008 global food price spike, undernourishment increased by 6.8%, or 63 million people globally.(5) In developing countries, staples contribute 40-80% of daily energy intake for vulnerable populations which often have food baskets composed of very few food items.(1) Therefore, even minimal increases in staple food prices such as rice, the staple in Liberia, can have a magnified impact on household purchasing power and overall food consumption.

Lack of food has also historically been closely associated with social unrest and conflict.(5) During the world food price spikes in 2007-2008, food protests and riots broke out in 48 countries.(6) Fragile states, such as import dependent, politically weak and post-conflict states like Liberia, often have limited capacity to respond to conflict driven by more systemic, complex problems such as food insecurity. This is particularly the case in rural areas that are farther from oversight and tend to be poorer and more dependent on agriculture for both food and livelihoods.(5) Thus, the

anticipated increase in challenges to ensuring food security creates a risk of civil unrest in many regions. Furthermore, high food and energy prices are creating competitive pressures on land use for mass agricultural food and biofuel.

From governments to private industries representing developed and emerging markets, foreign investors are buying lands in developing countries in an effort to secure long-term food or raw material supplies for their host country. Following the 2007–08 rise in commodity prices, the demand for land has consistently increased (see Graph B1-B4). Two-thirds of the demand for land is in Africa, where "demand in 2009 alone was equivalent to more than 20 years of previous land expansion." (9) As world demand for vegetable oils is expected to increase by 36% from 2007 to 2017, with biofuels accounting for one-third of the demand increase, a large portion of this expansion is for palm oil production. (8)

Since 1965, the World Bank has granted nearly US$2 billion to support over 45 oil palm related projects in 12 countries in Africa, Latin America, and Southeast Asia. (8) 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. (8) However, the rising demand for food coupled with growing demand for non-food products such as soaps, cosmetics and, in particular, biofuel – is creating 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).(8) The current price of crude palm oil is 183% above the long run price trend. (8)

Indonesia and Malaysia are the world's largest exporters of palm oil, accounting for nearly 90% in 2009. (9) 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. Achieving this goal requires devoting up to 300,000 ha of new land to oil palm annually over the next 10 years. Counter to the explosion of the industry in Indonesia, the expansion of oil palm production in Malaysia is expected to slowdown in light of the limited domestic land availability. (8)

Liberia: Rice and Food Security

Since 2003, Liberia has been weathering a challenging road to recovery. During the 14-year civil war, GDP fell 90% between 1987 and 1995. In 2005, when President Sirleaf was elected, the average income was 25% of what it had been in 1987. (18) One of the poorest countries in the world, imports still provide for 60% of the nation's food needs. (11) Approximately 68% of the rural and 55% of the urban population live on less than $1 a day.

Maternal mortality is one of the highest in the world. Malnutrition kills 4,600 (44%) children and contributes $40 million in lost economic productivity annually. (12) Stunting, underweight and acute malnourishment affect approximately 39%, 27% and 7% of children under five (respectively). Unemployment is estimated at 85% and 68% of human capital is largely unskilled labor due to the low access to education during the conflict. (10) (see Graph B9, B10 and Table C1) The majority of those that do have an income are engaged in vulnerable employment as subsistence level farmers. Even in instances where rural households engage in subsistence food production, households still spend two-thirds of their income on food. (12)

Food insecurity is unfortunately familiar for most throughout Liberia. The West African nation is considered a hunger hotspot with an "extremely alarming" state of hunger. (15) With higher rates in rural areas, 14.3% (0.5 million persons) are food insecure while 34.9 % are considered highly vulnerable to food insecurity. (10) (see Map A1 and A6) During the food price spikes from 2007-2008, the cost of an average food basket for a typical household increased by approximately 25%. (12) In 2012, no major regional changes in fuel prices were reported *except in Liberia*, where fuel prices increased 7% from May last year. Increased cost of transportation, in addition to the depreciation of the local currency, are putting upward pressure on domestic food prices. (1)

Rice is the primary staple for the Liberian diet. A meal is "not a meal" without rice. Smallholder, subsistence-level agriculture is centered on rice and cassava production and fishing. (see Maps A2, A3, A4 and A5 a,b)Rice consumption provides about 28% of dietary needs and purchases of rice account for 25% of expenditure of urban households and 17% for rural households. (12)

Nationally, food and fuel account for half of Liberia's total imports - making it one of Africa's most vulnerable countries to macroeconomic impacts due to higher prices. (13) Of Liberia's food imports, rice constitutes 65%. (12) This year imported rice is approximately 20-30% higher than in 2011, partially because China's restrictions on rice exports in 2011 resulted in a shift in consumption from Chinese butter rice to mainly parboiled rice (a Liberian import variety staple). Consistent with projections, from April 2011 and April 2012 the price of a 50kg bag of imported, parboiled rice was (on average) 31% higher than last year. (1) Rice purchased by the cup is 32% more expensive than by bag – an additional burden for vulnerable groups which cannot afford to purchase in bulk. (13) (see Graph B6-B7) These recent developments may particularly impact casual laborers in the agricultural and construction sectors as recent estimates show that their trade and purchasing power has diminished up to 40% due to increases in rice prices. (20) Recent estimates suggest that a 20% increase in rice prices will increase poverty by 4%. (12)

In Liberia, the price of 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 the potentially destabilizing effects. However, "despite the return of global prices to near previous levels, rice prices remain high and are of acute political focus." (11) 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."(12) Contrary to the appearance of a precariously destitute economy, investment in Liberia has been consistently robust.

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) (21) This marked growth is in line with Liberia's 2030 strategy and driven by foreign direct investment in mining, rubber, timber and palm oil.

Concession-related FDI has already increased considerably over recent years, from USD 153 million in 2009 to USD 431 million in 2011. This is expected to increase further to USD 821 million in 2012 and USD 903 million in 2013. The government projects total overseas development assistance, including UNMIL, at USD 1 035 million in FY 2011/12 with a slight decrease to USD 923 million in FY 2012/13.(21)

Liberia's climate is ideal for palm oil production. It itshome to approximately 40% of West Africa's rainforest. (18) In September 2010, Golden Veroleum Liberia, a subsidiary of the Indonesian conglomerate Sinar Mas, investment an estimated US$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. (23) The previous year, Sime Darby, a Malaysian palm oil producer, signed a contract promising investment of approximately US$3 billion dollars in exchange for a 63-year concession to develop 220,000-hectars of oil palm trees in Grand Cape Mount, Bomi, and Gbarpolu counties. (24,26) The initial plantings cover a 5,000-hectare plot of land, but by 2020 the company plans on clearing and planting over 120,000 hectares. (24,25)[1]

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 rates of unemployment. However, oil palm seedlings are required to remain a container in a nursery for approximately 16 to 18 months before it is ready to be planted in the palm grove. Not until approximately 3-4 years after it has been planted, does oil palm begin to produce fruit. Thus, in the interim, the land is cleared and remains relatively barren while there is low consistent, full-time employment as there is nothing to harvest. (7)

Survey District Overview

Gbarpolu

Known as Lower Lofa until 2001, Gbarpolu County is a 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 Chiefdom, most community members have Tribal Land Rights. Communities consisting primarily of farmers, predominately growing upland rice, cassava and vegetables. Peripheral micro and small enterprise opportunities, such as making liquor distilled from cane, making coal, etc., provide livelihood diversification opportunities. Additionally, a substantial portion of household cash income comes from traded bush-meat which is hunted in the densely biodiverse forest. The main FDI industries in the district are timber, diamonds and gold, with a few other mining exploration sites. Market access is relatively low due to the poor state of infrastructure. Surveys show that the average travel time to market in Gbarpolu County is 6 hours, far above the national average of 2.5 hours. (20) Low infrastructure exacerbates the low access to healthcare. Gbarpolu is slotted to be the next district under the concession contract with Sime Darby to be cleared and cultivated for oil palm. It is estimated that between 42-48% (approximately 4,300 sq km) of the district will be cleared for planting in the short-to-medium term.

Grand Cape Mount

Located approximately 2 hours from Monrovia, Grand Cape Mount County has a stressed history – first under Guthrie and Goodrich rubber companies and subsequently a location of intense fighting during the war. The county is afforded a major tarmac road and many of the communities are concentrated. Though rubber tapping has historically been a major source of livelihood, Grand Cape Mount's Gola Forest also provides an environment for hunting for some communities. Communities have also traditionally farmed rice, vegetables and fished. Grand Cape Mount was the first area that was cleared for cultivation of oil palm under the concession agreement with Sime Darby.

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[1] 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.

Liberia has a tumultuous history and faces a challenging recovery ahead. It is evident that the nation is highly sensitive to changes in price of food (particularly rice) and fuel. With respect to the rapidly changing landscape underway via new foreign direct investment, there is minimal to no data available to provide a foundation to better understand the morphing, complex environment. Therefore we must ask: How has land appropriation for oil palm production under Sime Darby impacted food security in West and Northwest Liberia?

Methodology

Research Objectives

In order to address this 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 responding on food security and livelihood questions for 2 years ago as well.

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?

Theoretical Framework

The following 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 and livelihoods in the representative communities.

1. *Food Security*: Household Food Security Access Scale (HFIAS)
   Measures the prevalence of food insecurity (access) and is used specifically to detect changes in food security situation of a population over time

2. *Food Availability*: Months of Adequate Household Food Provisioning (MAHFP)
   Captures households' ability to address their food needs as a measure of household food access

3. *Dietary Diversity*: Household Dietary Diversity Score (HDDS)
   Measures household diet patterns, as the number of food groups a household consumes over a time period

Assessment Methodology

The following research methods were used to conduct the research

- **Households Surveys** were used to gather detailed quantitative information on household food security. The area covered by the Palm Oil 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 chosen from each, one with access to roads and markets (Community 1), and the other with low or no access to paved roads (Community 2). 20 households were randomly chosen within each of these communities.
  This *stratified sampling* thus allowed for 80 household food security and livelihood surveys in total, 40 each from PACs and NPACs.
- **Focus Groups** with men, women and "youth" were facilitated to understand local perceptions of household food security and livelihoods, with qualitative in-depth answers to supplement quantitative data.
- **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 all involved stakeholders were incorporated in our analysis.

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 responses from Project Affected Communities (PACs) with those from non Project Affected Communities (NPACs).

The Temporal Analysis was limited to Project Affected Communities, PACs, as there was no significant change in indicators over the two year period in the non-Project Affected Communities, NPACs, (see Chart C1 a, b, c). 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 t-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 Project Affected Communities to control communities which have not been affected by the project yet. This analysis focused on our core research questions on food security and livelihood, with regression analysis of three indicators of food security to infer the relationship, if any, between the project and food security. In addition to the regression analysis, t-tests and graphical analysis was also conducted.

Findings

Quantitative Analysis and Trends

The section below describes the findings of the quantitative analyses, with the numerical findings summarized in Chart C2 a, b, c.

Temporal Analysis

The analysis exhibits a direct impact of land appropriation on land ownership in the PACs, with a statistically significant decrease in the size of farm land owned in PACs over the two years ago (t-test p-value = 0.000). On average, the proportion of households who don't own or farm any land increased from 10% to 49%, with the impact in the PAC Community 2 being much more drastic (changed from 5% to 60%). Significantly, over the 2 year period, the proportion of households who owned a farm (distinguished from a home garden) went from 62% to less than 5%.

On the other hand, on average, the livestock profile at PACs (measured by poultry, the most common livestock type) remained fairly constant, showing no significant trend in either direction. Expenditure patterns however did change, with a statistically significant decrease in proportion of households who spend on education (p-value = 0.0001) and agriculture (p-value = 0.0143) 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 most significant finding of the comparative analysis is the difference in Food Security indicators between the PACs and NPACs. Specifically, regression analysis (after controlling for the remoteness of communities and size of farm land owned 2 years ago) indicates that on average, NPACs have a 1.577 unit higher Daily Household Diet Diversity Score (DHDDS) and a 2.001higher Weekly Household Diet Diversity Score (WHDDS) than PACs, keeping all other variables constant. In general, NPACs have a 53% higher DHDDS and 38% higher WHDDS than PACs. These indicate a statistically significant (p value = 0.000, R^2 = 0.35 for DHHDS, and p value = 0.000, R^2 = 0.27 for WHHDS) inability to purchase a diverse (and minimally nutritious) diet in communities affected by the project.

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 4.409 more months in a year than those in NPACs (controlling for remoteness and land owned 2 years ago). This difference is statistically significant (p value = 0.000, R^2 = 0.25). On average, households in PACs have inadequate food in 7 of the past 12 months, whereas households in NPACs have experienced this in only 2.67 of the past 12 months. In addition, PACs score 2.27 higher than NPACs on the on the Food Insecurity Access (FIA) Index, which measures severity of food insecurity in communities (statistically significant with p value = 0.000, R^2 = 0.29).. The average FIA score in PACs is 8.28/9.0, indicating a highly food insecure environment, while households in NPACs, on the other hand, score 5.96, indicating a medium food insecure environment. **These significant differences in indicators exhibits that the land appropriation for the Sime Darby Palm Oil Plantation have had a substantial impact on communities' food security**

In addition, socioeconomic conditions in the two sets of communities also exhibit significant differences. T tests reveal a significantly (p value = 0.0068) higher debt prevalence PAC households as compared toNPACs.. 58% 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 37% households in the NPACs are in debt. The amount of average household debt in PACs is also more than double

that of non-PAC households, at Liberian$ 8,523.33 (US$115) as opposed to L$ 3,812.50 (US$50) 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 at PACs

And lastly, the land profile at NPACs is also more stable than PACs, with 51% 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 49% in PACs and only slightly above 5% 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

Gbarpolu County is a sparsely populated, densely forested, low access region of Liberia. Access to healthcare is quite poor and malaria, seasonal diarrhea and maternal mortality seem to be the primary health challenges. Education is moderately accessible, though the quality is questionable. Access to water via streams, rivers and a few hand-pumps per village seemed sufficient for community needs. It should be noted that water quality was not able to be examined. However, given Access to safe drinking water in rural areas is only 57 percent, it would not be surprising if the water quality was poor. (14)

Low infrastructure quality upon departing from Tubmanburg (the nearest large town) significantly hinders regional travel and increases transportation cost due to time and fuel 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 to Bopolu (the county capital), the region is significantly cut off from other counties during the two rainy seasons. Higher transportation costs put upward pressure on food prices in the market during these times. Overall, food prices in the market seem to be increasing mildly accept for rice which is noticeably increasing over the last two years.

With respect to food security, despite evidence of stunting among the adult population who largely 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 where the majority practice slash and burn agriculture. In NPAC Community 1, a local agriculture technician is assisting improved sedentary agricultural production via intensification utilizing piggery liquid waste for fertilizer. Households grow most of their rice and vegetables. Almost every household has chickens and in some instances, goats and sheep. In a few instances, predominately more in NPAC Community 1, some households even 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 extremely important to the communities surveyed. These activities can provide an important source of protein or be sold at the weekly market nearby. Access to the forests and streams also help households weather food shocks.

Challenges to access to food are typically expected threats to agriculture which can create a small or mildly exacerbate a household's hunger season. However, these shocks did not seem to significantly affect food security as community support helped mitigate the impact. In the instance of chicken

disease infecting a household, a neighbor would typically lend the affected house a pair of chickens to help replenish their flock. Should a crop be destroyed by a bush cows or weather variability, households would often be able to subsist from hunting and gathering in the forest to eat and 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, neighbors sometimes take turns sharing small portions of their meals. There are also a few limited cases, again more closely correlated with widows, where adults in the household may periodically eat less, skip a meal(s).

Diversity of livelihood sources is also vital to household food security. In Gbarpolu there seems to be a moderate level of entrepreneurship and micro-enterprises. Recently, a women's palm oil seller co-operative was established. Technically skilled people, such as a mechanic, carpenter and tailor, sell their services. Many women also grow cassava and make gari to sell in the market. In NPAC Community 1, some cane farmers mill and distill their cane juice and then sell it locally. These additional income opportunities for households were reflected in a higher number of noticeable investments in household's homes, such as improved zinc roofs.

Although the communities in Gbarpolu County serve as control communities, there are impending changes to land allocation which are 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 oil palms. At the time of writing this report, the community's leaders were still in conversation with the government as how to best allocate land to comply with the concession agreement. However, given the size of the concession of the county, it is inherent that land allocation, land management and access to land will change. 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 not possible to definitively predict how they changes 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

Grand Cape Mount County presents a very complex case as geography, infrastructure and temporal degrees of impact by oil palm operations vary. For communities living near the large tarmac 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 main road have lower access to markets, healthcare and education. PAC Community 1 and PAC Community 2 fit the profile of the former and later (respectively).

However, both communities unanimously agree that there has been a significant decrease, and in some instance elimination, in access to land and an acute reduction in ability to grow food. Currently both communities have limited to no forest reserves, experiencing a significant to extreme reduction since oil palm operations began. This has negatively impacted access to sources of protein by reducing the ability to hunt bushmeat.

For both communities, access to water has noticeably declined. Many respondents suspected that the act of the company clearing the trees and deforesting close to the river (an infringement on the riparian zone for which Sime Darby was fined by the Liberian Environmental Protection Agency) have dried the land. This hypothesis was supported by a few village wells which had gone dry since the forest had been cleared. Community members also perceived that the river and local streams where markedly lower than their observations over the last several years and replied that they now

had to spend twice as long walking to gather water than in previous years. Respondents also are experiencing a noticeable reduction in the amount of fish they consume (a primary source of protein) as the fish population has reduced.

Based on focus group and household responses, access to healthcare is quite poor. Malaria, seasonal diarrhea, maternal mortality and, in many cases increasingly common, malnutrition seems to be the primary health challenges. Almost every respondent confirmed that food prices are continuously increasing as well as the price of fuel, particularly biofuel (such as charcoal). This would be consistent with some of the recent estimates. Where July 2012, gasoline prices were slightly lower, prices for charcoal and other traded goods were approximately 20% higher than in May. (14) For those community members who make coal as a source of livelihood also expressed concern that the trees they have been making coal from are expected to soon run out.

PAC Community 1, having higher market access, is more densely populated and experiencing increasing rates of migration to the area as people are looking for jobs with Sime Darby. The increased migration not only enhances competition for jobs but may also be putting upward pressure on food prices as demand increases. For many that have been able to find either casual labor or employment with Sime Darby, livelihoods, on average, have improved due to a consistent source of income, weekly rice subsidy and the ability to access the company clinic, which is strictly for Sime Darby employees (i.e. not inclusive of casual day laborers). Conversely, some employees expressed a decrease in livelihood as corruption costs some employees more for their weekly rice subsidy and the negative impact of the reduced access to land and agricultural production outweighs the employment opportunity. Surprisingly, there may be more children benefitting from the Sime Darby school as households who have an employed family member will often "adopt" non-employee children for enrollment purposes. However, the quality of education is questionable, especially considering the inflation of class sizes, and there have been reports of corruption by teachers demanding informal school fees.

PAC Community 2, having lower market access, has been acutely affected by, in many cases, an elimination of their agricultural production areas. In this community, there seems to be much lower opportunities for members to become Sime Darby employees. Thus, the reduction in livelihood income is not offset by another opportunity. During the time of the survey, family consumption and dietary diversity was almost entirely dependent on cassava (a non-preferred food compared to rice) which was being gathered behind the Sime Darby tractors tilling the communities' 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 seemed to increase in order to support the increased need to forage for cassava and process into gari (granular cassava flour) which could be consumed or sold at a market. When surveying community members, concern was also expressed when they estimated that the cassava in the fields they were gathering behind the tractors would run-out by late May or early June. The culmination of community fears erupted in February 2012 when members of PAC Community 1, PAC Community 2 and surrounding communities in Grand Cape Mount stole 15 pieces of heavy machinery from Sime Darby and protested the decline of their living conditions.

Discussion

Liberia is a post-conflict, resource-rich nation at the cross-road of a complex history and a promising future. Though the path the nation forges will not be with difficulty, the challenges regarding international food and fuel price behavior adds an additional layer of complexity. Liberia's

status as a food insecure state with a high fuel and food price sensitivity to world market prices (particularly with respect to world market prices for rice) could undermine the fragility of the state unless timely action to mitigate expected prices shocks by improving food security via targets interventions.

The government has identified foreign direct investment in the nation's natural resources as a prime opportunity to stabilize the nation financially by bringing in large sums revenue of revenue. Palm oil has been identified by the government as an ideal investment as the large plantations would provide employment and is in line with 'agricultural investment'.

For investors, Liberia has an ideal climate and a large amount of land available for a relatively good price, making it attractive despite its history of conflict. Many investors have recently been buying up land for agricultural purposes in various developing countries, especially in Africa, since the food price spikes in 2008. The world market price for palm oil is only expected to increase as demand for palm oil for food and biofuels is expected to increase. This is particularly a lucrative investment for companies like Sime Darby which are operating domestically in countries with increasing land scarcity.

Though seemingly a 'silver bullet' of development investment, it is the communities affected by the concession which will directly feel the positive or negative externalities. As the majority of community members are employed by agriculture, and given the high unemployment rate, increasing food and fuel prices, marginalized communities, a significant change in access to food and food security has the potential to have a catalytic, negative impact which may devolve into violence.

This research project collectedbasic data on food security and the impact changes in land allocation food security in order to enable the government, communities and civil society to begin monitoring the changes (if any) in food security in the concession areas intended for palm oil production in Grand Cape Mount and Gbarpolu counties. The study also provides data and basic trends on food security on regions which are not currently a primary area of focus of international aid, IGO or NGO agricultural technical assistance.

The research team does recognize that there are some limitations to the original survey design as it was contingent on expected funding to support enumerators. However, in order to adjust for reduced budget size, the four researchers decided to enumerate 80 households. Thus, the sample size was restricted. Findings also intend to capture food security data at present and relies on respondents ability to recall information. However, given that there is no current or and limited historical data available from reputable organization to benchmark findings, the researchers find the responses reasonably consistent and qualitative data gathered sufficient to substantiate findings while creating value to the examination of food security in the region.

The findings detailed in the previous section clearly indicate a cause for concern for food security for the PACs in Grand Cape Mount. This conclusion is primarily evident in the reduction of overall dietary diversity, and an increase in food insecurity of community members accompanied by a decrease in access to livelihood diversity. The latter is primarily an effect of the reallocation, and decrease in access to land for household agricultural consumption which assists households weather food shocks. Additionally, the increase in 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 region, increases stress on demand for available resources and pushes upward pressure on prices of food.

With respect to Gbarpolu County, which at present appears relatively food secure, there are many opportunities to learn from the lessons that are transpiring in Grand Cape Mount. It is inherent that land allocation and management will change. To what extent and how is the area of opportunity which the community, government and company 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. (10) To ensure that this agreement is fulfilled, the company and government must explore interventions which will assist changes in livelihoods until the gestation period of the oil palms is over and the palms begin to fruit.

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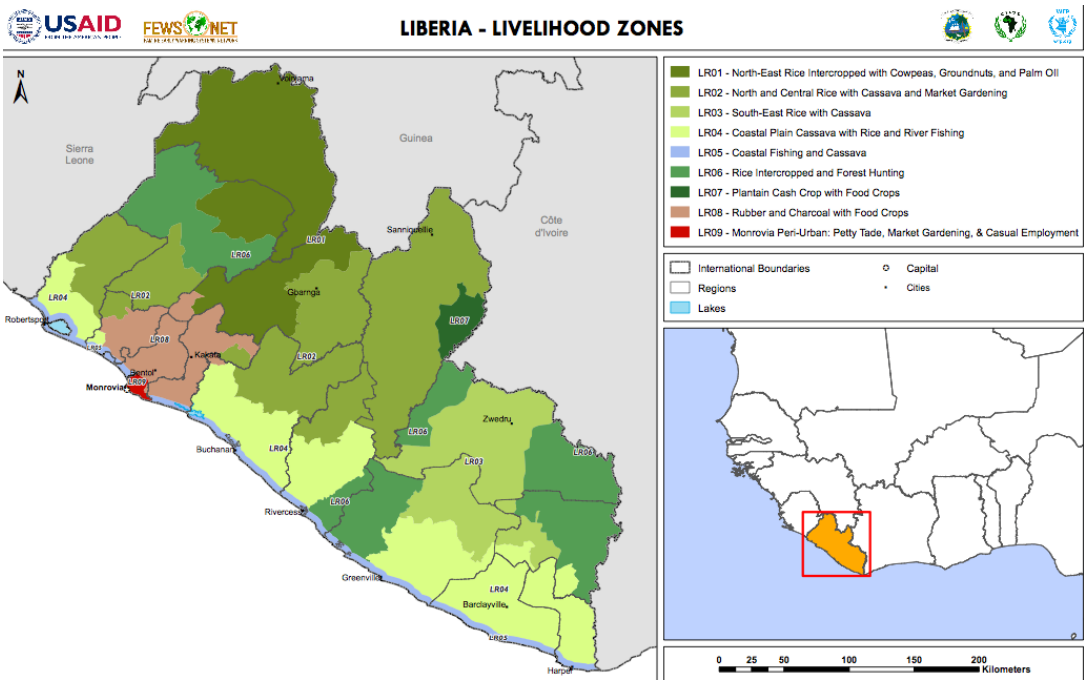
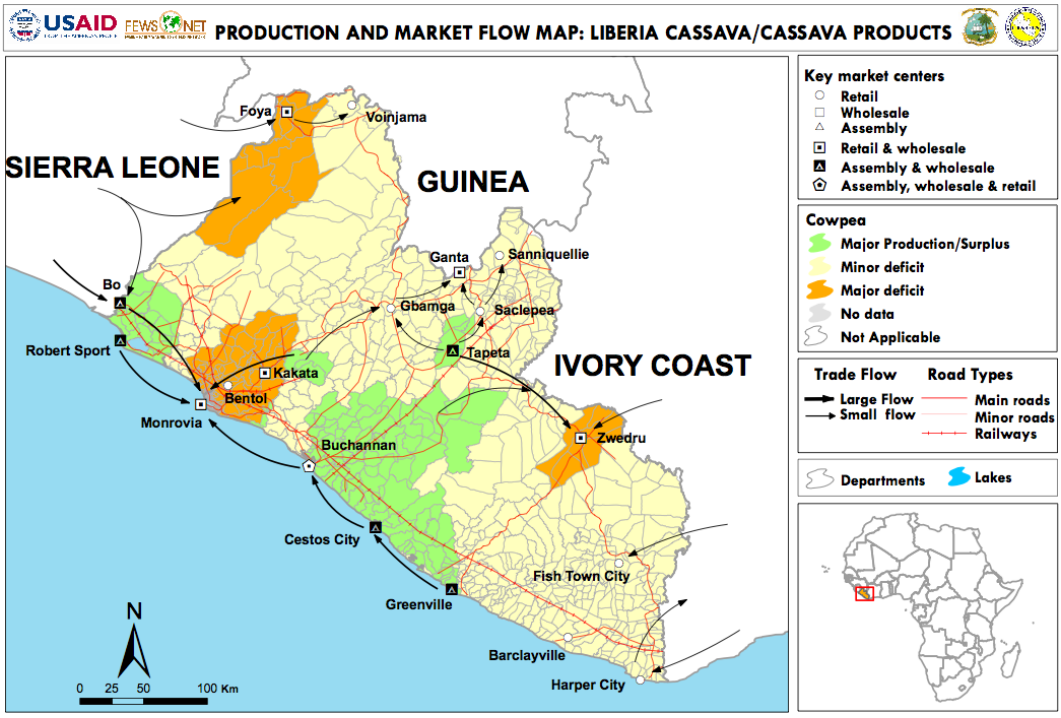
Appendix A: Maps

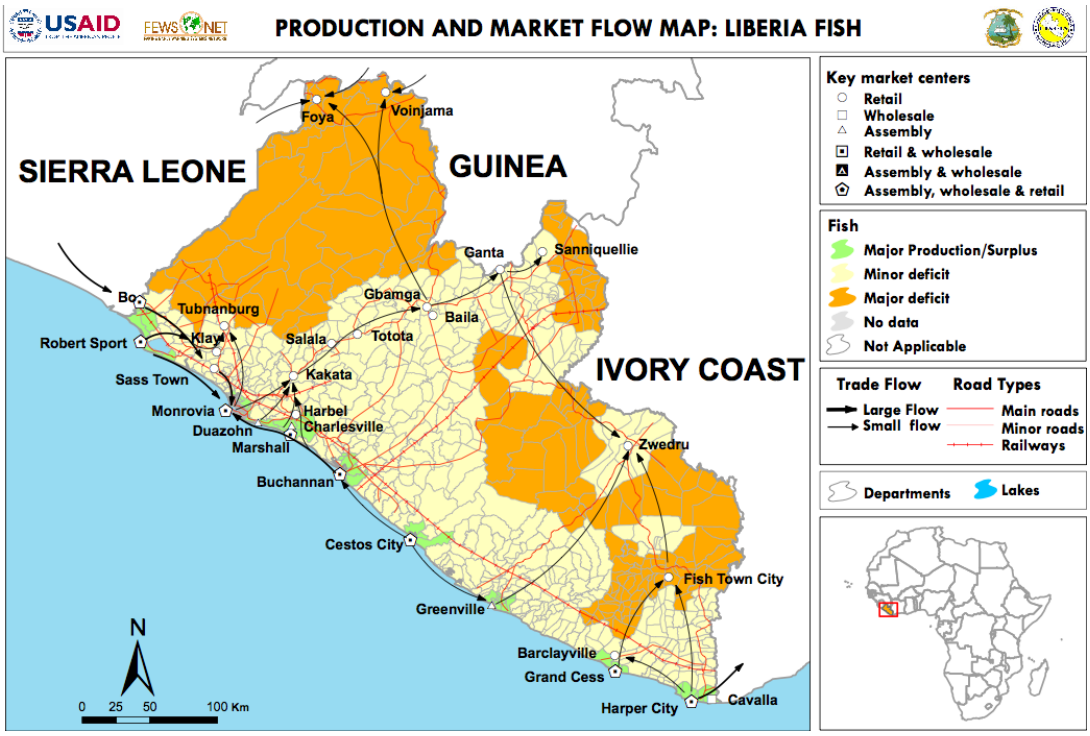
A1: Liberia Livelihood Zones (17)



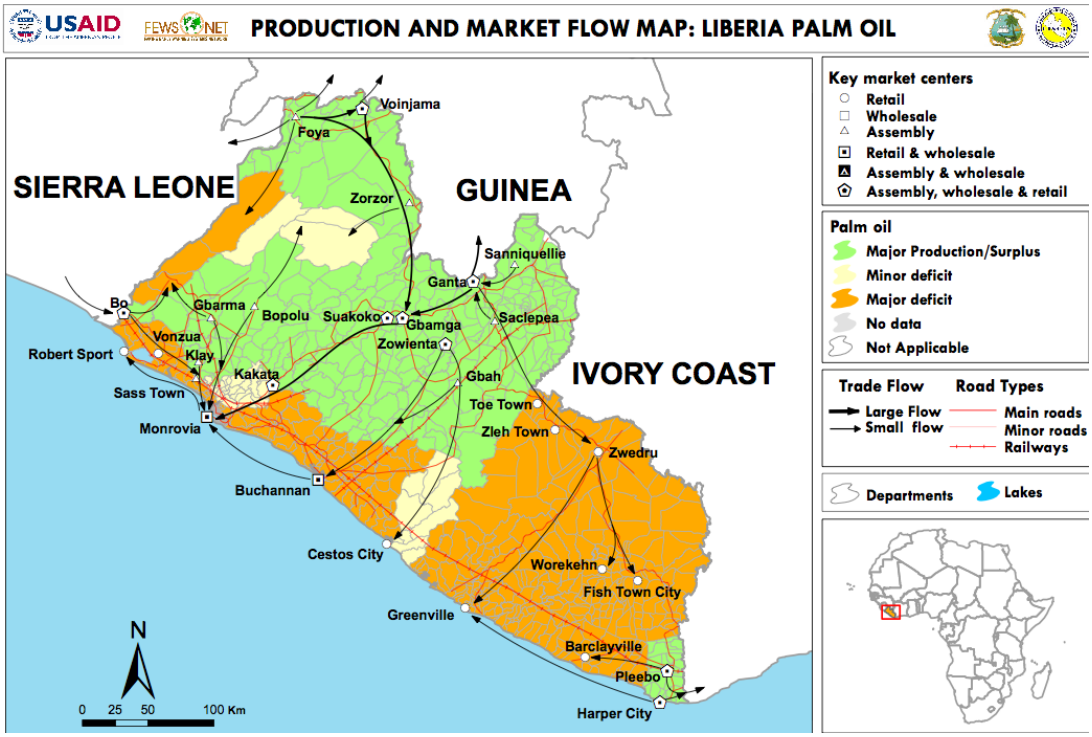
A2: Liberia Production and Markets Flows: Cassava Products (14)



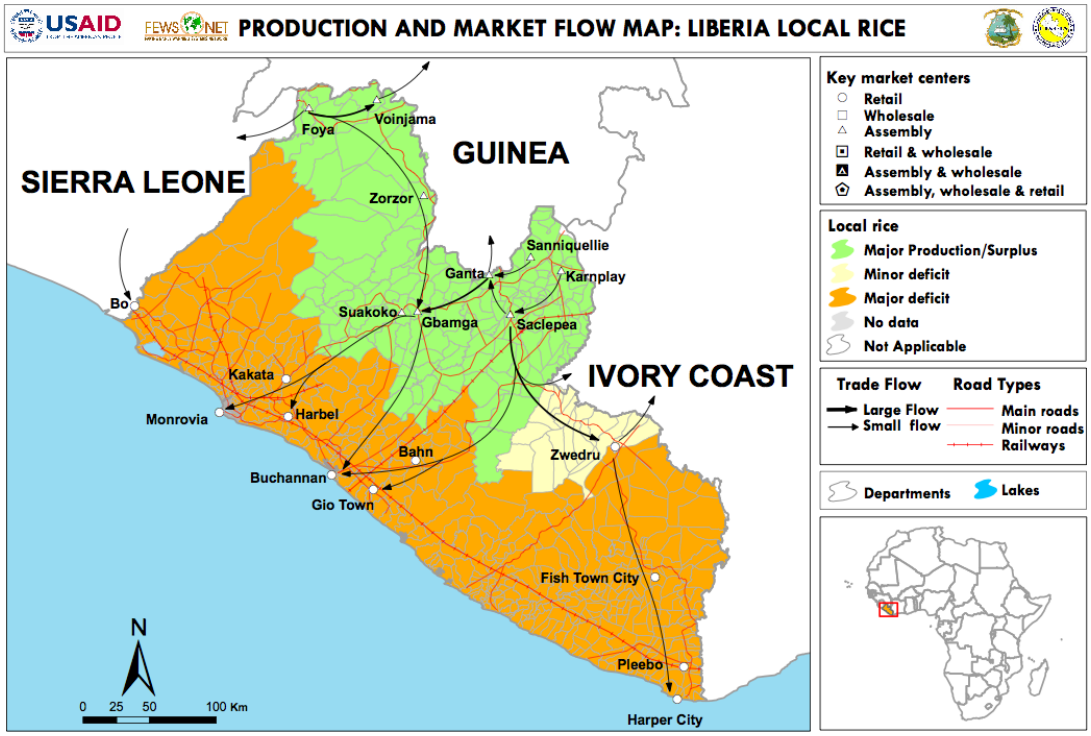
A3: Liberia Production and Markets Flows: Fish (14)



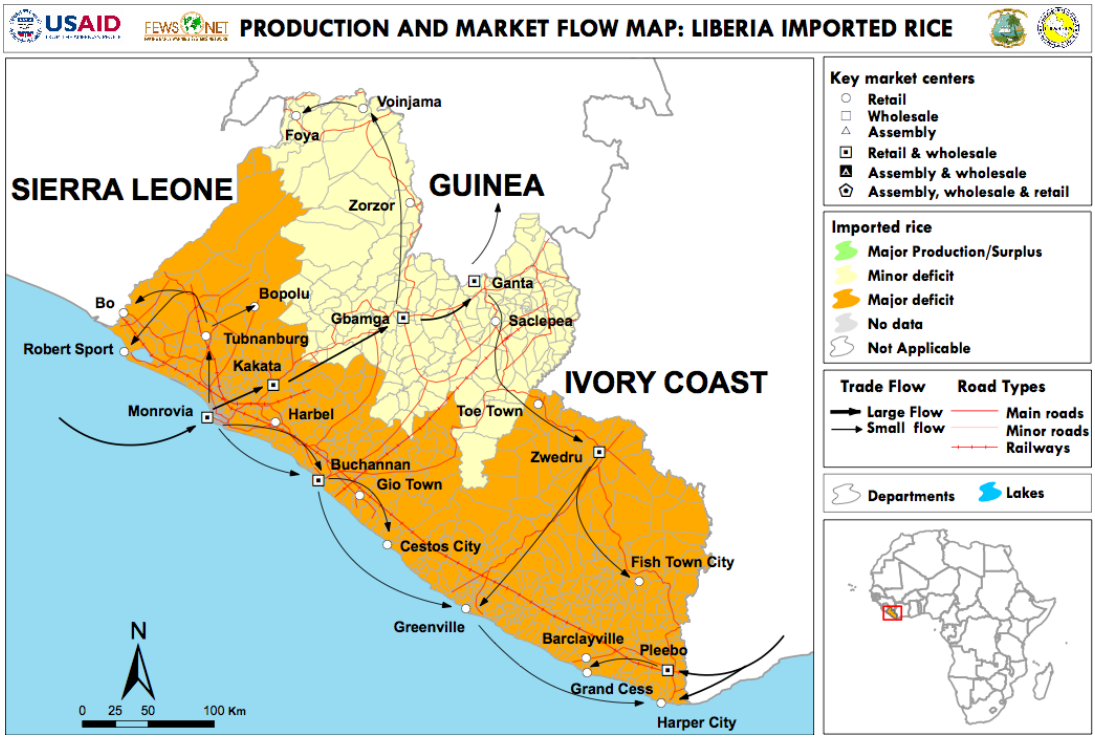
A4: Liberia Production and Markets Flows: Palm Oil (14)



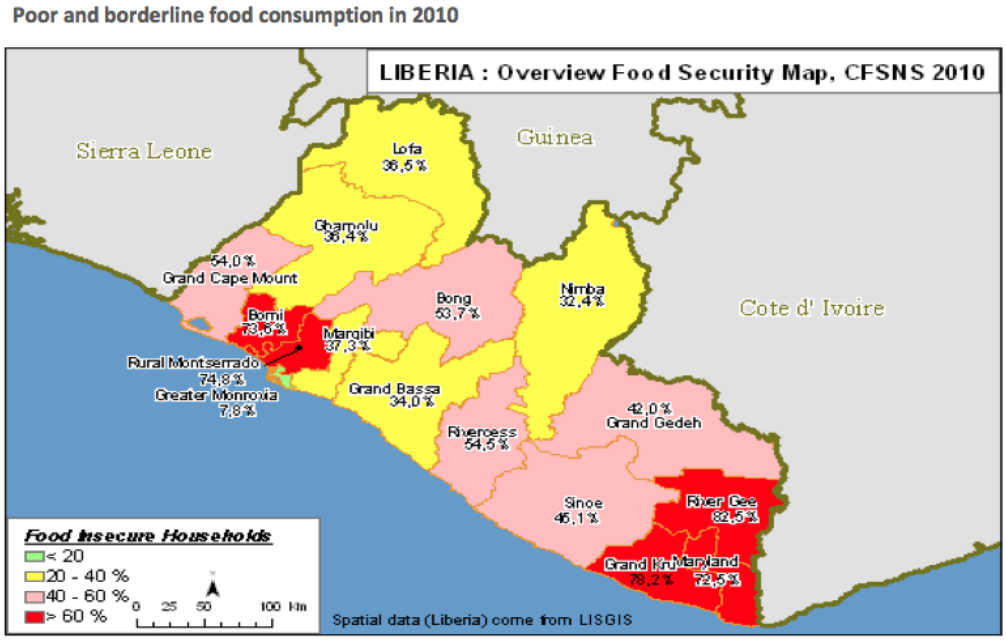
A5(a): Liberia Production and Markets Flows: Local Rice (14)



A5(b): Liberia Production and Markets Flows: Imported Rice (14)

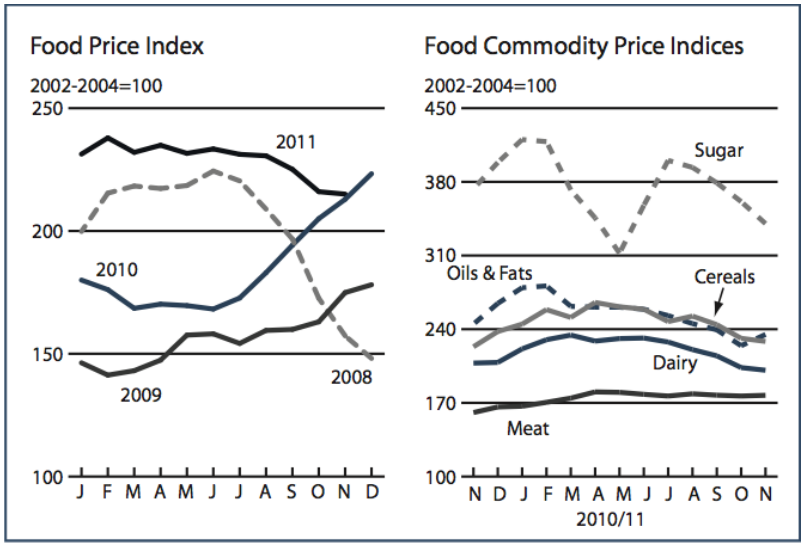


A6: Liberia Food Security Map (18)



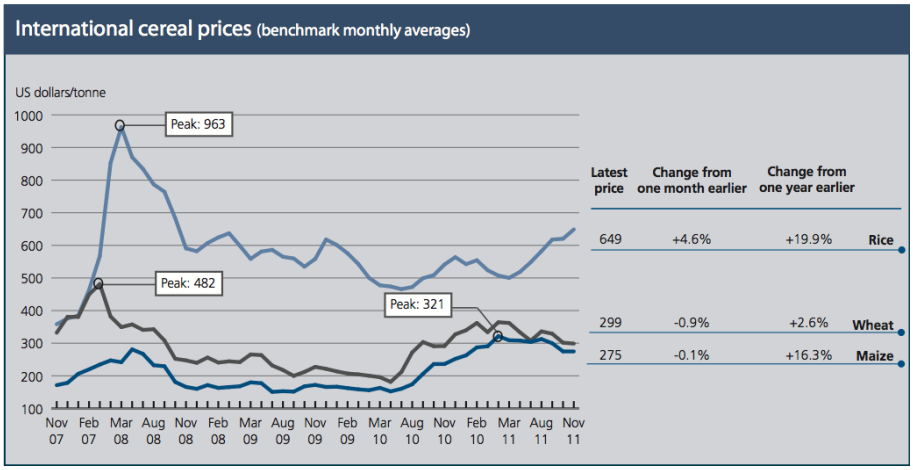
Appendix B: Graphs

B1: World Food Price Indices (1)

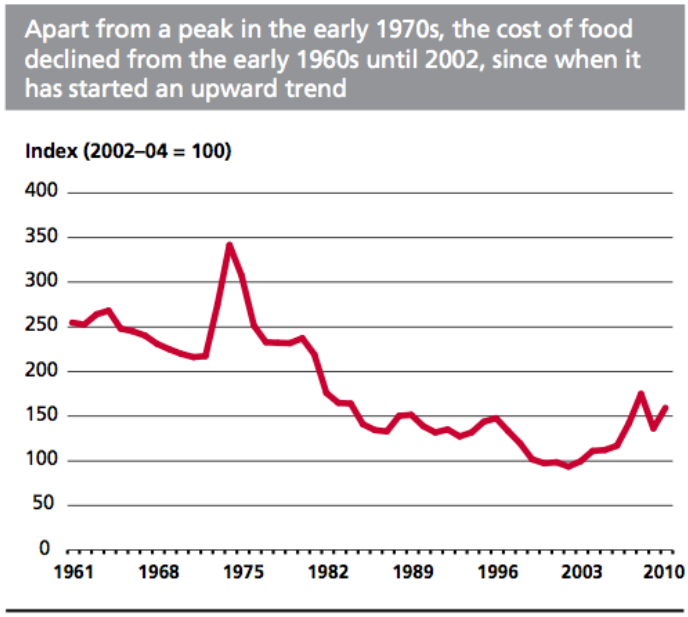


B2: FAO Food Price Index (1)

B3: International Cereal Prices (1)

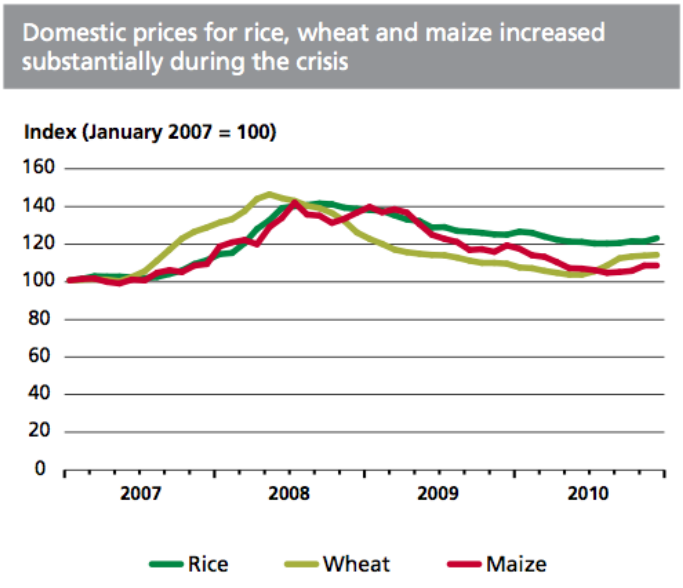


B4: FAO Food Price Index (1)



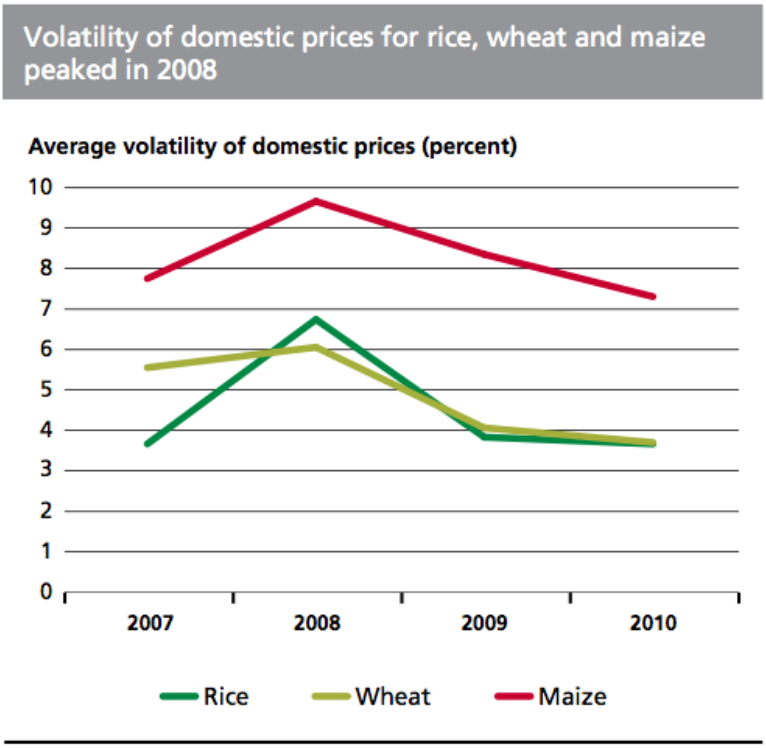
Note: FAO Food Price Index, adjusted for inflation, 1961–2010, calculated using international prices for cereals, oilseeds, meats, and dairy and sugar products. The official FAO Food Price Index has been calculated since only 1990; in this figure it has been extended back to 1961 using proxy price information. The index measures movements in international prices, not domestic prices. The United States gross domestic product deflator is used to express the Food Price Index in real rather than nominal terms.
Source: FAO.

B5: Domestic Rice, Wheat, Maize Price Index (16)



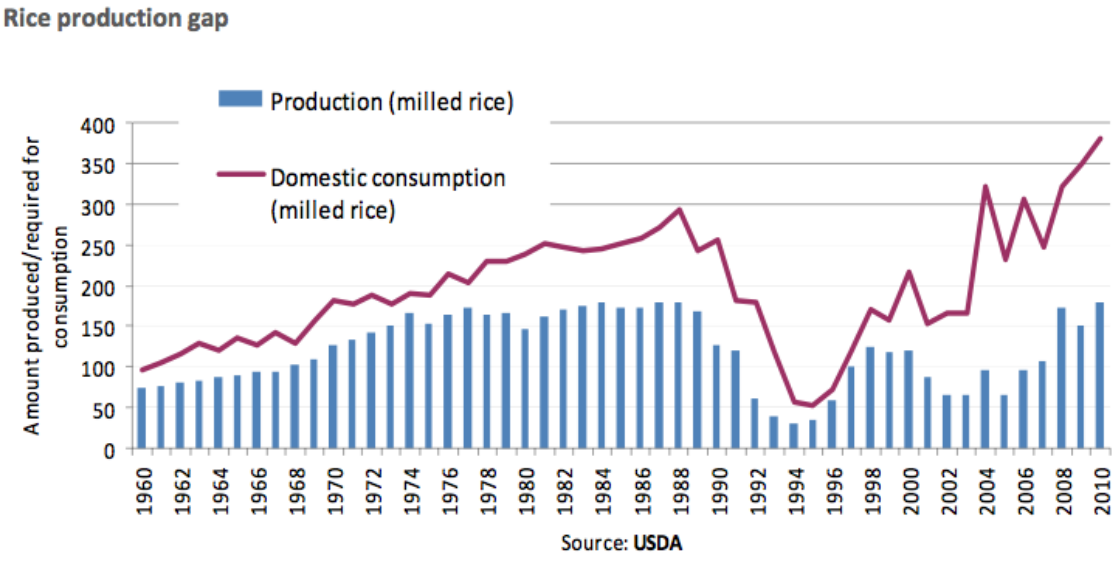
Note: The graph shows average inflation-adjusted trends in domestic prices for rice, wheat and maize across countries from January 2007 to December 2010. The domestic price is set equal to 100 in January 2007 for all countries, and the index value for subsequent months is equal to the average index value 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.

B7: Domestic Prices Volatility (16)

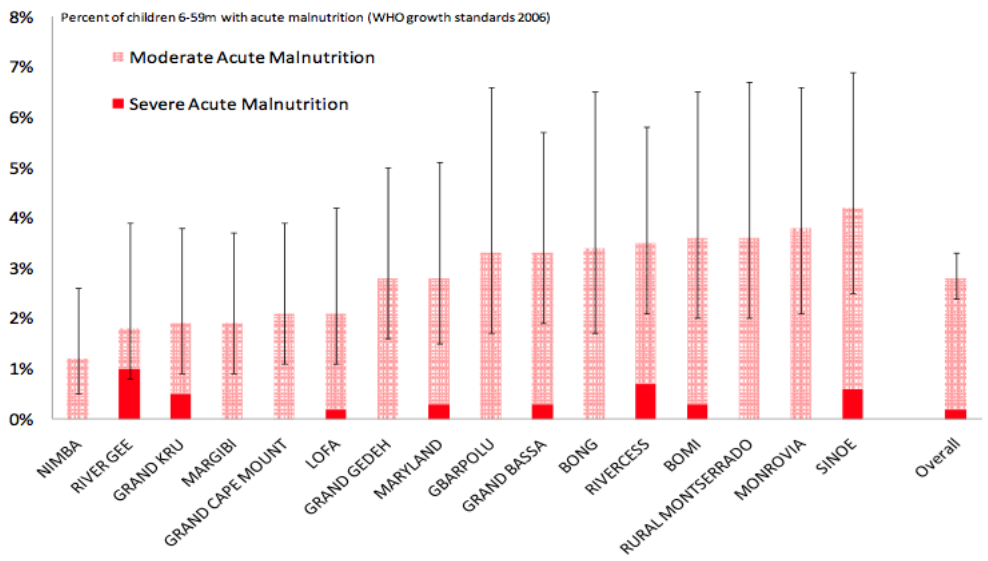


Note: Volatility of domestic prices is calculated as the standard deviation of the logarithm of (P_t/P_{t-1}), using monthly data. Countries included are the same as those in Figure 5.
Source of raw data: FAO Global Information and Early Warning System.

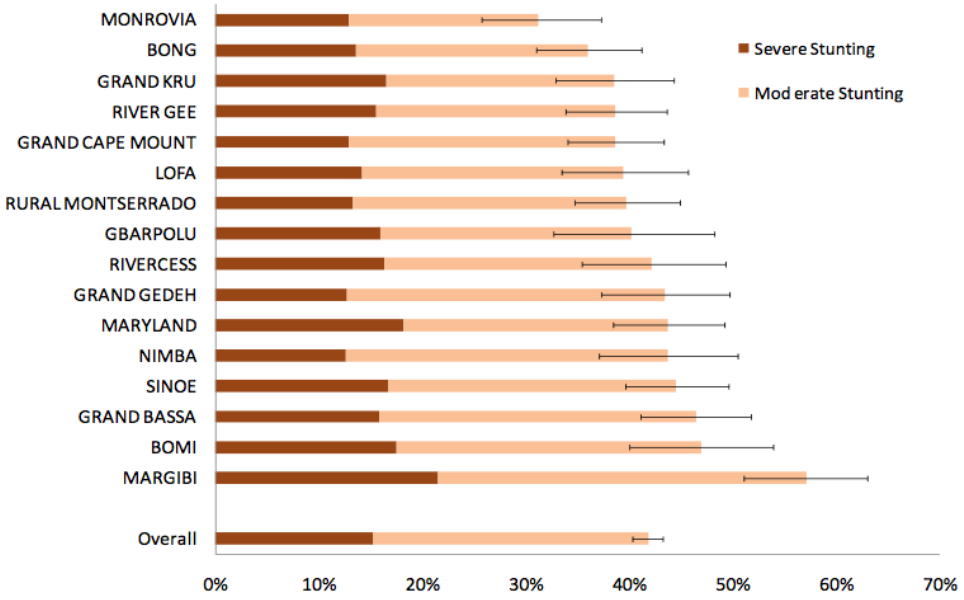
B8: Rice Production Gap (16)



B9: Liberia Malnutrition (18)



B10: Liberia Stunting (18)



Appendix C: Tables

C1: Liberia Undernourishment (18

Proportion and number of undernourished[1]

	Food consumption (%)			Population (no.)	
	Poor	Borderline	Acceptable	Poor	Borderline
Greater Monrovia	1.2	6.6	92.2	11,650	64,074
Lofa	3.0	33.5	63.5	8,306	92,749
Gbarpolu	4.2	32.2	63.6	502	26,851
Grand Bassa	6.6	27.4	66.0	14,632	60,744
Margibi	7.2	30.1	62.7	15,114	63,187
Nimba	9.2	23.2	67.6	42,506	107,190
Grand Gedeh	10.8	31.2	58.0	13,528	39,080
Sinoe	12.0	33.1	54.9	12,287	33,981
Cape Mount	13.1	41.0	45.9	16,647	51,974
Rivercess	15.8	38.7	45.5	11,298	27,674
Bong	16.3	37.3	46.4	54,357	124,722
Rural Montserrado	23.4	51.4	25.2	34,496	75,772
River gee	28.1	54.4	17.5	18,768	36,333
Grand Kru	33.6	44.6	21.8	19,459	25,829
Bomi	38.8	34.8	26.4	32,638	29,273
Maryland	43.3	29.3	27.4	58,861	39,694
Liberia	**13.0**	**27.9**	**59.1**	**368,000**	**899,000**

C2(a): Quantitative Analysis I: Household demographics, Livestock profile, Farmed land

County	Community	Period	Household Demographics		Livestock profile		Land farmed + owned		
			Average HH Size	Proportion of HH displaced in last 2 years	Chicken	Others	Proportion of HH w/ No farm	Proportion of HH w/ Small garden	Proportion of HH w/ Farm
Grand Cape Mount	Community 1	Current	10.67	0.29	3.76	0.10	0.38	0.52	0.10
		2 years ago			1.43	0.00	0.14	0.19	0.62
	Community 2	Current	16.73	0.00	4.21	0.07	0.60	0.40	0.00
		2 years ago			5.54	0.00	0.05	0.05	0.62
	Average	Current	13.70	0.14	3.99	0.08	0.49	0.46	0.05
		2 years ago			3.48	0.00	0.10	0.12	0.62
Gbarpolu	Community 1	Current	10.67	0.00	9.14	1.36	0.00	0.43	0.57
		2 years ago			3.21	2.29	0.14	0.36	0.50
	Community 2	Current	7.55	0.05	1.79	0.14	0.10	0.45	0.45
		2 years ago			1.57	0.29	0.10	0.45	0.45
	Average	Current	9.11	0.03	5.46	0.75	0.05	0.44	0.51
		2 years ago			2.39	1.29	0.12	0.40	0.48

C2(b): Quantitative Analysis II: Expenditure and Credit Patterns

County	Community	Period	Expenditure Pattern						Credit Pattern	
			Proportion of HH who spend on Food	Proportion of HH who spend on Water	Proportion of HH who spend on Education	Proportion of HH who spend on Health	Proportion of HH who spend on Agriculture	Proportion of HH who spend on Other exp.	Proportion of HH w/ debt	Average debt for those w/ debt
Grand Cape Mount	Community 1	Current	1.00	0.10	0.48	0.43	0.19	0.48	0.76	13,921.67
		2 years ago	1.00	0.00	0.43	0.38	0.14	0.43		
	Community 2	Current	1.00	0.00	0.20	0.67	0.07	0.13	0.40	3,125.00
		2 years ago	0.87	0.07	0.87	0.67	0.40	0.20		
	Average	Current	1.00	0.05	0.34	0.55	0.13	0.30	0.58	8,523.33
		2 years ago	0.93	0.03	0.65	0.52	0.27	0.31		
Gbarpolu	Community 1	Current	1.00	0.07	0.79	0.43	0.64	0.21	0.29	2,875.00
		2 years ago	1.00	0.07	0.79	0.43	0.64	0.21		
	Community 2	Current	1.00	0.00	0.75	0.05	0.40	0.10	0.45	4,750.00
		2 years ago	1.00	0.00	0.75	0.05	0.40	0.10		
	Average	Current	1.00	0.04	0.77	0.24	0.52	0.16	0.37	3,812.50
		2 years ago	1.00	0.04	0.77	0.24	0.52	0.16		

C2(c): Quantitative Analysis III: Food Security

County	Community	Period	Food Security			
			Daily HDDS (0-13), higher is better	Weekly HDDS (0-13), higher is better	Adequate HH food provision	Food Insecurity Access (0-9), higher is worse
Grand Cape Mount	Community 1	Current	3.86	6.38	7.71	7.62
		2 years ago				
	Community 2	Current	2.13	4.67	6.27	8.93
		2 years ago				
	Average	Current	3.00	5.52	6.99	8.28
		2 years ago				
Gbarpolu	Community 1	Current	5.14	8.29	2.14	4.93
		2 years ago				
	Community 2	Current	4.00	6.95	3.20	7.00
		2 years ago				
	Average	Current	4.57	7.62	2.67	5.96
		2 years ago				