

Modeling Food Security in Kenya: Interactions Between Neoliberal Policy Reforms, Environmental Factors, and Food Security

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Abstract

This study uses a historical case study methodology to examine the role that neoliberal policy reforms have played—and continue to play—in the state of food security in Kenya, within the framework of the country's increasingly challenging environmental climate. We employ the use of a new theoretical model to address the dynamic intersection of the 1986 neoliberal policy reforms, food security, and the environment in Kenya during the period from 1986 through the 1990s. Our innovative model combines the theoretical models of several other scholars of neoliberal policy reforms, food security, and the environment (Richardson 1996, Thrupp 1999, Madeley 2000, Nyangito et al. 2004), and is used to assess the impact of the following variables on the food security situation: Kenya's environmental context, population growth, and the effects of the policy reforms, including increased export production, cheaper imports, and agricultural intensification and expansion. We find that food security has decreased over the period subsequent to the neoliberal reforms, and that the agricultural tactics adopted to cope with this food insecurity post-reforms have caused land degradation which will presumably only lead to more food insecurity. Given the projected effects of climate change on the region, we feel that environmental organizations must act quickly in partnership with the governing bodies of Kenya in order to mitigate the effects of climate change before drastic effects ensue on the country's food security. We hope that this study may provide avenues for future research that include extending our model to look at how the neoliberal reforms have affected the food security situation in Kenya today, and beginning to develop solutions to some of the issues we identify and analyze.

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I. Introduction

Food insecurity is a global issue. Even the wealthiest countries in the world have citizens who experience food insecurity on a chronic basis. A wide and complex range of factors have been found to influence food security. In Kenya, the neoliberal policy reforms of the 1980s and 1990s have caused an unintended decrease in food security. Although many sources have explained this phenomenon by focusing on economic factors, we would like to provide a more complete explanation by introducing environmental factors and examining the three-way interaction between the neoliberal policy reforms, the natural environment, and food security.

Neoliberalism, a theory of political and economic practices developed in the late 1970s, “proposes that human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterized by strong private property rights, free markets, and free trade,” (Harvey 2005). In 1986, as a response to the growth in national revenue failing to catch up with government spending pressures, the government of Kenya officially established a wide range of neoliberal policy reforms for its entire economy through *Sessional Paper No. 1: Economic Management for Renewed Growth* (Nyangito et al. 2004). These reforms, taking full effect in the early 1990s, were meant to spark economic growth through the reduction of government controls on the economy, making a broad shift towards a much increased private sector role in most economic activities (Muriithi & Moyi 2003).

The bulk of these reforms were implemented as part of a number of World Bank-led Structural Adjustment Programs (SAPs), which were accompanied by the acquisition of Structural Adjustment Loans (SALs). An SAP is a mandated macroeconomic policy change that requires the recipient nation to liberalize its trade and investment policies, among other structural reforms, in exchange for the financial assistance of an SAL. Many specific policy reforms

stemmed from the SAPs. Major tax reforms included a reduction in direct taxes through the widening of tax brackets and the gradual lowering of income tax rates (Muriithi & Moyi 2003). Trade sector reforms focused on the liberalization of markets. Agricultural sector reforms simultaneously focused on eradicating the government monopoly on the marketing of agricultural goods and on lifting government-imposed controls on the pricing of goods, on importing, and on the distribution of farm inputs (Nyangito et al. 2004). Contemporarily, these reforms as a whole are considered to have resulted both in the elimination of social safety nets, thereby increasing poverty and inequality, and in the reduction of domestic food production in Kenya (Madeley 2000). Concurrent with these reform effects, a general decrease in national food security has occurred, beginning in the early 1990s and continuing today (Nyangito et al. 2004).

Over half of Kenya's population is now deemed chronically food insecure (KNBS 2008). Furthermore, farmers have continued to expand into marginal lands due to a need for greater crop production, resulting in environmental degradation that is expected to cause increased food insecurity in the future. According to climate change projections, unless substantial plans are put in place to combat the effects of climate change, that proportion of chronically food insecure people is only predicted to increase further. Yields from rain-fed agriculture in Africa, in particular, are predicted to decrease by up to 50% between 2007 and 2020, an event that is certain to cause major detrimental effects on food security (IPCC 2007).

Numerous models have explored the interactions at play between the neoliberal policy reforms and food security, the neoliberal policy reforms and the environment, and the environment and food security. However, a more complex model, integrating all three variables, is needed to develop a more comprehensive understanding of food security in Kenya. We would like to investigate the role that the neoliberal policy reforms have played—and continue to

play—as Kenya has attempted to address the issue of food security within the framework of its increasingly challenging environmental climate.

In this paper, we will use a historical case study analysis to pursue this investigation using the following questions: Why is it that food security has been declining in Kenya since the neoliberal policy reforms implemented in the 1980s and 1990s in an attempt to improve the Kenyan economy? In what ways may these reforms have influenced food security levels? How did the interaction between environmental factors and these reforms impact food security?

II. Methodology

In order to investigate our research question, we performed a historical case study analysis. A case study is generally used when one is attempting to understand a contemporary, real-life phenomenon in depth, and such understanding requires the incorporation of highly relevant contextual conditions. This methodology relies on the use of primary and secondary documents as chief sources of evidence to examine how and/or why a contemporary situation is occurring. If possible, a case study also employs interviews and direct observations of the situation (Yin 2009). Case studies benefit from, but do not require, the prior development of theoretical propositions to assist in guiding data collection and analysis (Yin 2009). We took a historical approach to the case study methodology by: 1) reviewing primary and secondary literature on the neoliberal policy reforms implemented in the 1980s and 1990s in Kenya, as well as on the political and environmental climate before and after these reforms, 2) performing a statistical review of food security data from before and after these reforms, and 3) investigating and analyzing possible reasons for changes in food security post-reforms based on our literature review.

Case studies are known to be strong exactly where statistical methods and more formal models are considered weak (George and Bennett 2005). The particular advantages of case studies are: their ability to allow a researcher to achieve high levels of conceptual validity through extensive consideration of contextual factors, their ability to lead a researcher to identify new variables and hypotheses through archival research and interviews, their ability as a useful means to closely examine potential causal mechanisms within individual cases, and their capacity to assess and develop theoretical models for complex causal mechanisms (George and Bennett 2005). It is for these reasons that we decided upon the case study method of analysis for the purposes of our study.

There are a number of common concerns about case studies. Case study researchers have regularly been accused of allowing ambiguous evidence and biased views to influence their results and conclusions. They have frequently been thought to over-generalize from a single case. Case study documents have often been considered huge and unreadable. Additionally, case studies cannot determine causality like other methodologies—such as randomized field trials—potentially can, and therefore they are sometimes considered to be an inadequate research method (Yin 2009).

We avoided these concerns in several specific ways. First, we attempted to present a non-biased, comprehensive view of our case, and we endeavored to clearly define any biases that may have influenced our research in the text of our comprehensive exercise. We generalized our findings only to the extent of making theoretical propositions, and never to the extent of making broad claims about other populations or the world. We limited ourselves to studying the factors we have defined here so as to create an in-depth but manageable and readable report. Also, we did not attempt to determine causality with our research, but simply to provide a political and

environmental framework for the food security issues at hand, and to investigate possible connections between this contextual framework and these food security issues. We then created an analytical model to provide a potential chain of causality among these interactions.

III. Defining Food Security

Initially, the theoretical focus of the term “food security” was on the volume and stability of food supplies (FAO 2003). The 1974 World Food Summit defined food security as: “[the] availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices” (United Nations 1975). In 1983, the FAO extended its definition to include securing access to available supplies, “ensuring that all people at all times have both physical and economic access to the basic food that they need” (FAO 1983). Then, in 1986, the World Bank published a report entitled “Poverty and Hunger” that focused on the temporal dynamics of food insecurity. This report introduced the now widely accepted distinction between chronic food insecurity, which is associated with issues of continuing and/or structural poverty and low income levels, and transitory food insecurity, which generally involves periods of food crisis caused by natural disasters, economic crash, or conflict (World Bank 1986). Additionally, it further extended the definition of food security to incorporate “access of all people at all times to enough food for an active, healthy life” (World Bank 1986).

By the mid-1990s, global concern with protein-energy malnutrition caused the definition to broaden to include problems of food safety and nutritional balance (FAO 2003). Socially and culturally determined food preferences became a consideration, as well. In 1996, the World Food Summit adopted an increasingly intricate definition: “Food security, at the individual, household, national, regional and global levels [is achieved] when all people, at all times, have physical and

economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (FAO 1996). This definition was even further developed in “The State of Food Insecurity 2001”: “Food security [is] a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO 2002). The international community has consistently accepted these increasingly broad statements of common goals and implicit responsibilities with regard to food security (FAO 2003).

IV. Why Kenya?



Figure 1. Greater Horn of Africa. Source: Thrupp 1999.

Kenya is located in the Greater Horn of Africa (Fig. 1), a largely arid region characterized by soils that are either inherently poor for farming or have been degraded by years

of cultivation (Thrupp 1999). Kenya measures about 580,367 sq. km in area with a population of approximately 41,070,934 people (CIA 2011). Eighty percent of the country's land is classified as arid or semi-arid, while only about 13% has high agricultural potential. The high-potential land—as well as the human population—is concentrated in Kenya's Central and Western provinces where proximity to Lake Victoria and mountainous areas leads to higher levels of rainfall than elsewhere in the country (Fig. 2, Thrupp 1999).

The top ten food and agricultural commodities produced in Kenya as of 2009, ranked by monetary value, are whole, fresh cow milk; indigenous cattle meat; tea; maize; mangoes, mangosteens, and guavas; dry beans; bananas; tomatoes; sugar cane; and plantains (FAOSTAT 2010). However, the ten most exported commodities—ranked by monetary value—are tea; coffee; fresh vegetables; cigarettes; tobacco; palm oil; confectionary sugar; canned pineapples; green beans; and beer of barley (*ibid*). Kenya's ten most imported commodities are maize; palm oil; wheat; refined sugar; broken rice; milled rice; tobacco; prepared food items; dried peas; and prepared flour products (*ibid*). The primary staple crops consumed in Kenya are maize, wheat, beans, potatoes, plantains, and rice (Ariga et al. 2010).

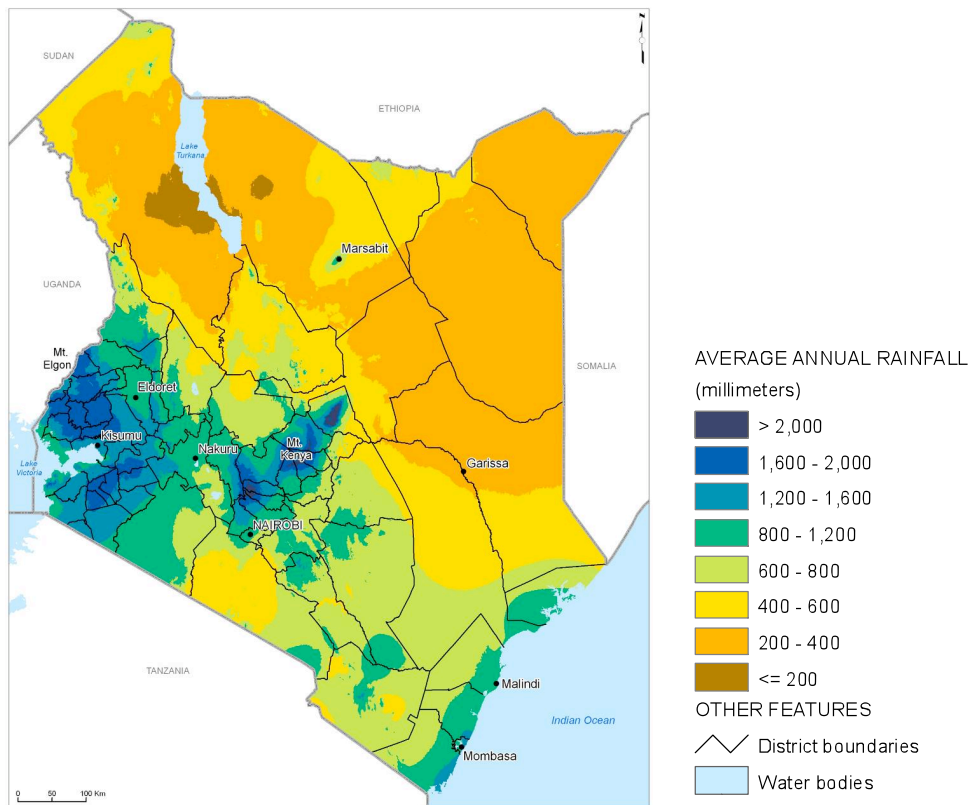


Figure 2. Average rainfall in Kenya, millimeters. Source: World Resources Institute, 2000.

We chose to focus on Kenya for this historical case study analysis for several specific reasons. The entire Greater Horn of Africa—the region composed of Sudan, Eritrea, Djibouti, Ethiopia, Somalia, Kenya, Uganda, Rwanda, Burundi, and Tanzania (Fig. 1)—is plagued by chronic food insecurity (Thrupp 1999). The countries in this region all have low proportions of high-potential agricultural land and experience periodic drought. The political instability and ethnic conflict that are common throughout the region often negatively affect efforts to improve food security, as well (*ibid*). Compared to other countries in this region, however, Kenya generally ranks higher on various development indicators (Gross National Product (GNP) per capita, infant mortality rate, percent of underweight children under 5, fertility rate, and adult literacy rate) (*ibid*). Yet Kenya still experiences significant food insecurity on the national and household levels, with over half of the nation deemed chronically food insecure and 24% of the

nation sitting under the critical food poverty line (KNBS 2008); this percentage appears to have increased since the implementation of Structural Adjustment Programs (SAPs) and related trade liberalization policies (Nyangito et al. 2004).

We find it curious that a relatively more developed country in this region is still experiencing such high levels of food insecurity, and want to use our analysis to determine the contextual factors that have contributed to Kenya's increased food insecurity in the wake of neoliberal policy reforms. Although we are focusing our study on Kenya, we believe that our findings may be applicable to other countries that are similar to Kenya in several specific ways. We feel that countries that have similar climatic conditions to Kenya, have similar access to agricultural production and transportation resources, have gained independence from a colonial power in the last 50 years, and have undergone structural adjustment loans to attempt to balance national debts would be particularly good potential candidates for applying the findings of our study.

V. Theoretical Framework

What Causes Food Insecurity?

In contrast to the description of food security above, food insecurity exists when a given population does not have sufficient food supplies to provide “all people, at all times, ... physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO 2002). Food security scholars have hypothesized that food insecurity can be caused by a number of factors, including a region's inherent biophysical characteristics, climatic events, demographic pressures such as population growth, a country's trade policies, and the presence of corruption and/or ethnic conflict (Richardson 1996, Thrupp 1999, Madeley 2000, Nyangito et al. 2004). Currently, drought is the

single most common cause of food shortages in the world (WFP 2012). Additionally, since 1992, the proportion of short and long-term food crises that can be attributed to human causes (such as conflict or detrimental government policies) has more than doubled, rising from 15 percent to more than 35 percent (*ibid*). For the purposes of this paper, we will focus on the three-way interaction between neoliberal policy reforms, environmental factors, and food security in Kenya.

Although trade liberalization is touted as part of a strategy for economic development in developing countries, opening and deregulating markets can result in unintended consequences. According to the law of comparative advantage, states should specialize in producing commodities based on their endowment of natural resources, and trade with other states to attain needed resources (Wiley Dictionary of Economics 1995). However, this may lead, especially in the case of countries like Kenya with a low proportion of high-potential land, to a dependence on imports for food security and an inability for domestic production to compete with the low prices of commodities imported from countries whose production of those commodities is heavily subsidized (Nyangito et al. 2004). Kenya became increasingly dependent on imports after its neoliberal trade reforms, but had less import capacity because its exports performed poorly in the world market (*ibid*).

Conceptual Models

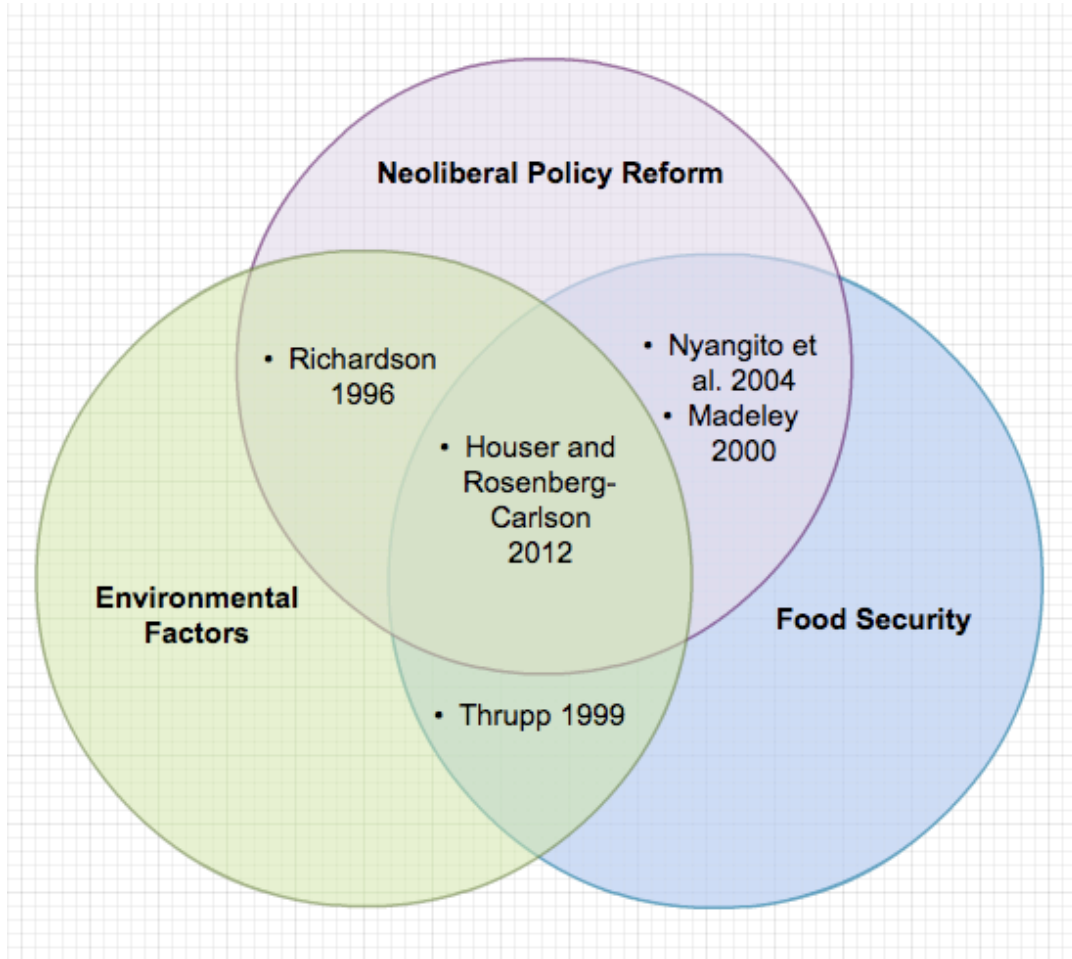


Figure 3. Theoretical interactions of models from the literature. Created using creately.com.

Our theoretical model is influenced by the conceptual models of four main authors—Madeley, Nyangito et al., Thrupp, and Richardson—who each address the intersection of two of the three dynamics we seek to assess (neoliberal policy reform, food security, and the environment). We seek to orient our model at the intersection of these three variables (Fig. 3).

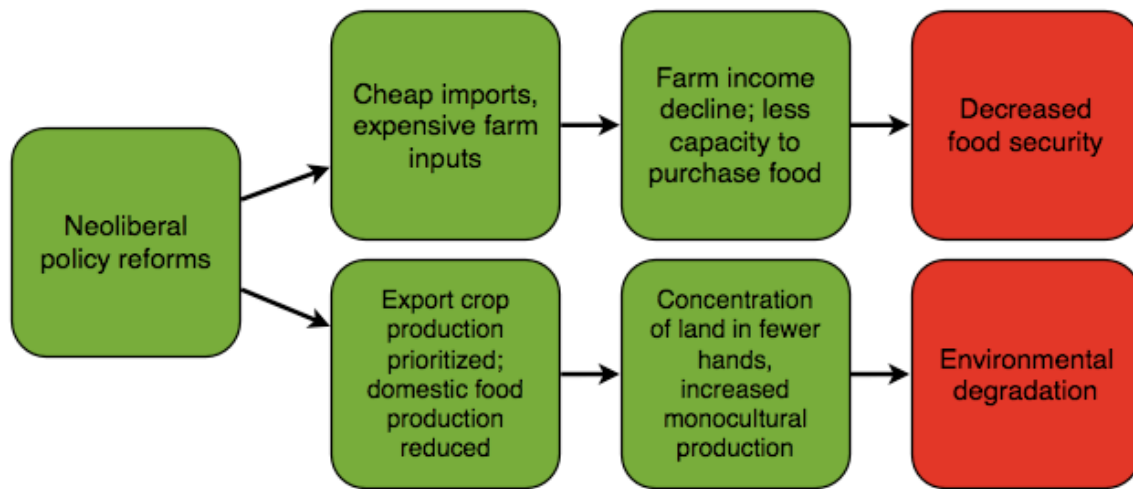


Figure 4. Madeley's conceptual model.

Madeley's review of 27 case studies in 39 countries focusing on the effects of trade liberalization on food security and poverty presents the overall trend that trade liberalization is associated with increased food insecurity and poverty (2000). This, he posits, is due to several effects of trade liberalization, including the fact that the market deregulation associated with neoliberal trade policy can lead to cheap imports with which farmers' produce cannot compete (*ibid*). Additionally, more priority is placed on cash crops for export than on domestic food production (*ibid*). There are a number of other associated effects of the policy reforms, such as a shift in the conception of land from a common good to a commodity, leading to the concentration of land in few hands; adverse environmental effects due to agricultural intensification geared toward a focus on exports; and a shift of power and sovereignty from a largely self-sufficient nation of producers into the hands of private trading firms or individual traders (Fig. 4) (*ibid*).

In Kenya specifically, Madeley reports growing dependence on world markets as well as substantial challenges competing in such markets (2000). Food production has declined and

imports of foodstuffs have increased since the late 1980s because of poor price incentives, high input costs, and associated low levels of input use (*ibid*). Although it would seem that the presence of cheaply imported food would allow Kenyans to purchase it at a lower price than previously, this is only true if they have sufficient income. Unfortunately, the majority of Kenyans depend on incomes linked either directly or indirectly to low-profit, subsistence agriculture, preventing them from benefiting from this cheaply imported food (Richardson 1996).



Figure 5. Nyangito et al.'s conceptual model.

The study by Nyangito et al. on food security in Kenya following the neoliberal policy reforms of the 1980s-90s uses a similar model (2004). It aims to identify the impact of the neoliberal policy reforms on “production, trade, and domestic food security at the national and household levels” by analyzing food production indices, measures of capacity to import, and malnutrition status (*ibid*). The study describes how these reforms may have affected food security differentially for various demographic groups in Kenya, based on location, land productivity potential, type of crop produced, and reliance on farm versus off-farm income (*ibid*). Overall, the authors posit that national food security in Kenya has decreased since the neoliberal policy reforms were implemented in the late 1980s. They present a number of factors that have contributed to this trend, including the expansion or contraction of land in agricultural production, climatic factors, failure to adopt technological improvements, and price instability, but ultimately hypothesize that, compared to these factors, the influence of neoliberal policy reforms on food security was unequaled (*ibid*).

According to Nyangito et al., the reforms were poorly coordinated and sequenced for the development of the agricultural sector (2004). The authors hypothesize that the declining performance of agriculture in the 1990s was caused by both supply constraints and poor implementation of liberalized policy reforms. The poor performance of agriculture served as somewhat of a feedback loop: farmers' produce was not competitive in the global market due to their relatively high costs of production compared to other countries' subsidized produce, and thus their incomes were lower than they would have been in the domestic market, making even cheap imports, not to mention agricultural inputs necessary to intensify production, inaccessible (*ibid*). Also, the failure of Kenya's crops to compete in the global market caused Kenya to have less capacity to participate in foreign exchange, leading to decreased food security on a national level (Fig. 5) (*ibid*).

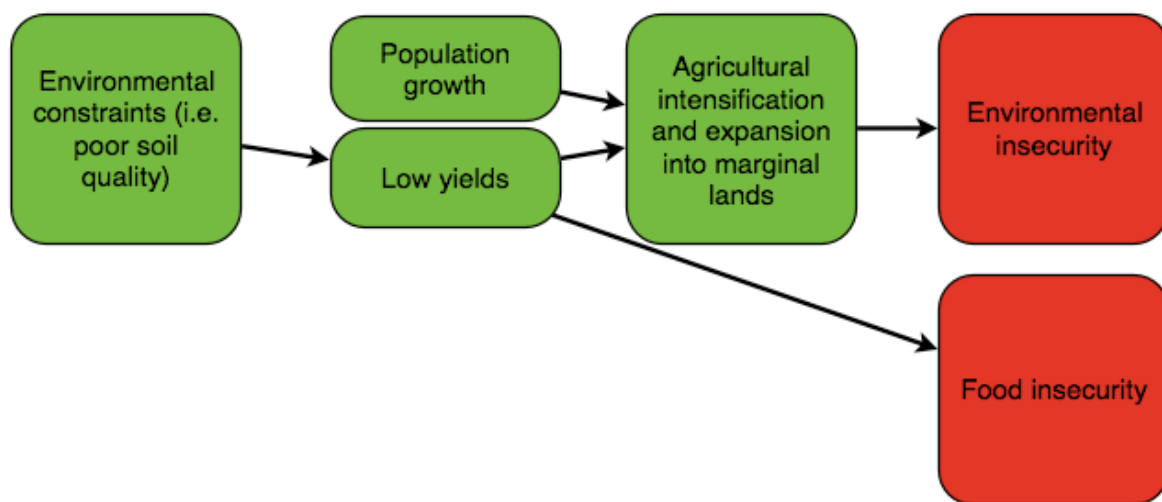


Figure 6. Thrupp's conceptual model.

In *Critical Links: Food Security and the Environment in the Greater Horn of Africa*, L.A. Thrupp presents a complex interaction between food security and the environment, involving a number of factors. The factors she examines are economic policies and programs; inequities in the distribution of resources and income; instability, conflict, and corruption; tenure insecurity

and legal constraints; institutional weaknesses and lack of coordination; demographic factors; ineffective implementation of environmental and conservation policies; and inherent biophysical constraints (Thrupp 1999). She argues that food security and environmental concerns are linked in somewhat of a vicious cycle, with the low environmental potential for agriculture in the Horn of Africa producing low yields, which leads to food insecurity in the area. This food insecurity, along with pressures of population growth and market forces, leads farmers to attempt to cultivate more and more marginal land, resulting in further environmental degradation (Fig. 6) (*ibid*).

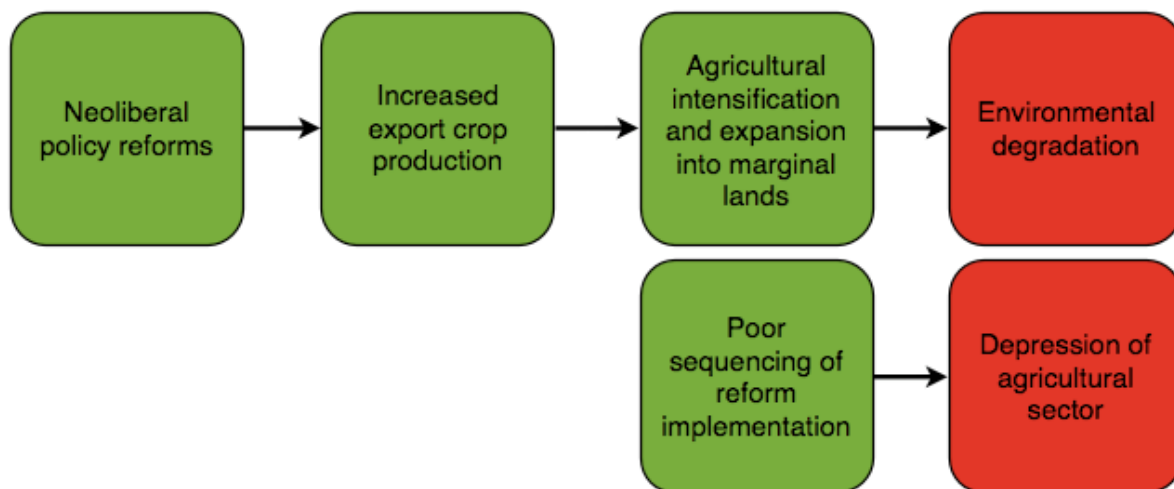


Figure 7. Richardson's conceptual model.

The negative trends in environmental potential and food security, according to Richardson, are amplified by the market pressures implicit in SAPs (1996). To remain competitive in the global market, smallholder farmers expand and intensify their production on marginal land and switch from low-value food crops to more profitable export-oriented crops (Fig. 7) (*ibid*). Richardson found that the geographical distribution of maize and beans grown in Kenya extends well beyond the area suitable for growing them, which she postulates is due to population pressure, dietary preference, and the influences of pricing and marketing (*ibid*).

Furthermore, although fertilizer use is encouraged as a means to intensify agricultural production, depreciations in the exchange rate under structural adjustment can increase the price of fertilizer beyond the reach of farmers (Thrupp 1999). If farmers can afford fertilizer, they may not be educated about its proper use, leading to further environmental degradation (*ibid*).

Both Richardson and Thrupp acknowledge that efforts by governments, NGOs, and aid organizations do not adequately address the linkages between food security and environmental issues. Richardson posits that SAPs and other trade liberalization measures in Kenya contributed to environmental degradation by encouraging the intensification of agriculture on marginal lands, and that environmental impact assessments must be conducted before and during the implementation of further development policy initiatives (Richardson 1996). Thrupp, on the other hand, proposes that further environmental and food security initiatives must be developed and implemented together, as the goals of food security and environmental security are so closely linked (1999). She proposes that instead of addressing the symptoms (i.e. food insecurity, poverty, and environmental degradation), countries in the Greater Horn of Africa would be better served by addressing the root causes of these issues, which include unsustainable, inequitable economic development, political and ethnic conflict, poverty, inadequate land tenure systems, and demographic pressures (Thrupp 1999). Similarly, Nyangito et al. posit that although climatic factors are important in determining a country's food security, policy factors are the most important, and thus improvements to food security can only be achieved through policy reform (2004).

While the models developed by Madeley, Nyangito et al., Thrupp, and Richardson all provide useful descriptions of some of the interactions between neoliberal policy reforms, food security, and the environment, none of them considers the interaction between all three

factors, and thus, they alone are not sufficient to explain the situation in Kenya during this period. Our model will attempt to combine certain elements of these models to create a more comprehensive view of the ways in which neoliberal policy reforms and environmental problems interacted to affect food security. Based on our reading of the models used by these four authors, we have devised the following model to represent the complex interactions between the four factors we are considering in our analysis.

VI. Our Model

One of the implied goals of the neoliberal policy reforms was to increase food security by encouraging nationwide economic growth through the opening of markets meant to encourage the production of export-oriented commodities. This, in combination with population pressures on the current agricultural resource base, led farmers to expand their agricultural production into more marginal land, contributing to further degradation of land that was already ill suited for agriculture, as well as to poor yields per unit area of land. At the same time, the opened markets were flooded with cheap imports from countries that could produce commodities at a cheaper price, with which Kenyan farmers' production could not compete. This effectively lowered farmers' incomes (and those of others in professions related to agriculture) and decreased their access to markets, decreasing food security overall. Additionally, the price of inputs such as fertilizer and labor were relatively high during this period and farmers were made to comply with new labor and environmental regulations, effectively lowering their incomes and decreasing their capacity for food security on an individual or household level, as well as decreasing their productivity potential by limiting their access to inputs. This state of decreased food security and low incomes may have prompted farmers to expand their area of production further onto land with low agricultural potential, bringing the process full-circle.

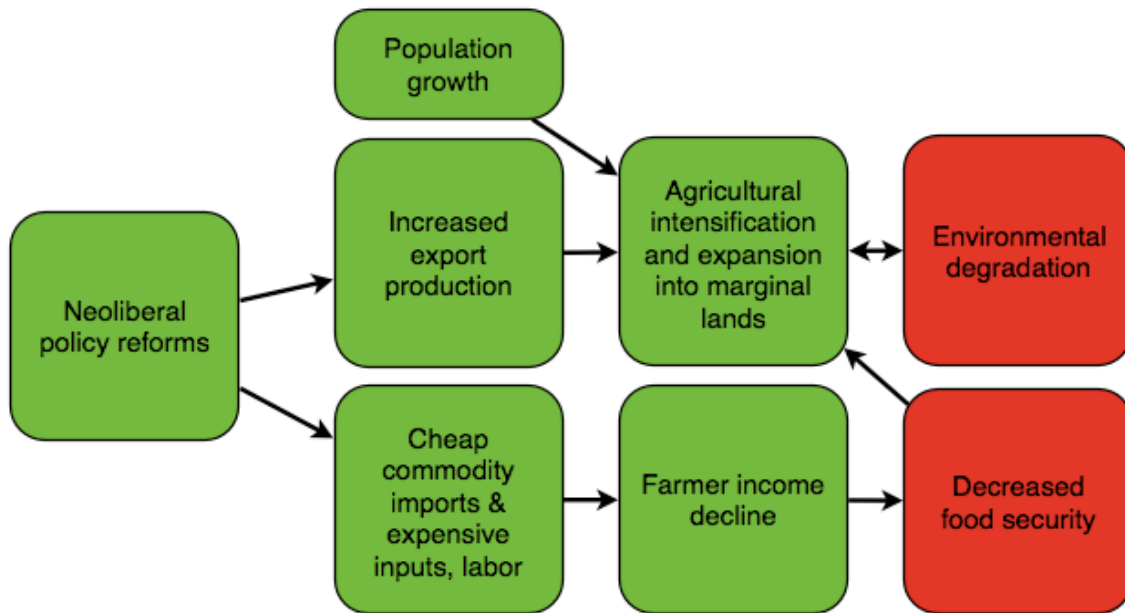


Figure 8. Our conceptual model, drawing on aspects of the models of Madeley, Nyangito et al., Thrupp, and Richardson.

In our analysis, we use this model as a theoretical framework within which to examine evidence from the period of study. We assess the ways in which these three factors (neoliberal policy reform, food security, and the environment) interacted in Kenya during the 1990s. We draw in data from various sources, including statistical data, government documents, and news publications, in an attempt to paint a detailed picture of the political, economic, social, and environmental changes in Kenya in this period, especially as they relate to agricultural production, trade, and food security. Specifically, we consider changes in production of export commodity crops as compared to domestic staples, other trade indicators, climate data, and government responses to the social problem of lingering food insecurity. Our analysis follows

the sequence of our model, beginning with a discussion of the political and economic context preceding the neoliberal policy reforms of 1986.

VII. Analysis

Contextualizing the Neoliberal Policy Reforms in Kenya

Kenya gained its independence in 1963 after 68 years of British rule. In its first decade of independence, Kenya experienced significant annual growth rates in per capita income (4.1%) and gross domestic product (GDP—6.5%) (Richardson 1996). Such excellent economic performance is said to have primarily resulted from an increase in the cultivated acreage under export crops, rapid industrialization, and an auspicious external economic environment (Godfrey 1986). But in 1971, the economy began to show signs of a minor crisis, with nominal imports increasing 27% while exports increased 3%. This minor crisis turned into a full-blown crisis in 1974 when oil prices and those of other imported goods quadrupled and were accompanied by a significantly smaller increase in Kenya's export, effectively decreasing its foreign exchange capacity (Richardson 1996).

At that point, the government sought external support from the International Monetary Fund (IMF) while endeavoring to explore long-term corrective measures for the economy. The IMF loan granted to Kenya was conditional upon Kenya implementing a stabilization program that required, among other things, a restriction on government borrowing from the banking system—which imposed a ceiling on total domestic credit. Kenya's official stabilization policy focused on the need for restructuring the economy by improving export performance and reducing dependence on imports (Richardson 1996). To achieve this restructuring, the government included in its 1975 budget the initiation of an export compensation system, a wage restraint, and tightening import licensing.

Following these new measures, the economy experienced a temporary boom in 1976 and 1977, mostly attributed to increases in the world prices of two of Kenya's major export crops (tea and coffee) (Richardson 1996). Yet Kenya continued to increase import restrictions and tighten its credit policy, and failed to use its gains from the boom to enforce stabilization measures or offset some of its external debt (Bevan et al. 1989). Personal incomes rose, the monetary base increased faster than the inflation rate, and more foreign borrowing was used to finance external debt. Furthermore, the measures set out in the stabilization policy were not observed (Richardson 1996).

The period directly after this boom was characterized by excess demand, major inflation, and external political issues that were harmful to the Kenyan economy. In 1977, the East African Community (EAC) collapsed, closing Kenya's common border with Tanzania and negatively affecting investment in the country. Due to this collapse, the government increased its expenditures because of the need to reorganize functions that had been controlled by the EAC. Simultaneously, the world prices of its major export crops fell, its terms of trade (price of exports/price of imports) diminished by 22% in 1977 and 1978, and 1979 brought a second oil shock that made the economy still more vulnerable (Richardson 1996).

In response to these economic crises, the Kenyan government instituted a fiscal policy that required banks to hold excess reserves and pay a substantial inflationary tax on them. The revenue acquired as a result of this policy was used to help offset the public deficit and allowed the government to tax some of the gains from the 1976-1977 boom. Inflation decreased significantly while both GDP and gross domestic investment increased. However, fiscal discipline in government project spending collapsed, which resulted in high waste and overspending (Richardson 1996).

Due to insufficient progress made towards stabilization, the IMF suspended its support in 1979. To secure much-needed loans, new stabilization programs were agreed upon and funds were granted from the Eurodollar market and the IMF. After receiving these funds, Kenya made still less progress towards stabilization. In fiscal year 1980-1981, the financial deficit increased as a result of overspending in many public sectors (Richardson 1996). Due to slow progress towards stabilization, Kenya was then disqualified from further use of IMF and World Bank aid, which caused the country's economic conditions to deteriorate immediately. Consequently, Kenya made the decision to embark on the World Bank-led Structural Adjustment Program (SAP), which was accompanied by the acquisition of a Structural Adjustment Loan (SAL) from the World Bank. Because Kenya was in dire need of financial support, this option seemed like a positive course of action.

Unfortunately, drought in 1980 and political unrest in 1982 in Kenya, in combination with the 1982 foreign exchange crisis, further destabilized the economy as the country attempted to embark on its SAP (Richardson 1996). Simultaneously, inflation rates and the fiscal deficit rose. A second SAL was approved in 1982 to support the continuing adjustment efforts. But in 1983, the second SAL was cancelled as a result of a disagreement over grain marketing policies and import controls.

Right as the economy began to recover, drought set in again in 1984. The drought caused a marked decline in Kenya's economic performance; its agricultural sector experienced negative growth and the country was not able to increase its exports. Fortunately, in 1985 the world price of tea improved and the international community began to move out of recession following a drop in the price of oil, both of which alleviated some of the stress on Kenya's economy. Concurrently, climatic conditions in Kenya improved, and the government enacted a policy of

stringent budgetary management that bettered the country's economic performance (Richardson 1996). In 1986, world oil prices fell significantly and coffee prices rose, giving the Kenyan economy the final push towards an effective recovery after 15 years of instability. It was in this moment of true economic stability that the Kenyan government decided to begin its course of large-scale neoliberal policy reforms.

Neoliberal Policy Reforms of 1986

Sessional Paper no. 1 of 1986 on Economic Management for Renewed Growth, a publication of the Kenyan government, outlines the principles behind the neoliberal policy reforms and the next steps the government should take to promote a more liberalized economy. Because the short-term crises of the previous decade had been brought under control, this Sessional Paper proposed a longer-term, more comprehensive economic reform to “renew economic growth in ways that will provide jobs for the growing labor force, prosperity for the mass of people in rural areas, an equitable and widespread sharing of the benefits of growth, and a continuing provision of basic needs for all,” looking ahead to and setting goals for the year 2000 (GoK 1986). The goals laid out in the paper include an overall economic growth rate of over 6% per year, including an agricultural value added growth rate of over 5% per year and a manufacturing growth rate of 7.5% per year, as well as vast expansion of exports in all sectors of the economy to help account for the increased imports expected with GDP growth (*ibid*). The strategies presented to meet these goals are increased private sector activity, job creation, increased agricultural productivity as well as promotion of off-farm rural employment, development of the informal sector, restructuring industry, and increased foreign investment (*ibid*). The Paper also includes fiscal and monetary policy reforms that aim to support renewed growth.

The Sessional Paper promotes increased agricultural production of exports, especially tea, coffee, and horticultural products, acknowledging the apparent conflict between this expanded export production and the goal of fulfilling most of the nation's food requirements through domestic production. It thus primarily proposes intensification of the cultivation of these crops with only modest area expansion into land previously in food crops (GoK 1986). The Paper also acknowledges the need to account for the increased food demand inherent with population growth, and thus stresses investment in domestic agricultural production through the promotion of fertilizer use, agricultural research, and extension services to promote new agricultural technologies (*ibid*). The Paper does not, however, recognize the ecological impacts of the proposed agricultural intensification and increased fertilizer use. The only explicit mention of environmental effects is a suggestion that buffer zones, soil conservation structures, and water catchments will become increasingly important, alluding to guidelines for local authorities and district development committees produced by the Ministry of Environment and Natural Resources (*ibid*).

Tax Reforms Subsequent to the 1986 Sessional Paper

It is common for the revenue structure of developing countries to be less prolific than desired. In the face of severe resource gaps, the growth in revenue in developing countries has often been unable to catch up with government spending pressures, thereby creating massive imbalances between the demand and supply of public fiscal resources (Muriithi 2003). In response to these imbalances, such countries have then had to reform their tax structures, generally with the primary goals of generating revenue adequacy, economic efficiency, equity and fairness, and simplicity (Osoro 1993). The main elements of these reform programs have included: imposing few taxes with the broadest possible base and moderate rates (World Bank

1990), using value-added tax (VAT) to replace commodity taxes in order to minimize deterrents for investments and exports (Thirsk 1991), both avoiding raising taxes on the poor and reducing their tax burden by taxing excise duties on luxury items and exempting foodstuffs, shifting to broader, simpler tax bases on which lower rates are applied, minimizing corporate tax evasion, and decreasing distortions that reduce economic growth (Muriithi 2003).

In Kenya, although the tax structure had changed significantly over the years, immense reforms were established subsequent to the publication of Sessional Paper No 1 of 1986 (Muriithi 2003). These reforms were neoliberal in nature, advocating for relatively free trade and open markets to spark economic growth. Their gradual implementation introduced a number of salient changes to the tax system in the years since. There has been a general decrease in direct taxes through the widening of tax brackets and gradual lowering of income tax rates. Indirect taxes have been augmented to cover the loss in revenue. Since indirect taxes are regressive and consequently impose a larger burden on the poor, this shift has unfortunately been condemned as reducing the redistributive effect of the reformed tax system (Muriithi 2003). But the principal aim of these reforms was to generate economic prosperity for the country at large.

Before delving into the specifics of these reforms, it is important to acknowledge that although the policy reforms proposed in Sessional Paper No.1 of 1986 were passed in that year and the Kenyan government had agreed to various SAPs before that time, the reforms were not considered to be implemented in full until 1993 (Nyangito et al. 2004). Prior to 1993, implementation of the reforms was surrounded by “considerable official ambiguity and covert and overt resistance” (*ibid*). In fact, another national policy document was released in 1989, the National Development Plan for the Period 1989-1993, describing in more detail how “the long-term development objectives and strategies for structural adjustment process contained in

Sessional Paper No.1 of 1986 ... will be implemented” and setting targets for GDP growth and other development indicators, stressing that this development must stem from “expansion and diversification of exports along the lines proposed in Sessional Paper No.1 of 1986” (GoK 1989). But however uncertain the process of implementation of these reforms was, it is clear that they had significant and marked effects on all sectors of the economy. We will describe the major reforms established below.

The 1986 reforms triggered a shift from taxes on international trade to taxes on domestic goods and services. In conjunction with this shift, value-added tax (VAT) has become the primary source of revenue in Kenya, producing about two-thirds of domestic taxes on goods and services (Muriithi 2003). Unfortunately, VAT is relatively open to graft given that each stage of verification, approval, and validation presents an opportunity to extort bribes. Unsurprisingly, corruption commonly erodes its efficacy (Muriithi 2003).

The 1986 reforms were largely intended to expand the export capacity of the country. To that end, duty/VAT exemption was introduced on direct and indirect imports of raw materials to be used in the production of exports, duty-free items for the domestic market, and inputs for aid-funded projects (Muriithi 2003). All machinery and raw materials were classified as duty/VAT exempt so long as the manufactured products were meant for export, but any such products sold in the domestic market had standard duties plus a 2.5% surcharge placed on them. Other export support programs concurrently ensued, including export compensation (from 1974 to 1993), export processing zones (from 1991 on), full import liberalization (from mid 1993 on), and full foreign exchange liberalization (from late 1993 on) (Muriithi 2003). Export compensation was eliminated in 1993 in an effort to save government revenue and to constrain the abuse of the incentive by corrupt manufacturers.

Kenya's customs taxes also experienced considerable changes during the reform period, focused on restricting duty exemptions, encouraging exports, reforming the tariff structure, and strengthening the administration of customs duties (Muriithi 2003). Between 1987 and 1998, the top tariff rate was reduced methodically from 170% to 25%, and the average tariff rate fell from 40% to 16% (*ibid*). The exemption system was rather generous before 1991, but then several measures were implemented to limit this generosity, including reducing the range of exempt goods, making imports by all government-controlled agencies tax deductible, abolishing the use of discretionary exemptions (in 1992), and eliminating exemptions on agricultural commodity aid (except during cases of a national disaster or refugee support) in 1995 (*ibid*). From 1994 to 1998, new measures were passed to additionally target the non-governmental organization (NGO) sector by imposing restrictions on NGO exemptions. Such changes had disproportionate negative effects on the agricultural sector, and particularly on small farmers reliant on aid.

Economic Context of the 1990s: Broken Promises

While these policy reforms were established in the time frames explicated above, the grantors of the loans conditional upon these reforms were not always pleased with Kenya's progress in implementing them, leading to a repeated pattern of granting and withdrawal of international aid. In April 1993, representatives of the Kenyan government, the IMF, and the World Bank met to discuss Kenya's economic future (KBC 1993). President Daniel Arap Moi of Kenya admitted that although Kenya's previous policies had been designed soundly, they had not been properly implemented (*ibid*). He maintained that support from the World Bank would remain crucial as the country strove to transition from a reliance on aid and SAPs to an economy based on trade and private enterprise (*ibid*). The World Bank, in response, announced that the progress Kenya had made toward resolving issues with the financial sector was satisfactory and

that it would resume financial support to the Kenyan economy, beginning with “the export development sector and the education structural adjustment sector” (KBC 1993).

In 1994, the Kenyan government “appealed to local and overseas investors to take advantage of the liberalized exchange system to step up their investments for the domestic and exchange markets,” announcing further reforms to encourage foreign exchange and increase confidence in the Kenyan shilling (Kenya News Agency 1994) and providing “investment preference to private companies expected to earn or save foreign exchange, increase the technical knowledge and employment of the country, and employ local resources” (Watkins 1997). While many services and institutions previously provided by the government were privatized as part of the neoliberal policy reforms, the government opted to retain several parastatal organizations, including Kenya Port Authority, Kenya Railways, and the National Cereals and Produce Board (KNA 1994). The government also introduced export processing zones, areas in which goods may be landed, manufactured, or reconfigured and re-exported without going through customs, in an attempt to push Kenya toward industrialization, encourage foreign investment, and create employment opportunities (Watkins 1997).

By January 1997, economic indicators pointed to a positive effect of the fiscal and monetary policy reforms on Kenya’s economic recovery and growth (Watkins 1997). Gross domestic product (GDP) growth accelerated from 3% in 1994 to 5% in 1995, inflation decreased from 28.8% in 1994 to 8.8% in 1995, and the fiscal deficit decreased considerably (*ibid*). It appeared that Kenya was on the path to economic growth and development. However, the government backed down from its reform agenda at the end of the fiscal year 1996/97, causing the IMF, World Bank, and African Development Bank to again withdraw their structural adjustment funding (Njeru 2003). After intensive lobbying by the World Bank and a team of

experts from the private sector and international organizations known as the Economic Recovery Team, another agreement was reached between the Kenyan government and international monetary institutions in July 2000 (*ibid*). However, this release of withheld aid was short-lived, as Kenya backtracked on the agreement again in December 2000 and the IMF and other lending institutions withdrew aid yet again (*ibid*).

The election of President Mwai Kibaki of the Kenya National Alliance Party, The opposition party in Kenya, in 2002 was a watershed moment for Kenyan politics. President Kibaki instated policy reforms in the Economic Recovery Strategy for Wealth and Employment Creation, prioritizing economic recovery by enacting measures to contain inflation, maintain a competitive exchange rate and ensure an interest rate structure that promotes financial savings, strengthen institutions of good governance to ensure sustainable development through reduction of corruption, strengthen the rule of law, and enact civil service reform (GoK 2003). Following these anti-corruption measures, the IMF reinstated its lending in 2003 for the first time in three years (BBC 2012). This cycle of Kenya agreeing to economic and policy reforms as a condition on loans and then failing to implement them or backing out of their implementation has caused the economy to be less than stable. It is beyond the scope of this paper to address the reasons behind the Kenyan government's lack of commitment to these neoliberal policy reforms, but we will speculate as to their effects on crop production and food security.

The Effects of Neoliberal Policy Reforms on the Agricultural Sector

While all sectors of the economy were significantly affected by the neoliberal policy reforms, the vast majority of the labor force is employed in the agricultural sector, and thus some of the biggest effects on the Kenyan population were felt through changes therein. In the agricultural sector, the focus of the reforms was specifically on removing government monopoly

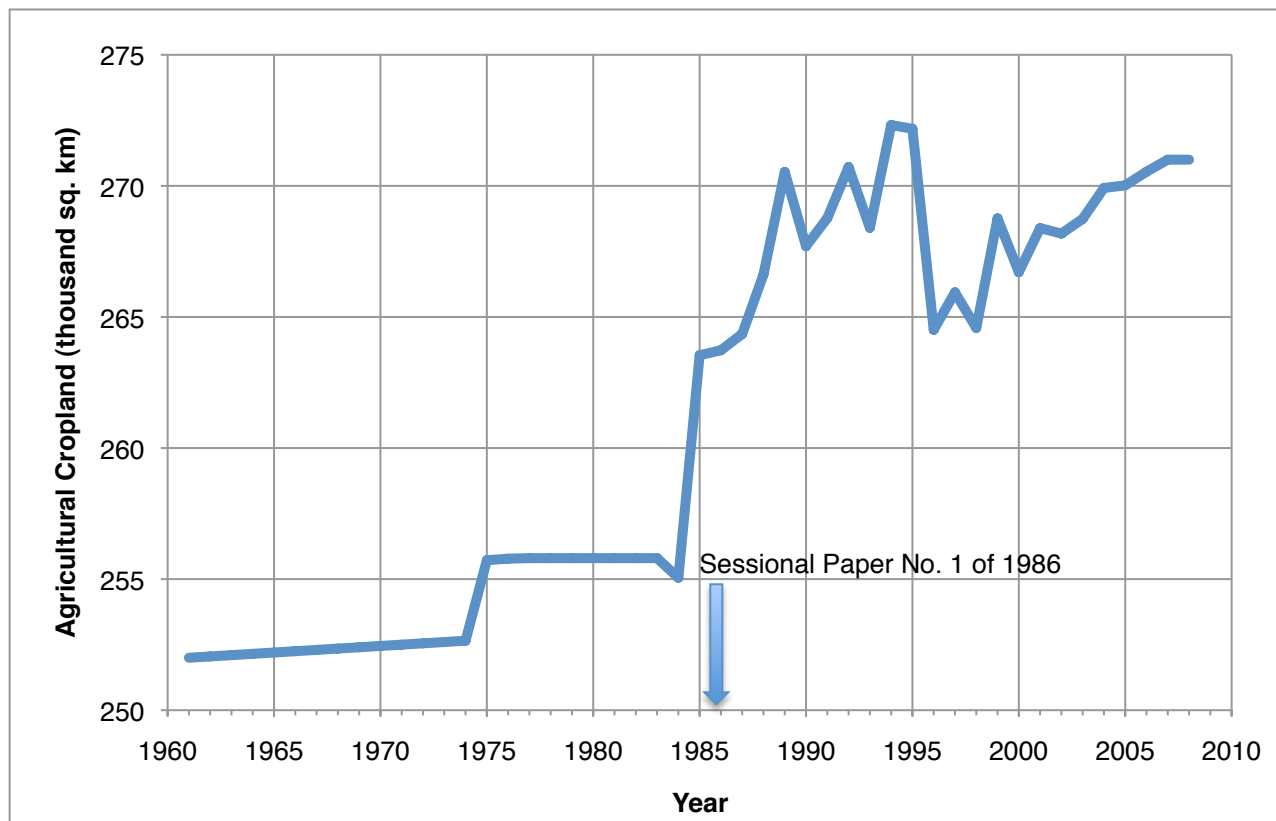


Figure 9. Area in Agricultural Cropland, 1961-2008. Source: UNEP 2012.

on the marketing of agricultural commodities, lifting associated price controls and ending government control on importing, and the pricing and distribution of farm inputs (Nyangito et al. 2004). Unfortunately, the agricultural sector was not equipped to use the reforms to stimulate growth; there was no institutional framework put in place to guide an efficient operation of markets, nor to respond to citizen needs (*ibid*). Additionally, small-scale farmers found it increasingly difficult to access credit following these reforms due to the liberalization of interest rates and spending policies. They also increasingly struggled to gain access to agricultural inputs due to the lack of quality assurance and high prices present in the liberalized market.

Although the agricultural sector has in many ways found it difficult to adjust to the reforms, the amount of land in agricultural production in Kenya since the neoliberal policy reforms of the 1980s-90s has increased dramatically, with the most impressive spike in production occurring between 1985 and 1990 (Fig. 9). This increase is likely due to the increased

production of export commodities, such as coffee and tea, alongside increased production of commodities for domestic consumption to compensate for population growth. It is likely that the dramatic increase in 1985 was caused by anticipation of the implementation of the reforms, which was expected to make the cultivation of export-oriented crops more profitable. Other countries in Sub-Saharan Africa that underwent similar neoliberal policy reforms as part of SAPs experienced similar spikes in the area of land in agricultural production in the mid-80s to early 90s (FAOSTAT 2010).

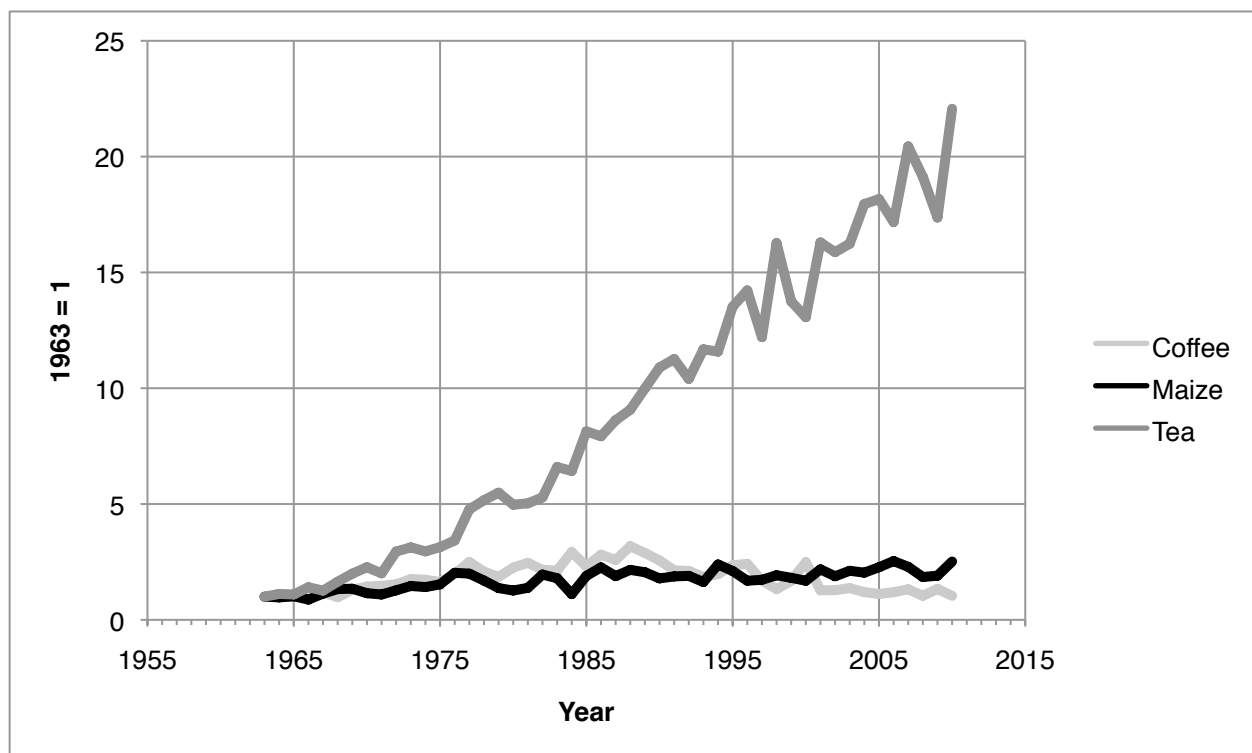


Figure 10. Production indexes (using production in 1963 as a baseline) for coffee and tea, two high-value, export-oriented cash crops, and for maize, a food staple. Source: FAOSTAT 2010.

The production of tea, in tonnes, was 22 times as much in 2010 as it was in 1963, while coffee production decreased slightly (Fig. 10). Tea seems to have replaced coffee in Kenya's export strategy—since 2005, Kenya has been the world's top exporter of tea by quantity (FAOSTAT 2010). Production of maize also increased slightly over this period, but not nearly to the same extent (Fig. 10). The proportion of total agricultural land occupied by tea and coffee

production also increased at a faster rate than that of maize (UNEP 2012). This shows that as more emphasis was placed on export production, export-oriented commodities were grown more widely, although the concurrent (although much less substantial) increase of area in maize production suggests that production of food staples still played a role in Kenya's economy. However, the population of Kenya increased nearly fivefold over this period (Fig. 11), so one would expect that the production of maize would be increased accordingly to account for this increased demand. The deficit in maize was made up for, at least in part, by increased imports of

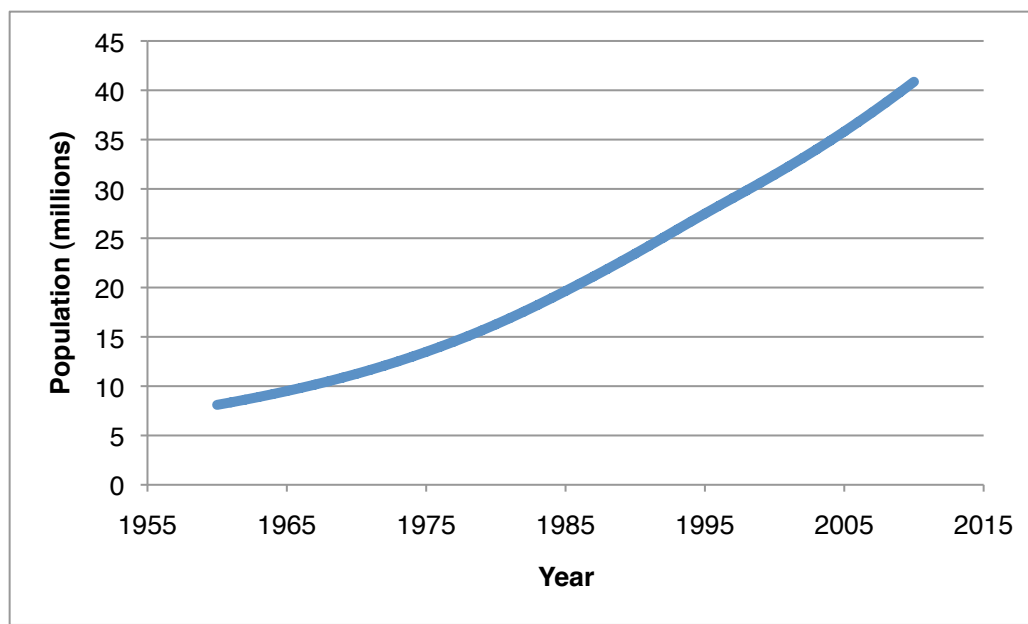


Figure 11. Population of Kenya, 1960-2010. Source: World Bank 2012.

maize (FAOSTAT 2010). Indeed, as described by Nyangito et al., Kenya went “from being self-sufficient in most basic staples to a net food importer” (2004). Taking into account fluctuations in prices on the world market, this equates to an unstable economic and food security situation. On the individual level, local producers could not compete in domestic markets with the low prices of commodities imported from developed countries—for which the costs of production are heavily subsidized, leading to a decrease in farmer incomes, and, further, a decrease in food

security (*ibid*). On the national level, Kenya's export market was not able to keep up with its increased imports, leading to a diminished foreign exchange capacity (*ibid*).

This follows our model, which predicts that following neoliberal policy reforms, the price of inputs will increase, while the price of agricultural commodities will decrease, effectively lowering farmers' incomes. While numerical data on these variables were not available, there is a consensus in the literature that this is, in fact, what happened in Kenya following the policy changes (Nyangito et al. 2004, Madeley 2000). We can assume that this decrease in income led to decreased food security on the household level, because these households subsequently had less purchasing power. In the next section, we will take a closer look at indicators of food security to assess whether the trends they show are consistent with our model.

Food Security

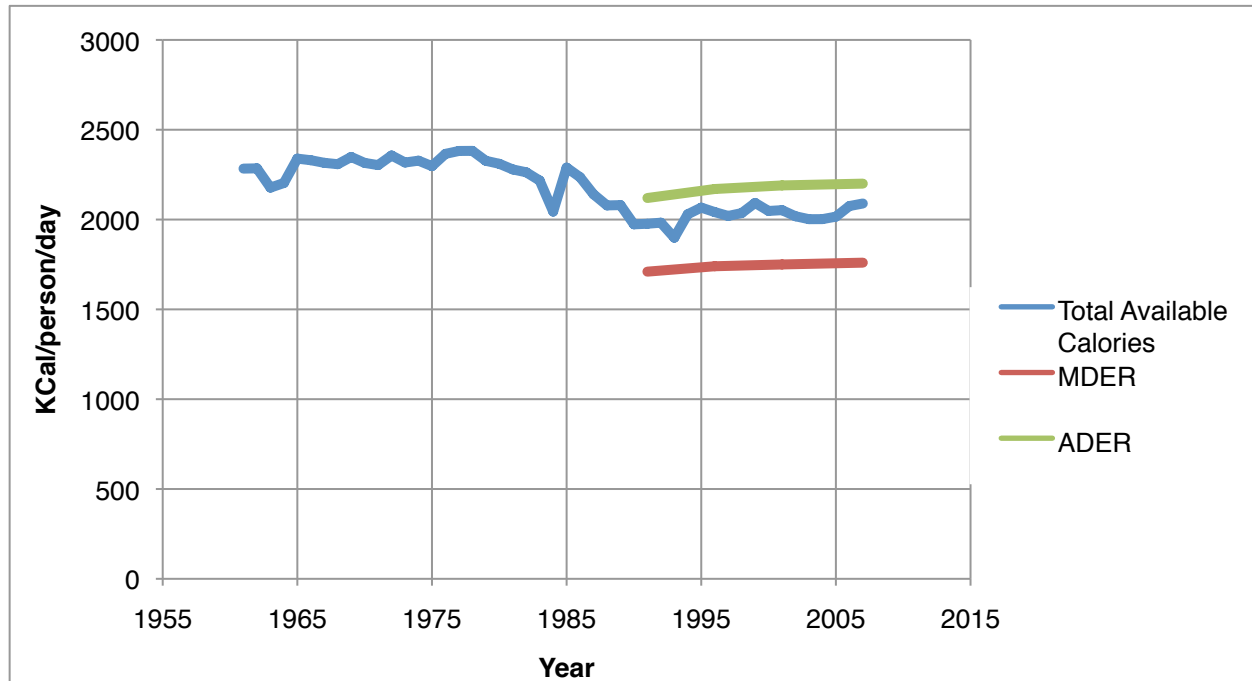


Figure 12. Caloric Supply per capita per day, 1961-2007. Source: FAOSTAT 2010.

How did these policy reforms and associated changes in the agricultural sector affect Kenyan food security? Due to lack of available data, the main indicator of food security we will assess is food supply per capita per day (Fig. 12). The national food supply per capita is decreasing (Fig. 12). This is likely due in part to Kenya's high rate of population growth, which peaked in 1981 at 3.81% and has since leveled off to approximately 2.5% (World Bank 2012). This trend, as well as the dips and spikes in available food supply, are likely influenced by a number of additional factors, including, but not limited to, changes in agricultural and trade policy that affected which crops were produced domestically and which were imported, and climatic conditions and natural disasters such as drought or floods that affected agricultural productivity. When the data are separated by the policy reforms of 1986 (Fig. 13), a clear difference can be seen between the caloric supply before and after the policy reforms were instated.

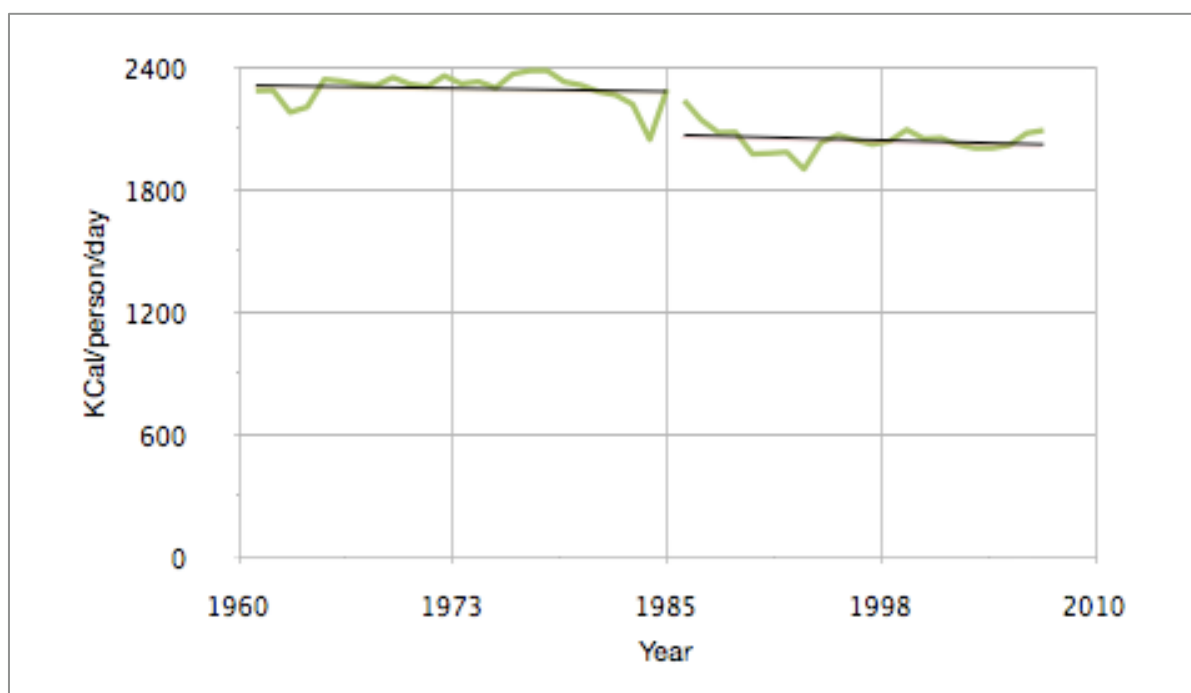


Figure 13. Caloric Supply per capita per day before and after policy reforms of 1986. Source: FAOSTAT 2010.

The caloric availability data are still well above the national Minimum Daily Energy Requirement (MDER), “the minimum dietary energy needed to maintain body-weight and perform a sedentary light physical activity taking [into] account age and sex structure of the population” (KNBS 2008), but below the Average Daily Energy Requirement (ADER) (Fig. 12). Although it is problematic that the average caloric need of the population is not met by the food supply, looking at nationwide caloric availability is unlikely to capture the complex dynamics at play in determining food security at a household level. It is probable that throughout the period depicted in Figure 12, many households did not have access to even the MDER, as found in the Food Insecurity Assessment based on the Kenya Integrated Household Budget Survey (2008).

Year	1990-1992	1995-1997	2000-2002	2006-2008
Proportion of undernourishment in population	33	33	32	33
Number of undernourished millions	8.1	9	10.6	12.4
Food deficit of undernourished population (kcal/person/day)	250	250	260	260

Table 1. Food Security Indicators. Source: FAO 2011.

The food security indicators presented by the FAO in its Country Profile of Kenya show negligible changes since 1990 (Table 1). This is likely because these are nationwide aggregate measures of food security, and they, like food supply per capita, do not capture the complexities of food security on a sub-national or household level. Regardless, the fact that the proportion of undernourished folk has not changed over the past 20 years and that the number of undernourished people in Kenya continues to grow demonstrates the fact that food insecurity remains a problem in Kenya, and the actions of the government to mitigate it have not had a significant effect on the general population. It is regrettable that we were unable to access other food security indicators or data on other scales, but in the following section we will describe the factors that account for the gap between the apparent level of food insecurity based on Figure 9 and Table 1 and the actual levels of food insecurity in the population. We hypothesize that real levels of food security vary based on other factors, such as geography and climate, natural disasters, access to roads and markets, employment status, income, household size, and gender of the head of household. For the purposes of our study, we will limit our analysis to the effects of the neoliberal policy changes as described above, in addition to the impacts of environmental factors, on the state of food security in Kenya.

Vulnerability to Environmental Hazards and an Unstable Food System

On top of the low proportion of high-potential agricultural land in Kenya (Thrupp 1999), which inherently leaves Kenya with less capacity for food self-sufficiency, Kenya is also

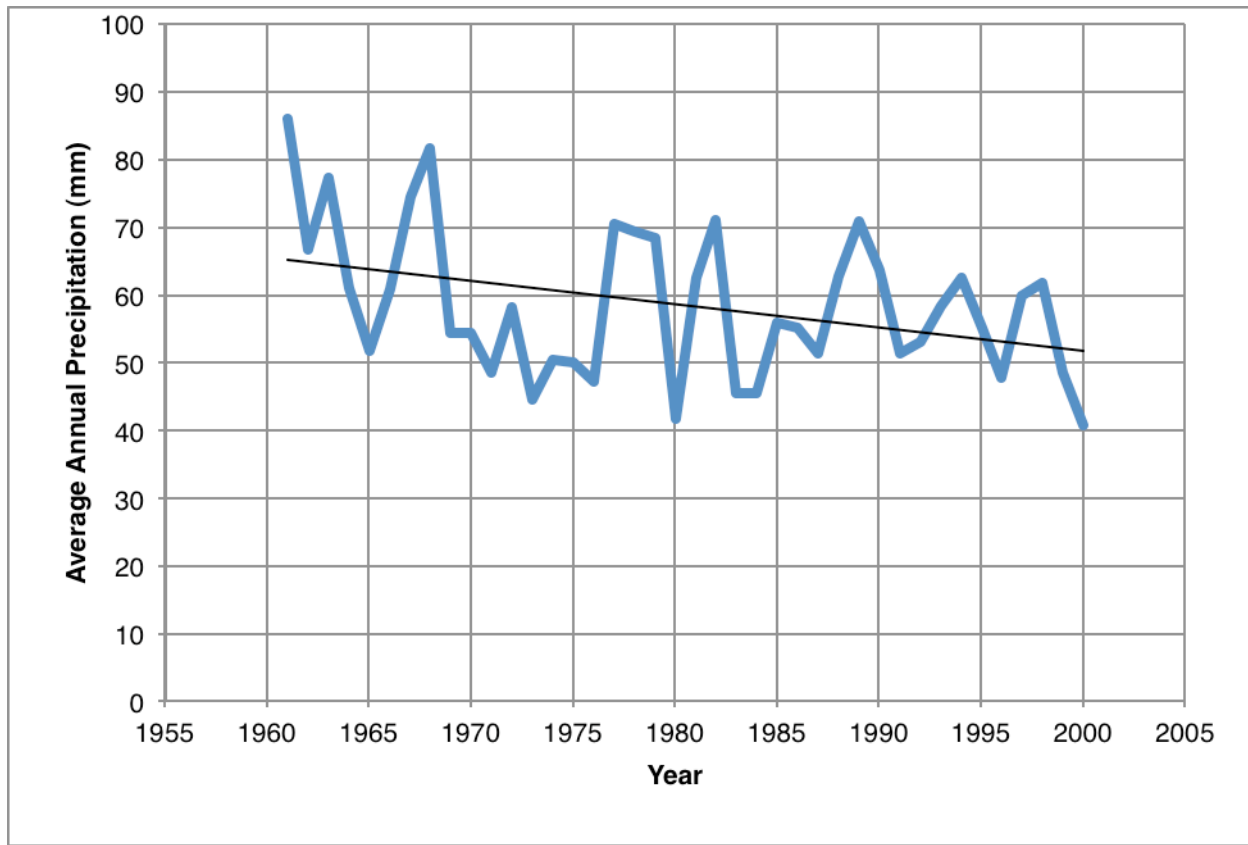


Figure 14. Average Annual Precipitation in Kenya, 1961-2000. Source: WRI 2012.

vulnerable to droughts, floods, and other climatic anomalies. Much of Kenya's agriculture is rain-fed, leaving it more susceptible to food shortages caused by low yields due to climatic variation.

In interaction with the policy reforms giving preference to export-oriented commodities, natural disasters that occurred during the same period had a detrimental effect on food security, as agricultural producers shifted production away from staple foods toward cash crops. The amount of land in tea production increased by nearly seven times between 1963 and 2008, while land in coffee production increased 2.5 times and maize production increased only 1.5 times (FAOSTAT 2010). Thus there was less of a reserve of food staples built up in case of food crisis, making the entire country more vulnerable to environmental shocks and stressors. Figure 14 depicts the average annual precipitation in Kenya, showing considerable drought in 1980, floods

in 1982, droughts in 1991, 1995, and 1997, as well as flooding caused by El Niño in 1998 (UNDP 2004). Each of these instances resulted in temporarily decreased food security; not surprisingly, crop production follows relatively the same trends as average annual precipitation (FAOSTAT 2010). It follows that each instance of climatic variation can lead to food insecurity, and that the unpredictability of the climate creates an unstable system. Further, average annual precipitation data from 1961-2000 show a downward trend, pointing to a climatic shift (Fig. 14). The unstable environmental situation may leave smallholder farmers dependent on rain-fed agriculture especially vulnerable to climate change, resulting in magnified food insecurity.

Further, the export-oriented policy framework of the neoliberal policy reforms likely led farmers to attempt to increase their production of export crops, whether by intensifying production on existing land or by expanding onto land that was not previously in agriculture. While agricultural expansion can be problematic, as much of the land not already in production in Kenya is not suitable for agriculture, intensification has its own issues. For instance, if farmers are not educated about sustainable management practices, their management decisions may further degrade already marginal land. In addition, we must consider the effects on soil and water health of agrichemicals used, sometimes without proper education about their application, in an effort to increase yields. As this land becomes more degraded, it will produce increasingly lower yields, thus leading to decreased food security. Here we see the cyclical nature of the complex interaction between the neoliberal policy reforms of the 1980s and 90s, the environment, and food security in Kenya.

Fertilizer Use and Environmental Degradation

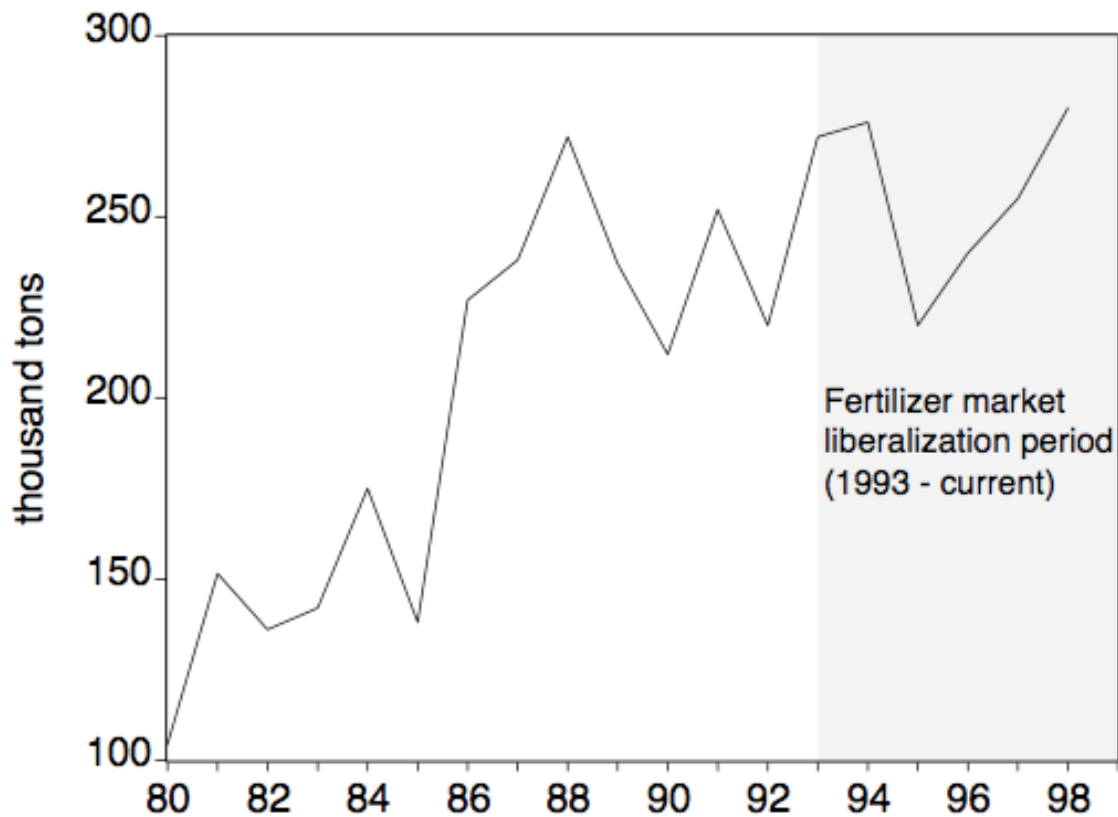


Figure 15. Trends in Fertilizer Consumption in Kenya, 1980 – 1998. Source: Wanzala et al. 2001.

Although fertilizer use can play a role in increasing yields and, some argue, increasing food security, it is well documented that fertilizer use can have detrimental environmental effects (Byrnes 1990). Despite high prices, fertilizer consumption in Kenya has been increasing since 1980 (Fig. 15). The use of fertilizer has resulted in increased yields per hectare, especially for tea (Fig. 16). Mathenge hypothesizes that this increased use of fertilizer is due to a stabilized fertilizer marketing policy, increased private sector participation, more widespread availability of fertilizer in rural areas, institutional innovations in fertilizer-seed technologies, and increased farmer education about the benefits of fertilizer (2009). Although fertilizer has the potential to increase yields, and thus food security, in Kenya, it is used more widely and more heavily

farmers of tea, an export-oriented cash crop, than by farmers of maize, a domestic food staple (*ibid*).

Tea: Kenya's Leading Export Commodity and Our Model

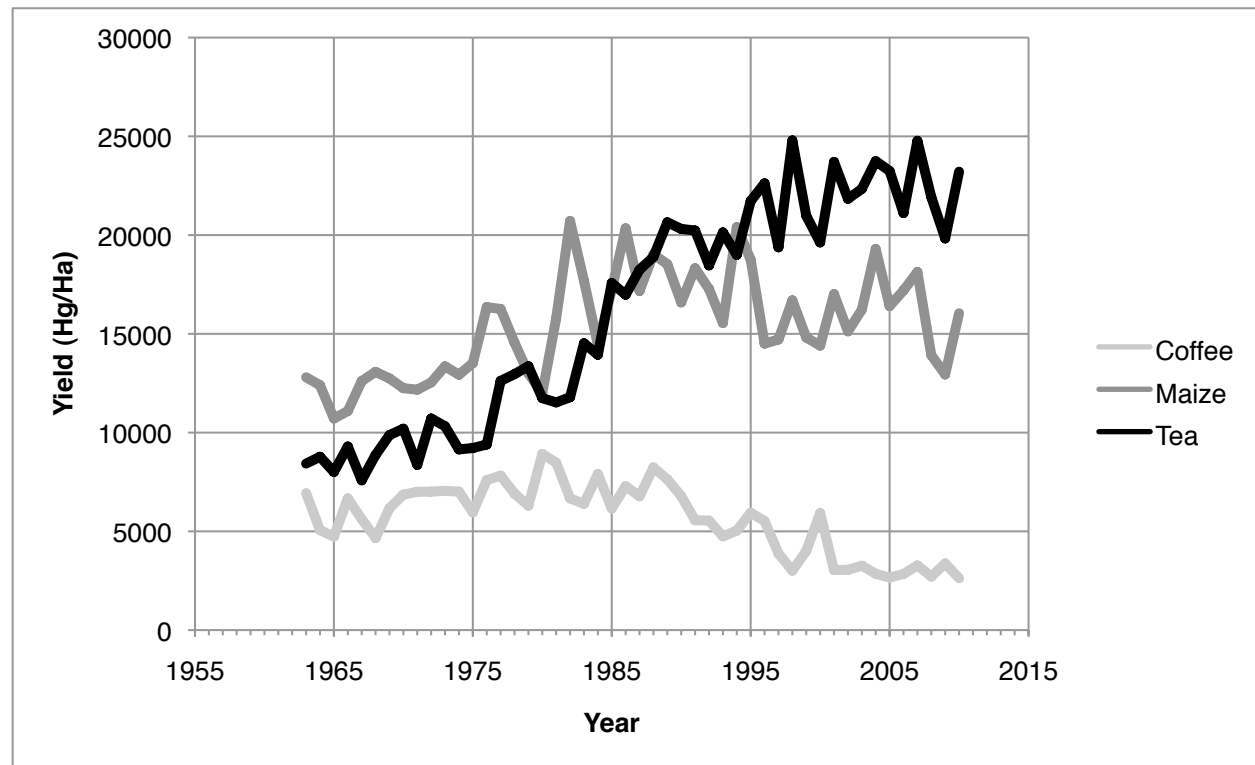


Figure 16. Yield (Hg/Ha) of coffee, maize and tea, 1963-2010. Source: FAOSTAT 2010.

In addition to expanding onto marginal lands, farmers aiming for export-oriented cash crop production shifted to crops that are, perhaps, more ecologically intensive than the food staples they had been producing. Although Kenya's top exports include tea, coffee, and other horticultural products, we will focus our analysis on tea, as both its quantity of production in tonnes and its area in production vastly exceed those of all other export commodities. In the following section, we will consider tea closely as it relates to our conceptual model, as an illustration of the effects of neoliberal policy reforms in Kenya as described by our model.

Tea plants (*Camellia sinensis*) are native to India and China, and can thus grow in similar ecological zones in other parts of the world (FAO 2007). Tea can be grown in subtropical

regions, or in tropical regions at higher elevation. It requires at least 120 centimeters of annual rainfall and year-round temperatures above 0° C (*ibid*). Tea is a perennial evergreen plant, and in some climates it can be harvested throughout the year (*ibid*). Most tea is grown on hillsides, which are vulnerable to erosion. Other environmental impacts of tea production include habitat conversion and resultant biodiversity loss, high and inefficient energy use in factories that process raw tea leaves, deforestation required to produce firewood for these processes, and the application of agrochemicals to tea monocultures, although the latter is less pronounced in African countries than in other tea-producing countries (van der Waal 2008).

Tea was first introduced to Kenya in 1903 by European settlers, and had begun to be exported to London by 1933 (van der Waal 2008). Tea cultivation was mostly the purview of European settlers until Kenya's independence in 1963, when it was extended to Kenyan estate holders and smallholders (*ibid*). Tea production has increased dramatically since then, making Kenya the number two tea exporter in terms of monetary value globally, second only to Sri Lanka (FAOSTAT 2010). Tea production thus provides jobs for millions of Kenyans and plays an important role in Kenya's economy. The converse to that benefit is that as Kenya's number one export (CIA World Factbook 2011), tea has an unequaled influence on Kenya's economy. Fluctuations in tea prices or climatic irregularities can dramatically affect its economic stability.

Since tea is a profitable export crop for developing countries in tropical and subtropical regions, world tea production has been steadily increasing over the past few decades. However, for the past ten years, world tea supply has exceeded demand, leaving the export price weak—in Kenya, it has remained stagnant for the past ten years (Gesimba 2005). Some strategies proposed to confront this problem include regulating the amount of tea that enters the market, either alone or with a coalition of tea-producing countries analogous to OPEC, or trying to promote tea

consumption in Kenya to absorb a portion of its exports (*ibid*). Unfortunately, the cost of production of tea is rising; increases in the basic wage rate, lack of available credit facilities, poor infrastructure, high costs of fuel and packaging, and new labor laws and environmental regulations will further reduce tea growers' profits (*ibid*).

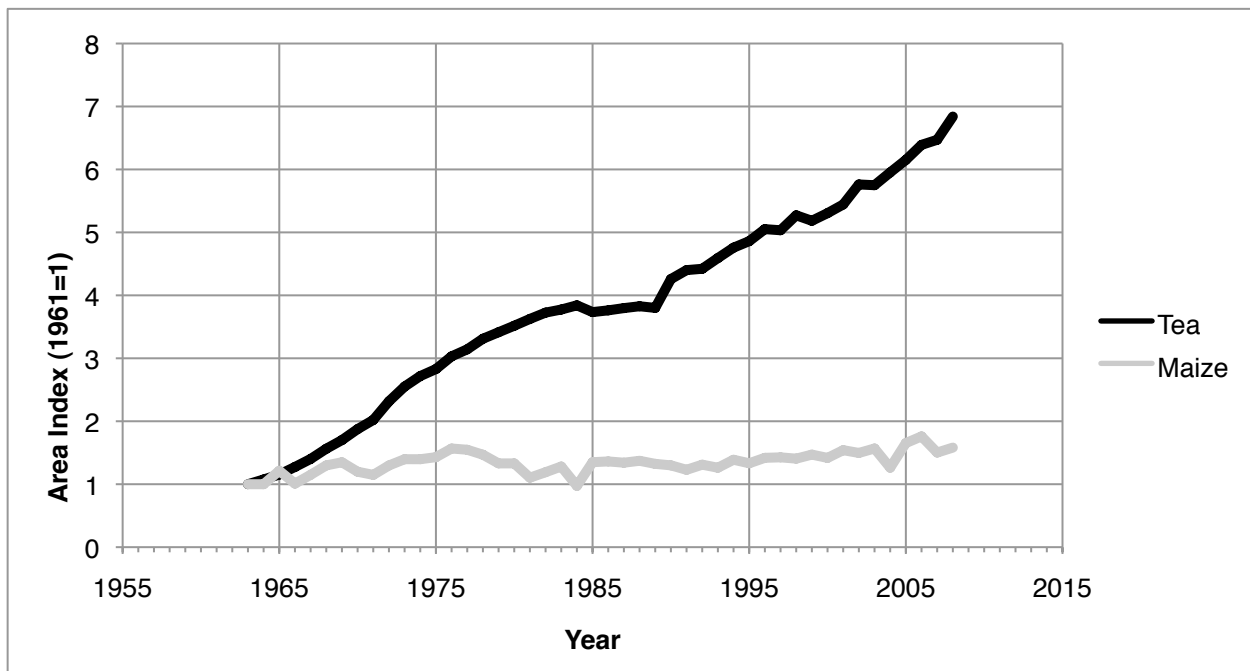


Figure 17. Area indexes (using production in 1963 as a baseline) for tea, a high-value, export-oriented cash crop, and for maize, a food staple. Source: FAOSTAT 2010.

Referring back to our conceptual model, we can see that the neoliberal policy reforms of 1986 encouraged the increased production of tea, an export-oriented cash crop. Determining whether the new land brought into production of tea was marginal would be an arduous task requiring the analysis of satellite imagery combined with ground-truthing. However, we do know that the area in tea production has increased, especially following the policy reforms of the late 1980s (Fig. 17). Although the area in tea production was already increasing before the policy reforms, we can see that the reforms did not have the same effect on the relatively small area in maize production, despite the pressures of population growth on Kenya's domestic food supply. This phenomenon leads us to believe that after 1986, Kenya's strategy shifted from focusing on domestic food self-sufficiency to production of export-oriented crops like tea and importation of food staples. This is an inherently unstable system; a reduction in the world price of tea could drastically reduce Kenya's foreign exchange capacity, and, on a household level, farmers' incomes. The dependence on export production, following our model, likely contributed to the decreased food security observed in Kenya following the policy reforms (Fig. 13). Additionally, we can see that agricultural production was intensified, as described in the previous section on fertilizer. A higher percentage of tea growers use fertilizer than farmers growing other crops, and they use more fertilizer per hectare (Mathenge 2009).

Climate Change and the Future of Food Security in Kenya

Unfortunately, the state of food security in Kenya is only expected to worsen in the coming years due to climate change. By 2020, between 75 and 250 million people in water-stressed regions are projected to be exposed to increased water stress, and yields from rain-fed agriculture have the potential to be reduced by up to 50% (IPCC 2007). Agricultural production,

including access to food, is projected to be severely compromised in Kenya and many other African countries. By 2080, an increase of 5 to 8% of arid and semi-arid land in Africa is predicted (IPCC 2007). As area affected by drought increases, so will land degradation, resulting in increased crop damage and failure, livestock deaths, wildfire risk, risk of food and water shortages, and risk of water- and food-borne diseases (IPCC 2007).

Thomas E. Downing further articulates the potential effects of climate change in Kenya:

If precipitation changes do not compensate for the warming, the impact on productivity and vulnerable socio-economic groups in the semi-arid areas could be devastating. The effects of climate change will be felt most directly by those vulnerable groups that rely on their own agricultural production for a major share of their food consumption: pastoralists and smallholder agriculturalists. For these two groups, reductions in the area suitable for maize cultivation in the order of 15 to 30 per cent in the sub-humid and semi-arid provinces would significantly increase the number of people with inadequate climatic resources for sustainable agriculture. Decreases in the growing season would also increase vulnerability as the probability of achieving adequate yields is reduced. (1992)

Now, more than ever, it is imperative for environmental organizations to learn about the state of food security in Kenya and strategize to attempt to mitigate the effects of climate change on this vulnerable region.

VIII. Discussion

Using our conceptual model, we have begun to examine the interactions between neoliberal policy reforms in the 1980s-90s, the environmental context, and the food security situation in Kenya. We have found that, although one of the implicit goals of the policy reforms of 1986 was to increase food security by improving Kenya's economic situation and increasing its foreign exchange capacity, the reforms were not successful at fulfilling this goal; the food security situation appears to have worsened during this period. We hypothesize that this is due, in part, to Kenya's inherent lack of suitable agricultural land and vulnerability to climatic

irregularities, and to the absence of recognition of these environmental limitations in the policies enacted in a push toward the liberalization of agricultural markets. We believe that these environmental conditions, and the lack of planning to account for them, contributed to the low and variable yields experienced in Kenya in the 1980s-1990s. This led to a decrease in foreign exchange capacity on the national level and a decrease in farmer income on the household level, which together resulted in decreased food security in Kenya. The push towards increased export production, alongside the continuing pressures of population growth, led to agricultural intensification and expansion onto marginal lands, which contributed to their degradation. When these lands failed to produce high yields, farmers intensified and expanded further, only continuing the cycle of food insecurity and environmental degradation. This cycle is predicted to escalate as the effects of climate change are magnified in the coming years.

X. Limitations and Avenues for Future Research

There are several limitations that define our study. First, we do not have the resources to adequately assess the exact timing of the implementation of the reform measures established in 1986. We have found widely conflicting information on this issue, and have attempted to provide as accurate a picture as possible in our study. We recognize that we likely have been unable to provide a fully accurate depiction. Similarly, we have encountered conflicting data regarding the effectiveness of the reforms. We have done our best to display our findings accurately given the sources we have had access to.

In our study, we attempt to assess the food security situation in Kenya. Unfortunately, we were only able to access very limited data on food security indicators; there is a long list of potential indicators to explore, and we were only able to look at a select few. Those that we had the opportunity to explore were nationwide, aggregate measures of food security, and thus we

were unable to analyze any food security data that took into account the complexities of food security on the regional or household level. We used our analysis of the literature to try and fill in these gaps to an extent, but the lack of quantitative data is certainly a limitation in our study.

Tackling these limitations provides various avenues for future research. Additionally, future studies could focus on the geographic variation present in the interaction between the neoliberal policy reforms and food security in Kenya, or on the demographic factors relevant to the relationship between the neoliberal reforms and food security. They could provide more background on the political context of the period, both nationally and internationally, to better evaluate the exact role that these policy reforms were meant to have on food security, and to better define what political factors may have limited this role. Studies could look at whether various agricultural technologies—such as improved seeds and mechanical tools—were affected by the reforms in terms of availability and accessibility. Studies could also use a more data-oriented methodology to make determinations about causality regarding the interaction between the reforms and food security. Given the continued high levels of food insecurity in Kenya, researchers could extend our model to look at how the neoliberal reforms have affected the food security situation in Kenya today. Furthermore, future research into the development of solutions to some of the issues we have identified and analyzed here could be very beneficial on a practical level to the governing bodies in Kenya.

IX. Conclusion

In this paper, we combined the models of Nyangito et. al, Madeley, Richardson, and Thrupp to develop a new model with which to analyze the interactions between the neoliberal policy reforms of the 1980s and 90s, the environment, and food security in Kenya. In order to test our model, we performed a historical case study analysis on Kenya. Having gained insight

into the policy reforms, food security, and the environmental situation separately, we then attempted to examine the interactions that exist between the three. We found that the neoliberal policy reforms, within the context of the environment of Kenya, have had the unintended consequence of decreasing food security. Furthermore, the agricultural tactics adopted to cope with food insecurity post-reforms have caused land degradation which will presumably only lead to more food insecurity. We believe that this was, in part, because of the insensitivity of the policy reforms to Kenya's environmental conditions. Given the projected effects of climate change on the region, we feel that future economic policy, especially relating to agriculture, must take Kenya's inherent environmental conditions into account. Furthermore, environmental organizations must act quickly in partnership with the governing bodies of Kenya in order to mitigate the effects of climate change before drastic effects ensue on the country's food security.

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